

**“DOES PROLONGED BREAST-FEEDING ENHANCE NUTRITIONAL
STATUS?:
EVIDENCE FROM GHANA”**

BY

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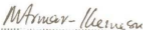
I hereby declare that this thesis is the result of my own analysis of the 1998 GDHS data carried out under the supervision of Dr. Clement Ahiadeke and Dr. Margaret Armar-Klemesu and Professor Asenso-Okyere of the University of Ghana, Legon.

All references are duly acknowledged.



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Dedication

This study is dedicated to all mothers and children of the Universe.

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Abstract

This study set out to investigate the relationship between breastfeeding and the nutritional status of children in Ghana. This stems from the fact that in spite of conflicting research findings on the benefits of prolonged breastfeeding, there is intensive breastfeeding campaign going on in the country.

The 1998 GDHS data set was used in this study. Specifically, data on breastfeeding and other child feeding practices, childhood illnesses and anthropometry as well as some background information on mothers were utilised in this study. In all, data on a total of 2108 children aged 0-3 years were analysed.

Bivariate analysis and linear regression models were used in analysing the data. Findings of the study show that almost 100% of Ghanaian children are breastfed for some time of their lives. The mean duration of breastfeeding was 19 months with mothers from urban areas and mothers with higher education breastfeeding for shorter periods than their counterparts. Other factors that significantly influenced the duration of breastfeeding included the age, educational level and employment status of mother, place of residence and type of toilet facility, morbidity especially diarrhoea and sex of household head. The study further revealed that breastfeeding beyond 18 months of age is associated with increased risk of malnutrition. (This finding is consistent with other studies from Ghana (Brakohiapa et al., 1988 and Nube and Asenso-Okyere, 1996) and other countries). The negative association between prolonged breastfeeding and nutritional status may be partially explained by the fact that children who continue to breastfeed beyond 18 months of age may be deprived of adequate qualities and quantities of supplementary foods either because of their impoverished situation or simply

because their mothers are ignorant of the need to enrich and give adequate meals to supplement breastfeeding. It is also possible that such children may not have developed good appetite for other meals owing to delayed introduction of supplementary foods.

In conclusion, the results of the findings presented in this study show that, there is some evidence to suggest that prolonged breastfeeding beyond 18 months of age in Ghana is negatively associated with increased risk of malnutrition even after controlling for confounding variables. The policy implication from this study is that even though the promotion of breastfeeding is in the right direction, there is the urgent need for health workers to emphasize the need for mothers to give their children adequate qualities and quantities of supplementary foods in addition to breast-milk. Mothers should also be made to consider breastfeeding a secondary source of food (energy) for their children after the first six months of age. This will encourage the children to develop better appetite for supplementary foods from which they derive their daily energy requirement.

These findings were however, limited by the fact that the GDHS data was inadequate in investigating the relationship between breastfeeding and nutritional status. Secondly, the findings are also limited by methodological errors in the study.

In view of these limitations, it is suggested that further research be carried out using different methodological approaches. Further studies can also be carried out to assess the impact of prolonged breastfeeding on maternal health and nutritional status so as to ensure that extended breastfeeding is not done at the expense of mothers' health.



CHAPTER ONE

BACKGROUND, SCOPE AND PURPOSE OF THE STUDY

1.1 Introduction

Infant feeding practices are important determinants of the nutritional status of children in general. Studies have shown that breast-feeding is one of the most commonly and widely practiced feeding pattern among infants not only in Ghana but world-wide. The Ghana Demographic And Health Survey (GSS) and Micro International (MI) report of 1999 shows that about 97% of mothers breast-feed their infants for some time in an infant's life. Breast-feeding has also been shown to be beneficial to the health and nutritional status of all children by promoting normal growth and providing protection against infection. Breast-fed infants have also been shown to carry lower risks of mortality as against non-breast-fed infants (WHO/UNICEF, 1990). This means by which nature meets the physiological, psychological and intellectual needs of infants may in turn be affected by certain factors (Helen and Charles 1994). These include: urbanization/Modernization, social isolation of parents, household composition, women's status in society, traditional beliefs and practices, women's educational background and their exposure to violence. These factors can influence a mother's ability to breast-feed for desirable periods, thus affecting an infant's growth and development process. In situations where mothers are unable to effectively breast-feed their infants, the immune system of the infants may become compromised and this may result in malnutrition. According to the GDHS, 1998, 39% of under five (years of age) mortality in Ghana is attributed to mild to severe malnutrition.

Also, comparing malnutrition rates of children 3-35 months old (in Ghana) with other Sub-Saharan African countries between the years 1986-1996, the DHS shows that though the problem of being under-weight and stunted are common among children under five in these regions, their levels in Ghana are quite high (28% and 26% respectively). This state of affairs however changed for the better by 1998 when the DHS (1992-1998) reported that the rate of stunting in Ghana had dropped from 26% to 20% in 1998 while the level of under-weight dropped by a margin of 2% from 27% to 25% within the same period. Wasting, according to the same source, however, deteriorated by 2% from 11% to 13%.

It can be deduced from the above that, though there have been some decreases in child malnutrition in Ghana, these have not been significant, hence there is more room for improvement. The purpose of this study is to find out the extent to which the duration of breast-feeding impacts positively on the nutritional status of infants.

1.2 Statement of the Problem

Malnutrition is still a serious public health problem in Ghana in spite of extensive breast-feeding promotion campaigns in the country. The Ministry of Health (MOH), in collaboration with the World Health Organisation (WHO), has among other programmes initiated the Baby Friendly Hospitals throughout the country aimed at promoting breast-feeding exclusively for the first six months and continued breast-feeding with supplementation into the second and third years of an infant's life.

Although breast-feeding is encouraged during the child's second year of life and beyond, there is a lot of debate on whether prolonged breast-feeding is always associated with improved child

nutrition. Studies from Ghana (Brakohiapa, 1988; Nube and Asenso-Okyere, 1996), Ethiopia (Thoren, 1998) and Botswana (1998) found that breast-feeding beyond 12 months of an infant's life is associated with malnutrition. On the other hand, a study in China (Taren, 1993) showed that the nutritional status of infants receiving prolonged breast-feeding was positively related to their length of period of breast-feeding. Other studies from Bangladesh e.g. (Briend, 1989), and Burkina-Faso (Cousens, 1993) found no relationship between prolonged breast-feeding and the nutritional status of children.

This debate with regard to the effects of prolonged breast-feeding has necessitated this study to assess whether there is an optimal age at which breast-feeding improves child's nutritional status, and beyond which breastfeeding is no longer important so far as the nutritional status of infants is concerned.

1.3 Objectives of the study

The overall objective of this study is to determine the optimal age at which prolonged breast-feeding is beneficial to infants' nutritional status in Ghana. To attain this objective, the following specific objectives were proposed:

1. To examine the various ages at which infants are weaned off the breast in Ghana;
2. To examine the factors that affect the duration of breast-feeding;
3. To examine the relationship between prolonged breast-feeding and malnutrition;
4. To examine other factors that influence the nutritional status of infants who are breast-fed beyond their first year of life in Ghana.

1.4 Relevance of the study

Findings from this study will help policy makers to determine whether the problem of malnutrition lies with prolonged breast-feeding or a combination of other factors that need to be addressed. This is partly because extensive campaign on breast-feeding has been carried out in the country of late, but very little or nothing on when breast-feeding of children should be stopped.

CHAPTER TWO

2.1 LITERATURE REVIEW

2.1.1 Factors affecting the Duration of breastfeeding

A review of available literature on breastfeeding and other infant feeding practices suggest that a number of factors influence a mother's choice to breastfeed for long or short duration. Armstrong (1994) emphasises some of the factors that can either support or interfere with breast-feeding among infants. He cautioned however, that, every woman after birth has the potential resource of breast milk for two years or more and the control of this milk should be left solely with the mother and child. Some of the factors he mentioned as influencing a mother's ability to breast-feed for longer or shorter periods are the absence of family and social support, tradition of giving low household food priority to women and allowing others to decide on what they should do with their time, energy and what babies are fed on (women's lack of status and power) and the introduction of breast-milk substitutes. Others include family size, social isolation of parents e.g. through migration, women's years of schooling and early supplementation, poor positioning and ineffective suckling as well as the inadequate treatment of breast problems among others.

Many other research studies have been carried out in the area of breastfeeding worldwide. Trussell et al. (1992) carried out some studies on the trends and differentials in breastfeeding behaviour with World Fertility Survey (WFS) and Demographic and Health Survey (DHS) data in 14 developing countries. Their findings reported a general increase in the duration of breastfeeding in seven of the countries studied. Decreases were reported in five with conflicting reports from the other two countries. In other words, while some countries were experiencing improved duration of breastfeeding, others experienced declining rates. The other major finding

from this study was on breastfeeding duration by educational attainment and place of residence. The study found that, breastfeeding duration was always longer among rural women than urban women. However, there was also the tendency for breastfeeding to decline with increased educational attainment.

2.1.2 Duration of Breastfeeding and Nutritional Status of children

The duration of breastfeeding is very important because of its impact on children's nutritional status. Omen and co-workers (1954) suggested that breast milk formed a valuable complementary source of proteins, fats, calcium and vitamins for infants. However, it has also been found to be associated with clinical malnutrition in Indonesia and anthropometric malnutrition in Kenya if it is continued after the child is 12 months of age.

Victora et al.(1984) also reported a similar association between prolonged breastfeeding and malnutrition in Brazil. The study included 802 children aged 12-36 months. An analysis of nutritional status against duration of breast-feeding produced a U-shaped Curve of weight for age, length for age and weight for length showing that children who were breastfed for 3 to 6 months tended to have better nutritional status than those who were breastfed for durations of either below 3 months or beyond 6 months. In other words, prolonged breastfeeding was found to be associated with malnutrition even after controlling for possible confounding variables such as age, sex and birth-order number.

In another study by Brakohiapa et al. (1988), the association between prolonged breastfeeding and malnutrition was again confirmed. They studied 202 children who visited a hospital in Accra and came to the conclusion that continued breastfeeding beyond 18 months of age was associated with malnutrition. To prove that the conditions (malnutrition) of their subjects were due to

prolonged breastfeeding, 15 malnourished children who were still breastfeeding were studied to assess the effects of weaning on their nutritional status. Before weaning which involved the complete cessation from breast milk, it was realized that the protein and energy intakes of all the malnourished children were about half those of five (5) normal children. Ten of the malnourished children were then weaned off the breast while five were made to continue breast-feeding. At the end of the study, it was realized that the intake levels of the ten children who were weaned off the breast rose to those of the normal children. On the contrary, in the case of the five children, who continued to breastfeed, their intake levels remained the same. The conclusion drawn from the study was that prolonged breastfeeding can reduce food intake and thus predispose children to malnutrition. Eighteen months was, therefore, proposed as the weaning age for children in Ghana and other developing countries.

Briend and Bari (1989) investigated the association between prolonged breastfeeding, nutritional status and survival in a cohort of 1087 children aged between 12 and 35 months. These children were monitored monthly for a continuous period of two years. The results from the study revealed that the mean weight-for-age of breast-fed children was 69.6% (s.d: 9.3%) compared with that of non-breast-fed children of 70.6% (s.d: 10.7%). This confirmed that after one year of age, breast-fed children tend to be more malnourished than non-breastfed children. In terms of survival, however, the study showed that the risk of dying after adjusting for age was six times higher in non-breast-fed, malnourished children than in similarly malnourished, breast-fed children. Brien and Bari, therefore, concluded that prolonged breast-feeding should be encouraged in communities with a high prevalence of malnutrition.

Nube and Asenso-Okyere (1998), in looking at the effects of prolonged breastfeeding on the nutritional status of children used the data set from the Ghana Living Standard Survey of

1987/1988 and 1988/1989. Their results revealed that infants who were breastfed into their second year and beyond have lower nutritional status than those who were fully weaned at the same age. They concluded that in environments with relatively lower levels of infection and satisfactory post weaning child-feeding practices, prolonged breastfeeding can directly or indirectly contribute to lower nutritional status. These findings confirmed those made by Omen et al almost three decades earlier in 1954.

In comparing data from demographic and health survey collected from 19 countries, Caulfields et al (1996) indicated that differences did exist in the nutritional status of children who breastfed for shorter or longer duration. Their analysis showed that infants aged 12-18 months and beyond from non- Sub-Saharan African (S.S.A) countries who still breastfeed were lighter and shorter than those no longer breastfed. Among infants from SSA countries however younger children (≤ 12 months) who are still breastfed tend to be lighter and shorter than those who have stopped breastfeeding. However, as the duration of breastfeeding continues, these differences diminish. In other words older breastfed infants from non-SSA countries are lighter and shorter than those who have stopped breastfeeding. The contrast is true for children in SSA where younger still breastfed infants are lighter and shorter in weight and height than those who have stopped breastfeeding. However, the differences, according to the authors, diminish with age.

The association between breastfeeding and malnutrition was further investigated by Sit et al (2001) among Chinese-Canadian infants aged 9-12 months of age. Their findings revealed that a longer duration of breastfeeding was associated with lighter infants, while a longer duration of feeding of infant formula was associated with heavier infants. They also found that where infants are introduced to complementary foods by age 4 months, they tended to have higher weights and weights for height z-scores than infants introduced to complementary foods at a latter age.

In contrast to these findings, Taren and Chen (1993), found a positive association between prolonged breastfeeding and nutritional status in Hubei, China. In their study, a total of 21 children were observed to assess the effect of prolonged breastfeeding on their nutritional status. Results from this study indicated that children breast-fed for more than 12 months had a greater weight for age, length for age and weight for length scores than children who had stopped breastfeeding before their first birthdays. They also discovered that breast-feeding beyond 18 months of age was also beneficial to growth. Cousens et al (1993) confirmed the findings by Taren and Chen with their study in Burkina Faso. Their findings suggest that prolonged breastfeeding offered substantial protection against malnutrition and that in cases where infants were malnourished, mothers are forced to stop breastfeeding. Simondon et al (2001) in their article "Breast-feeding is associated with improved growth in length but not in weight" had contrasting results from that of Caulfields and co-workers. Simondon et al. found from their study of 100 Senegalese toddlers that, prolonged breastfeeding improved linear growth and not weight for age. Their study indicated that infants who breast-feed for long duration had better weights for age during the second and third years of life. They also found from their study that, the association of stunting to long duration of breastfeeding stems from the fact that such infants were initially of lower height for age. They therefore concluded that the higher prevalence of stunting among prolonged breast-fed children is explained completely by the fact that such infants were already malnourished rather than being malnourished as a result of prolonged breastfeeding. In other words, stunted children tend to breast-feed for prolonged periods rather than the reverse (i.e. prolonged breastfeeding resulting in stunted growth).

But the question asked by some scholars is, are there any biological reasons why breast fed children should be more malnourished after one year of age than fully weaned children of the same age, with supplementation? Studies from Bangladesh (Brown et al. 1982) showed that, breast milk has the highest energy density of all foods consumed by children of this age. The protein content of breast milk also has the highest biological value compared to other foods (Jelliffe and Jelliffe, 1979). Studies from Cote d'Voire by Lauber and Reinhardt (1979) further state that during extended lactation, the composition of protein remains constant.

The above studies confirm that, there is no biological reason why prolonged breast-feeding of children beyond one year of age should result in their being more malnourished than their counterparts of the same age who are weaned off the breast. According to Dualah and Henry (1989), studies that associated prolonged breast-feeding with malnutrition, failed to collect data on the frequency of breast-feeding, volume of breast milk taken, or even the adequacy of other foods given to the child. Hence breast milk should not be terminated in an attempt to improve child's feeding behaviour. Dualah and Henry also dismissed Brakohiapa's proposal as "misleading and unwise" under the conditions still prevailing in Bangladesh for example. They cited a study from Bangladesh and reported that breast-feeding was found to decrease the risk of children dying from diarrhoea-related infections well into their third year of life. Based on these findings, Dualah and Henry concluded that supplemented breast-feeding could have a favourable impact on survival compared to full weaning, even when it results in less than optimal nutritional status. Hence poor nutritional status should not be the only criteria for terminating breast-feeding in children.

Findings by Brakohiapa that weaned children who are 18 months and above experienced improvement in their energy and protein intake has also been questioned by Northrup and Dipko

(1990). These authors questioned whether this same increase in energy and protein intake would have occurred if the children had not been under observation. They also wondered whether the controlled children (those who were still breast-feeding) were encouraged to eat in the same way as those who were weaned off the breast. In other words, will the same results be realized if the same children were not studied but only followed a standard procedure.

2.1.3 Other Factors Affecting Nutritional Status

The causes of wasting and stunting changes with age. According to the ACC/SCN, UNICEF (1989), at birth maternal factors including nutrition and whether the infant was full term determine infants' weight and length. During the first 6 months, breast-feeding practices coupled with maternal health and mothers ability to provide care, are major determinants. After 6 months to about 2 years, however, breast-feeding coupled with weaning practices and exposure to infectious diseases plays a crucial role in the infants' nutritional status. Poverty rather than breast-feeding and weaning practices plays a more important role in the child's nutritional status after 2 years of age.

2.1.4 Measuring Nutritional Status

"Nutritional status" and "malnutrition" have been used synonymously (ACC/SCN, UNICEF, 1989). In assessing the nutritional status of any population or individuals, anthropometric measures are usually used (GSS) in relation to age for the purpose of assessing growth and body mass: stunting (shortness), wasting (thinness) and under-weight.

Children are said to be stunted when their height-for-age z score is less than -2 standard deviation of the median based on the National Centre of Health Statistics (NCHS) and the World Health Organization (WHO) reference population. Stunting represents past or chronic under nutrition

and indicates failure on the part of the infant to grow adequately in height in relation to its age.

Stunting is usually caused by a long period of inadequate food intake.

The second nutritional indicator, wasting, is a situation where infants' weight -for-height Z score is also less than -2 standard deviations of the mean based on the NCHS/WHO reference population. It is a condition where the infant fails to gain weight adequately in relation to his height. Wasting represents recent under-nutrition.

The third measure of nutritional status is underweight, which is defined as a situation of low weight for age. Children are said to be underweight when their weight- for- age Z score is less than -2 standard deviation of the median.

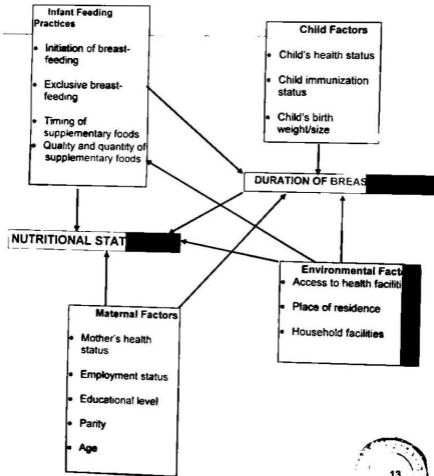
2.2 Conceptual Framework

Breast-feeding, the only activity that satisfies an infant's need for food, health and care, has been identified as an important component for maintaining the nutritional status of infants and children.

In their conceptual framework for care and nutrition of young children, the UNICEF-Cornell presentation papers emphasized the importance of optimal breast-feeding to an infant's nutritional status and development. They defined optimal breast-feeding of infants to include exclusive breast-feeding up to the age of six months, followed thereafter by the introduction of complementary foods. Breast-feeding should also be continued or sustained well into or beyond the second year of life with increasing amounts of complementary foods (Food and Nutrition Bulletin, 1995). However, the age at which breast-feeding should be discouraged is not mentioned.

Figure 1 below shows a diagram on child nutritional status. It is an adoption of the conceptual framework developed by the UNICEF-Cornell Colloquium. The framework tried to demonstrate some of the factors that effect the child's nutritional status.

Figure 1. Conceptual Framework of Child's Nutritional Status adopted from Unicef-Cornell Colloquium (Food and Nutrition Bulletin, 1995)).



The various literature reviewed in this study reveal that the duration of breastfeeding and the nutritional status of children are affected by a combination of factors as shown in Figure 1. The figure shows that there are some linkages between child feeding practices, maternal factors and factors relating to the child and its environment on the one hand and the duration of breastfeeding and nutritional status on the other hand.

The figure demonstrates that, proper child feeding practices such as early initiation of breastfeeding, exclusive breastfeeding up to 4-6 months of age as recommended by the WHO, the timely introduction coupled with adequate quantities and quality of supplementary foods enhances the nutritional status of children. Also, where the introduction of complementary foods are delayed, the duration of breastfeeding may be affected and this can impact negatively on a child's nutritional status.

Secondly, factors such as child's health, immunization status and birth weight can affect both the duration of breastfeeding and nutritional status. The literature shows that, children who are ill or already malnourished as a result of past events are most likely to be breastfed for prolonged periods and this can eventually affect nutritional status.

Thirdly, access to basic household facilities, health facilities and place of residence are also important determinants of the duration of breastfeeding and nutritional status. For instance, with the on-going education on breastfeeding, mothers who have access to basic health facilities are more likely to make informed decisions about their child feeding practices and this ultimately affects nutritional status.

Lastly but not the least, Figure 1 demonstrates that maternal factors such as mother's health, age, educational level, employment status and parity (number of children ever born) also affect the duration of breastfeeding and nutritional status.

In a nut shell, Figure 1 demonstrates that child feeding practices, maternal factors and factors relating to the child and its environment do affect the duration of breastfeeding and the nutritional status of children.

3.0. SOURCES OF DATA AND METHODS

3.1. Sources of Data

The main data source for this study was the 1998 Ghana Demographic and Health Survey carried out by the Ghana Statistical service (GSS) in collaboration with Micro- International Inc. The primary objective of this survey was to provide current and reliable data on health and demographic indicators that are essential for policy makers and planners for social and national development.

3.2. Type of Data.

To enable the GSS to provide updated estimates of these important demographic and health indicators, the survey collected data that covered the following areas: **fertility, family planning, childhood mortality and child health, maternity care, breast-feeding and nutrition, HIV/AIDS and STDS** as well as **women's status in society**.

For the purpose of this study however, data collected on breast-feeding and nutrition were used in order to realize the objectives of this study.

3.3. Sampling Design

To enable the GSS to collect data representative of the whole country, a two- stage stratified sampling design was adopted. Using the Enumeration Areas (EAs) created by the 1984 Population census 400 EAs were selected in the first –stage using systematic sampling with probability proportional to size. Of these 400 Eas, 138 were urban while 262 were rural. This was followed by a complete household listing in all the 400 EAs nation wide to provide another

sampling frame for the second stage selection of households. Having counted the number of households in each EA to constitute another sampling frame, 15 households from each of the EAs (except in the Northern, Upper East and Upper West regions) were selected during the second stage. In each of these three northern regions however, the number of households was increased to 20 order to obtain an adequate number of households to provide reliable estimate of key demographic and health variables .The sample in those 3 regions were however weighted to adjust for over-sampling. A total of 6,375 households were selected in the second stage nationwide to be interviewed. Of these 6,375 households, a total of 6,566 individuals were interviewed. Out of this total, 4970 were women interviewed from each household while 1,596 were interviewed from every third household.

3.4 Relevant aspects of the GSS Data to this Study

The relevant aspects of the GSS data that relates to this study are contained mainly in the kind of information collected in the women's questionnaire in the following areas:

- Respondents background characteristics;
- The reproduction history;
- Pregnancy and breastfeeding history;
- Immunization and health;
- Height and weight of mother and child; and
- Husband's background and women's work.

Information collected in relation to the above areas are relevant in answering the objectives the study sets out to investigate. The advantage in using these data are that it provides certain variables which relate directly to this study. For instance, information was collected on the

duration of breast-feeding, which is considered as the dependent variable in this study. Also the anthropometric measurements of the children in addition to other independent variables collected are all vital in assessing the nutritional status of Ghanaian children and establishing scientifically, factors that affect infants' nutritional status in Ghana.

3.5. How Data were collected and measured

Respondents (mothers) who were selected for the study were mothers who had given birth in the last three years preceding the survey. The respondents were asked questions on their backgrounds such as their age, marital status, educational background and work status and place of residence. In relation to infant feeding practices, mothers were asked detailed questions on how they fed their children. Mothers were asked whether they had ever breast-fed their infants, if they did, how soon after birth was breast milk initiated. Mothers were also asked whether they were still breast-feeding and for those who responded in the negative they were asked about the duration they breast-fed their infants for, among other questions. Also asked were questions relating to their pregnancies and antenatal care, where the child was born, whether the mother had normal or, caesarian delivery, weight of child after delivery, and post-natal care. Mothers were also asked about the immunization status of their children and whether such children experienced any of the following illnesses within the last two weeks prior to the survey: fever, cough, cold, and diarrhoea. They were also asked about the type of treatment given to the child. Lastly, the anthropometric measurements of all the children in this category and those of their mothers were taken to assess their nutritional status.

It is important to note that a total of 2108 children had their anthropometric measurements taken and these are the only infants included in this study.

3.5.1. Dependent (Out come)Variable

The dependent variable in this study is the duration of breast-feeding. That is the length of period children are breast-fed. This period can vary from a day to as long as three years and over depending on both mother and child as well as environmental factors. In order to make analysis of the data easier the duration of breast-feeding has been grouped into the following categories.

0-6 months: At birth the natural occurrence is that mothers produce breast-milk which satisfies the nutritional needs of the new born child. Within the first few hours, the ability of the mother to put the child to the breast, offers the child the opportunity to be fed with colustrun which serves as the first immunization to the child. Thereafter, breast-feeding is recommended to continue exclusively for the next 4-6 months. The introduction of complementary food at this stage puts the child at a high risk of infection and illness. For various reasons however, most mothers do not go by this recommendation and so supplementary feeding starts earlier than this recommended age.

7-12 months. The WHO recommends that the introduction of other foods apart from breast milk should start after six months but this should be done in addition to breast milk. The major determinants of nutritional status here is the amount of complementary foods given to the child in addition to breast milk. At this age special meals in semi-solid form are introduced to the child.

13-18 months. After one year of age infants should rely heavily on complementary foods, even though breast-feeding still forms part of their diet. This is also the stage when most infants would have started moving about and may start eating foods by themselves. The risk of infection through ingestion of contaminated foods, liquids etc. is increased. It is also recommended that at this age breast feeding should be ceased since it leads to malnutrition ((Brakohiapa, 1998). Nube and Asenso-Okyerere (1996) also found in their study that the prevalence of malnutrition is highest among infants in the age group 13-18 months who are still on the breast milk than infants who are weaned off the breast at the same age.

19-24 months. A majority of children are weaned off the breast between the ages of 18 months and two years. Their main sources of energy and nutrients are other foods. Here the major determinants of the nutritional status of the children are the quality and quantity of meals consumed and the type of environment they live in.

25 months and above. By the end of the second year of life, most infants in Ghana are weaned off the breast and their main sources of nutrients are from other foods. The few who continue to be breast fed at this age do so as a source of comfort rather than as a means of satisfying hunger. However, infants who rely mainly on breast milk at this stage rather than other meals tend to have lower nutritional status than those who are weaned off the breast at the same age.

3.5.2. Independent Variables

These are variables that affect the duration of breast-feeding and consequently the nutritional status of infants. They are grouped into direct (or main), intermediate and background variables.

3.5.2.1 Direct or main variables

These are variables that impact directly on infants' nutritional status as a result of certain endogenous characteristics pertaining to the mother at the birth of the child. They include the following:

Birth weight: The normal birth weight for a newly born infant is 2500 grammes and above. Infants born with a low birth weight or who are small for gestational age (i.e. less than 2.5kg or 2500g) are vulnerable to under-nutrition and poor growth. This is partly because they are more susceptible to disease and this can affect their food intake and thus make them prone to malnutrition.

Holland (1987) found in his study that infants who are born with lower birth-weights stand a higher risk of dying than those who are born with the minimum weight.

Antenatal Attendance: Antenatal care can have a direct impact on infants' nutritional status. This is due to the fact that attendance of ante-natal clinic can prevent low birth weight, birth complication, poor foetal and maternal health and at the same time providing mother with valuable information as to the best way to care for the new born infant. These have a long-term positive effect on the growth of the child. Expectant mothers who do not obtain any ante-natal care stand a much greater risk of bringing forth babies with deformities and ailments or are less nourished. They are also likely to have less information on proper infant feeding practices including exclusive breast-feeding. This can predispose the infants to malnutrition.

Mothers, who fail to make the requisite minimum of four ante-natal visits during pregnancy, put their babies at risk of not developing healthily. This unhealthy condition can hinder the infants' ability to feed properly and adequately, thus exposing them to malnutrition.

It is recommended that the minimum number of antenatal visits a pregnant woman can make is 4. Expectant mothers who are able to make four or more antenatal visits during pregnancy stand a better chance of having healthier babies. They are also likely to practice proper infant feeding and thus have better nourished infants.

3.5.2.2. Intermediate Variables

These are variables within the environment of the growing infant as well as certain characteristics of the mother that indirectly could affect infants' nutritional status.

Age of mother at birth: It has been found that mothers who are under twenty years of age tend to have less healthy children. Younger mothers (under 20 years) are not physically mature and may be still dependent on their parents for their livelihood. Mothers under 20 years of age may not also have the support of their partners and this may limit their ability to care adequately for themselves and their children. The result is that mothers are not well nourished and this can impact negatively on their children's nutritional status.

It is assumed that between the ages of 20-34 years women are in their right physical, psychological and mental frame to have healthier and normal babies. They are also more likely to have partners (whether married or living together) who may help in the care of the infants. Mothers in this age group are likely to have some kind of employment which increases households' resources to provide care for the growing infants and enhance their ability to attend ante-natal care facilities.

Mothers who are over 40 years on the other hand turn to develop certain hormonal changes that affect the unborn foetus health. Mothers at this age are also physically weak and again this

impacts negatively on the health of the baby. The effects of these factors are that babies born to women in this age group tend to breast feed for shorter duration and if they can not afford quality nutritious food for their growing children, the latter's health and nutritional status is hampered.

Nutritional status of mother

Mothers with low Body Mass Index(BMI): The nutritional status of the mother has a significant impact on her infants' nutritional status. This is because where the mother is not well nourished, she can not adequately breast feed her infants and this will in turn impact on the infants growth and health.

Mothers who are ill: The ability of a mother to give adequate care including breast feeding to infants depends partly on the health status of the mother. Mothers who are ill may not have the strength to breast feed adequately their infants. In some cases they are advised to stop breast-feeding the infants at very early stages since their breast milk is likely to be contaminated. This is likely to impact negatively on the infant's nutritional status.

Place of birth

Health facility (government, private, maternity Home etc.): Births that take place in health facilities are more likely to be given the best of care than those who are born outside health facilities. Also, mothers who had their babies in health facilities may have attended some prenatal care and are more likely to initiate breast-feeding soon after birth, practice exclusive breast feeding for the recommended period and have longer duration of breast-feeding. Such children are likely to be nutritionally better than those born outside health facilities.

on health facility (home, TBA): Infants born outside a health facility may not be given the necessary medical care at birth. They may also be given water and other traditional concoctions, which may put them at a greater risk of infection and ailment. Also, breast milk may not be

initiated soon after birth, and infants may not also enjoy the benefits being exclusively breast-fed due to traditional beliefs and practices. The results of the above is that the infants are prone to minor ailments and their nutritional status is affected.

Number of times child ate food yesterday. It has been recognized that beyond six months of age breast-milk alone is insufficient to sustain infants' normal growth (Cousen et. al, 1993). A causal link has been established between inadequate supplementation and malnutrition. To this effect, adequate supplementation in addition to breast-milk is highly recommended for the healthy growth of the child (WHO/ CDD/ SER, 1991). Infants who receive less than four meals a day may not be receiving adequate food supplementation and this can result in wasting.

It has been recommended that the minimum number of times infants should eat other meals in a day is four (Armstrong, 1995). Failure to meet this recommendation can affect the child's nutritional status negatively. It is also assumed that children who do not take in adequate amounts of other meals tend to breast-feed for longer duration.

Immunization status of child (measles)

Infants who are vaccinated against diseases such as measles are less likely to be malnourished than those who are not. This is because children who are not vaccinated stand a greater risk of falling ill than children who have been vaccinated. It is also postulated that vaccination can also reflect quality of care and access to health services. Infants who have access to these facilities and a better chance of being breast-fed for longer duration (due to the health talks from the health facilities) and therefore better nutritional status.

Type or form of birth/delivery. Infants who are of caesarean birth may be disadvantaged when it comes to their nutritional status. This is partly because a caesarean section impacts negatively on the health of the mother during the first few weeks after birth. The inability of the mother to feed the baby adequately owing to ill health can have negative effects on the child's health.

Mothers who give births the normal way tend to have the strength to breast-feed adequately, to give the child a good start for growth. Infants of such births tend to grow better than those born of caesarean birth.

Also, infants of multiple births (twins etc.) tend to have lower nutritional status than those born of single births. They also tend to breast-feed for shorter duration. This is because in the first place, infants born of multiple birth tend to have lower birth weight than those born singly. Secondly, breast-feeding more than one infant at a time from the same breast-milk may not be adequate for the two or more competing infants. Also, twins may put undue pressure on the mother and this can affect the mother's nutritional status.

Infants born singly are likely to be of normal weight or better, they do not also have to compete for their mothers' milk with other infants and may also have all the attention they need from their mothers. This factor makes them better nourished than infants born of multiple birth.

birth order number (parity). The birth order number of a child may have some nutritional and health implications on them. It is assumed that first and second order children stand a better chance of being breast-fed for longer duration and also have better nutritional status. This can be explained by the fact that mothers with the first or two children generally have greater vitality and energy than mothers with three, four, five and more children. Such mothers also have less social and economic responsibilities than the latter. As such, the nutritional status of first and second order number infants is likely to be better than those of third or higher order infants.

As the number of children increase in a household, the mother's ability to care adequately for all the children is reduced especially in the case of low income households who tend to have limited financial resources (assuming the older children are alive). It is also assumed that though by the third or fourth delivery the mother may not be as physically fit as during the time of her first or second delivery, she is aided by her experience in child care to take good care of her younger children. This can result in better nutritional status of the infant.

Mothers who continue to have children beyond four births do not only put themselves at risk, but that of their infants as well. In the first place, the mother's vitality and energy to carry the infant to full term is low. This may result in low birth weight and unhealthy births. Secondly, such mothers also have greater economic and social responsibilities and therefore their ability to provide adequate care to their infants is hampered.

Occurrence of illnesses

The health status of an infant also impacts on its nutritional status. Cousens et. al (1991) in their study found a positive link between malnutrition and the prevalence of fever. The possible

explanation might be that infants' appetite for food falls when they have fever and this has negative effect on their intake of food.

Like fever, diarrhoea or dysentery has also been associated negatively with malnutrition. In this case too the negative link was revealed in the study by Cousens et al (1991). Diarrhoea causes weakness and therefore hinders the ability of the child to eat adequately.

Place of residence

Rural: Infants born in rural areas are more likely to have lower nutritional status than those born in urban centres. This is partly because most rural women are less likely to attend antenatal care (either because the facilities are lacking or most mothers can't afford to pay). Also due to the high poverty levels in the rural areas, maternal nutrition is poor during pregnancy and this can result in low birth-weight, which can also impact negatively on nutritional status. The GDHS (1993) report that mothers in rural areas reported more small and underweight babies than mothers in urban areas.

Urban: Infants who are born and live in urban areas are more likely to be better nourished and hence have better nutritional status because of their exposure to health facilities, good drinking water, better sanitary facilities and mother's exposure to a variety of nutritious foods for the child.

Sex of child. Sex differentials have been observed to have effects on infants' health and nutritional status. While in some societies the treatment of infants differs by sex, Holland (1987) thinks that sex differentials in death rates for instance are attributed to endogenous cases.

In this study, Holland found out that female infants of every age had higher survival rates than male infants. Trussell and Hammerslough also confirmed that endogenous mortality factors for males are higher but exogenous mortality factors for females are more. This, according to them, is due to differential in feeding practices with males having the advantage over the females.

Genetically, the female new born, because of hormonal make up has a higher survival rate than male new born up to the age of 5 years. In some societies however because of male preference the female babies are discriminated against during feeding and this makes the females prone to malnutrition than the males.

Source of Drinking water Some sources of drinking water are exposed to contaminants and thus have negative effects on child nutritional status. Holland (1987) found no significant inverse relation between the availability pipe borne water and the rate of infant mortality. Access to safe water is a prerequisite for the control of diarrhoea and other diseases that affect the nutritional status of infants.

Non-safe source of drinking water tend to put infants at greater risk of infections especially diarrhoea because they are likely to be contaminated.

Electricity/ Refrigeration. The availability of electricity and refrigeration can improve the health and nutritional status of infants. For instance, households with refrigeration can preserve food for longer periods than those without this facility. The implication of this is that households without refrigeration tend to store foods (especially for babies) in flasks, so the food can not be preserved for long. Such households tend to have children who are less nourished than households with refrigeration. Access to electricity can also mean an opportunity to own and use a refrigeration in one's household and hence increasing the chances of better nourished children.

Type of toilet facility: It has been hypothesized that the availability of the type of sanitary facilities has profound effects on infants' health status especially during the period when supplementary foods are introduced to the child. Households with modern facilities create a more healthy environment free of contamination for the healthy growth of infants. Trussell and Hammerslough (1983) found in their study that at the age of 3-6 months (when most infants are introduced to complementary foods) the presence of modern sanitary facilities exert the strongest negative effects on the risk of deaths on infants. The absence of a modern (flush) toilet facility puts households at greater risk of contamination and low hygiene. Such households also encourage infants to defecate in chamber pots which, when left exposed can be a source of contamination especially to infants. The result is that infants are exposed to diarrhoea and other infectious diseases. The total absence of a toilet facility, like the non-flush facility also put infants at greater risk of getting diarrhoea because of the indiscriminate nature of disposing faecal material around the community and in some households.

3.5.2.3. Background Variables

These are variables that tend to inform mothers and equip them with the skills to care adequately for their children.

Sex of House Hold Head. Children from female-headed households tend to be weaned off from breast milk earlier than those from male headed households. This is because of the greater economic and social responsibility faced by the female -heads. Male household heads tend to exert pressure on their partners against rushing to wean off their children. The implication is that, the nutritional status of children from male-headed households tends to be higher than those from female-headed households.

Mother's educational level. Education has been found to have a negative association with the nutritional status of children. Trussell and Hammerslough (1983) are of the view that increased education of mothers can be a proxy for increased command over resources, resulting in higher quality clothing, shelter, nutrition and health. Caldwell (1979) also emphasised that female education is important because it helps to break traditional norms, which in one way or the other impacts negatively on nutrition.

No form of formal education: Even though mothers with no education tend to breast-feed for longer duration, they may also tend to have less nourished children. Such mothers may not have the knowledge of the advantages of exclusive breast-feeding, may not be able to read prescriptions in order to administer medication correctly to their children etc. Non-educated mothers are also likely not to attend antenatal and post natal care and these can impact negatively on their children's nutritional status.

Primary education: Mothers with primary education are likely to have better nourished children since they are likely to be in some form of paid employment. They are also likely to attend antenatal clinics and may have some knowledge of proper child caring practices.

Secondary education/ Higher: Trussell and Hammerslough (1983) found in their study that, children of the most highly educated mothers have lower mortality than children whose mothers have comparatively little or no education at all.

Mother's employment status

Unemployed /Housewife: These are women without skills for employment or their partners are not gainfully employed. Mothers with the latter status are more likely to breast-feed for longer duration because they have fewer economic and social responsibilities. The former, on the other hand, may breast-feed for long duration but may not be able to afford adequate and nutritious

supplementary food for the growing children. This can have negative implications for the child's nutritional status.

Employed away from home: Secondly, women who are in full formal employment may breast feed for shorter periods but because of their economic strength still have better nourished children. Also, mothers who work away from home tend to breast-feed for shorter periods and are more likely to have children with lower nutritional status than mothers who work from home.

Self-employed and work from home: Mothers who are self-employed and work from their homes may have ample time to adequately breast feed for long duration. They may also have the time needed to provide all the necessary care for infant growth and development. Their ability to work can also increase household resources needed for the healthy growth of children.

Partner's Education

The educational status of the father also has an effect on the child's nutritional status. This means education can also be a measure of one's social status as well as one's exposure to basic nutritional knowledge.

Lack of Education/Only Primary Education: Partners with primary or no education tend to have less nourished children than those with higher level of education. In the first place, such partners may not be well informed about proper child feeding practices and hence not in a position to advise their wives on such matters. Secondly, such partners may not also be in well-paid jobs and hence their inability to provide or support their partners to adequately care for their children. The results of the above is that children from such parents tend to have lower nutritional status.

Secondary Education/Higher Education : Where the fathers have had more than primary education, they are more likely to be in better employment and hence able to afford the basic necessities. They are also more likely to support their partners to adequately care for child (including the infant). Trussell & Hammerslough (1983) found a positive association, between father's education and child's nutritional status. Chaudhury (1993) is also of the view that fathers with higher education are more responsible towards the needs of their children, and hence stand a better chance of being healthy and more nourished.

Father's Employment Status

Like education, the employment status of fathers has also been closely linked with child's nutritional status.

Employed: Fathers who are gainfully employed can increase their household resources and therefore tend to raise better-nourished children than unemployed fathers.

Unemployed: Unemployed fathers may lack the necessary support needed by their partners to provide adequate care for the children. This may put pressure on their partners to work for longer hours to take care of the family. In effect, children of such parents may tend to breast feed for shorter duration and may not have adequate supplementary foods, thus leading to lower nutritional status.

Current marital status of mother:

Never married/ Widowed/ Divorced: Single parents are faced with the stress of earning a living and carrying out all responsibilities of child up-bringing. These responsibilities can limit a parent's ability to give out her best for her child.

Married/ Living Together: Mothers who are married or live together with their partners can have the support of their partners in caring for their children and thus reducing her economic and

social work load and creating more time for caring for her children. Where mothers receive the support of their partners, they tend to have children with better nutritional status.

Not Living Together: The absence of a father figure in caring for a child may affect child's nutritional status either positively or negatively. On one hand, where the father remits the mother regularly and there is periodic exchange of visits, the mother is better able to provide adequate care for infant because of her emotional stability and access to additional resources. On the other hand, where a mother does not enjoy the above, her ability to give of her best is hampered. The result is that children from such homes have lower nutritional status than the former.

3.6. Data Analysis

Several analytical tools have been used to analyse the relationship between breast-feeding and the nutritional status of children.

Cossen et al (1993) employed conditional logistic regression in the analysis of their data to estimate the odd ratios for the association between prolonged breast-feeding and clinical malnutrition.

Victoria et al (1984) used multiple logistic regression analysis and the likelihood ratio test as the two main statistical tools to analyze their data. Their analysis indicated that, the prevalence of malnutrition was smallest in those infants who breast-fed for 3-6 months, but after this age, nutritional status appeared to be worse in those infants who breast-fed for longer duration. Their results also showed that children, who were still on breast milk at the time of the survey, presented a significantly higher prevalence of lower weight for length of child than those who were completely weaned off breast milk at the same age.

Nube and Asenso-Okyere (1996) also analyzed their data using bivariate and multiple regression analysis. Bivariate analysis was used to assess the relationship between mode of feeding at the

time of the survey and anthropometric Z score by age group. Multiple regressions were also used to assess the significance and magnitude of the effects of selected variables on the nutritional status of the infants. Their findings indicate that, infants who continued to breast-feed to their second and third years of life had lower nutritional status than those who were weaned at the same age.

Kathryn et al (1992) also analyzed their data using a two-factor analysis of variance model. This was used to compare weight, length, head circumference, Z score, and growth velocity between breast-fed and formula-fed infants.

In this study, the SPSS soft-ware programme was made use of. Bivariate analysis was used to examine the relationship that exist between the dependent and independent variables after which a chi-square analysis was performed to determine the level of significance between the variables. Linear regression models were then applied to significant variables determined by the chi-square to show the relationship between the duration of breast-feeding and infants' nutritional status. The estimation of the coefficients were done using the following models:

$$\text{Weight} = b_0 + b_1\text{Age} + b_2\text{BF} + b_3\text{Age} * \text{BF} + b_4\text{Age}^2 + b_5\text{Age}^2 * \text{BF}$$

$$\text{Height} = b_0 + b_1\text{Age} + b_2\text{BF} + b_3\text{Age} * \text{BF} + b_4\text{Age}^2 + b_5\text{Age}^2 * \text{BF}$$

Where: b_0, \dots, b_5 are the coefficients, Age = age of child in months, BF = duration of breastfeeding in months

3.7. Limitations of the data

In spite of the advantages in using the GDHS data, there are a few shortcomings. The data did not collect adequate information on the quantity and quality of other meals infants consumed the previous day. Mothers were only asked about the number of times infants ate other foods apart from breast milk the previous day without making reference to the quality and quantity of the food.

4.0 FACTORS AFFECTING THE DURATION OF BREASTFEEDING**4.1. Bivariate Analysis**

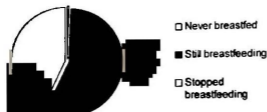
This chapter presents the findings of this study along the lines set for the objectives of the study. First, a general description and frequencies are presented as well as the average means of the duration of breast-feeding. This is followed by a bivariate analysis to assess the relationship between the duration of breastfeeding and some background variables defined in Chapter Three of this study. Finally, a chi-square analysis is applied in order to assess the level of significance of these variables.

4.1.1. Breast-feeding status among children in the study

From the data, a good majority of children in the study are fed breast milk at some time in their lives. Out of a total of 2,108 children in the study, only eleven (0.5%) children had never been breast-fed, 1,186 (56.3%) were still being fed on the breast at the time of the survey and 899 (46%) had stopped breast-feeding at the time of the study. Figure 2 gives a graphical presentation of the breast-feeding status of infants in the study.

Figure 2: Breast feeding status of infants in the study

Breastfeeding status of infants



For children who had stopped breast-feeding Table I gives a break down of the length of period they breast fed.

Table I: Duration of breast-feeding of "children weaned off the breast".

Duration of breast-feeding	No. Of Chn.	%
0-6 months	23	2.6
7-12 months	117	13.0
13-18 months	250	27.8
19-24 months	388	43.2
25 and Above	121	13.5
TOTAL	899	100.0

Table I shows that 43% of the children in the study were weaned off the breast between the ages of 19 and 24 months. They are followed by children in the age group 13 and 18 months (27.8%). Almost the same percentage of children are weaned off between the ages 7 and 12 months as those weaned off at the age of 25 months and above (13.0% and 13.5% respectively), with only 2.6% being weaned off the breast at age 0 and 6 months.

Table 2 gives the statistics of children who were still being breast-fed at the time of the survey. From the statistics, children who were in the age-group 0-6 months constituted the largest group (almost 29%). They are followed by children in the age group 7-12 and 12-18 months (24.7% and 24.3% respectively). Fourteen percent (14.0%) are in the age group 19-24 months and 8.0% in the age group 25 months and above.

Table 2: Age group of "children still breast-feeding "

Age group of still B.F infants	No.	%
0-6 months	343	28.9
7-12 months	293	24.7
13-18 months	288	24.3
19-24 months	167	14.1
25 and above	95	8.0
Total	1186	100.0

4.1.2. Mean Duration of Breast feeding

The survey results indicate that children are weaned off the breast at different ages. However, the mean duration of breast-feeding in this study is 19 months. There is no difference in the mean duration of breast-feeding with regard to the sex of the children. However, the mean duration of breast-feeding for children whose mothers had no formal education is 21 months and that for children whose mothers have had tertiary education is as low as 13 months. Also, households with male heads had a higher mean duration of breast-feeding (20 months) than female-headed households (18 months). Furthermore, urban households recorded a lower mean duration of breast-feeding than rural households. It is also found from the data that the mean duration of breast-feeding for normal-growing children is 19 months while that for stunted children is 21 months and that for wasted infants is 18 months.

4.2. Factors affecting the duration of breast-feeding

To assess the factors that influence the duration of breast-feeding among children in this study, the length of period of breast-feeding for children who had stopped breast-feeding at the time of the survey are analysed. The following section describes the results of a bivariate analysis of the relationship between the duration children in the study breast-fed and some independent variables described in Chapter Three.

4.2.1. Duration of breastfeeding and age of mother:

The total number of children who had stopped breast-feeding at the time of the survey was 899. Of this number, 2.6% breast-fed for a duration of 0-6 months, 13% for 7- 12 months, 27.8% for 13-18 months, 43.2% for 19-24 months and 13.5% breast-fed for over 24 months.

The data also indicate that mothers in the age group 20-39 years formed the majority in the sample (80%) as against those who were above 40 years (18%) and below 20 years (2%).

A bivariate analysis indicates that 58% of mothers less than 20 years of age wean off their children at age 19-24 months while 42% and 46.4% of mothers aged 20 -39 and 40 and above respectively wean off their children at the same age. The data also show that while 21% of mothers aged 40 years and above wean off their children from the breast after 24 months, only 12 % of mothers in the age group 20-39 years and none (0%) of the mothers less than 20 years old do so at that age. Also, none of the mothers less than 20 years of age weaned off their children from the breast at age 0-6 months as compared with 2.8% and 1.8% for mothers in the two age groups 20-39 years and 40 years and above respectively. This relationship between a mother's age and the duration of breast-feeding is significant ($P < 0.005$). Table 3 gives a break down of the statistics of the relationship between the duration of breast-feeding and mother's age. The conclusion drawn from this relationship is that children whose mothers are aged less than 20

years are less likely to be weaned off the breast at ages as early as 0-6 months and as late as 25 months and above. On the other hand, children with mothers older than 20 years are more likely to breast-feed for as long as 25 months and above and at the same time more likely than mothers less than 20 years to be weaned off the breast at ages as early as 0-6 months.

Table 3: Relationship between duration of breastfeeding and mother's age

Duration of breastfeeding	Age group of mothers							
	Less than 20 yrs.		Btwn 20-39 yr		40 yrs and above		Total	
	Actual No.	%	Actual No.	%	Actual No.	%	Actual No.	%
0 - 6	0	0	20	2.8	3	1.8	23	2.6
7 - 12	3	21	91	12.7	23	13.9	117	13.0
13 - 18	3	21	219	30.5	28	16.9	250	27.8
19 - 24	8	58	303	42	77	46.4	388	43.2
24 +	0	0	86	12	35	21.0	121	13.4
Total	14	100.0	719	100.0	166	100.0	899	100.0

4.2.2. Duration of breastfeeding and Type of place of residence

With regard to the impact of a child's place of residence on its duration of breast-feeding, (i.e. rural versus urban), the analysis shows that while 49% of children in rural areas tend to breast-feed for a longer duration (of 19-24 months), the proportion for infants in urban areas is 27.8%. On the other hand, while 41% of urban children breast-feed for 13-18 months, the corresponding percentage for rural children is 22.5. This indicates that rural children stay longer on breast milk than urban children. This point is further emphasized by the fact that while 16% of rural children continued to breast feed beyond 24 months, only 7% of urban children do so. This, according to a chi-square test, is significant ($P < 0.005$).

Table 4: Duration of breastfeeding and type of place of residence

Duration of breastfeeding (months)	Type of place of residence					
	Urban		Rural		Total	
	Freq.	%	Freq.	%	Freq.	%
0 - 6	9	3.4	14	2.1	23	2.6
7 - 12	54	20.8	63	9.8	177	13.0
13 - 18	106	41.0	144	22.5	250	27.8
19 - 24	72	27.8	316	49.3	388	43.2
24 +	18	7.0	103	16.0	121	13.4
Total	259	100.0	640	100.0	899	100.0

4.2.3. Duration of breast-feeding and mother's education

A large proportion of infants in the study had mothers who had had up to secondary education (42%). They are closely followed by mothers who did not have any form of education (38%) with only 1% having tertiary education.

In relation to the duration of breast-feeding, however, 48% of children whose mothers had no form of formal education or only up to primary education breast-fed for as long as 24 months while 37% and 18% of children with mothers up to secondary and tertiary education levels respectively breast fed their children up to the same age (i.e.24 months). This relationship, according to a chi-square test, is very significant ($P < 0.005$). The statistics also show that while the majority of mothers with up to secondary education wean off their children at the ages of 19-24 months, the majority of mothers with tertiary education tend to do so at the ages of 7-12 months. Table 5 gives a break-down of this statistics

Table 5: Duration of breast-feeding and Mother's Educational Level

Duration of breastfeeding (months)	Education of the mothers				Total (%)
	No Education (%)	Primary (%)	Secondary (%)	Tertiary (%)	
0 - 6	2.9	1.8	2.3	9	2.6
7 - 12	9.7	15.6	13.8	45.4	13.0
13 - 18	17.9	27.7	39	22.2	27.8
19 - 24	48	48.1	37.4	18	43.2
24 +	21.4	12.3	7.3	0	13.5
Total	100.0	100.0	100.0	100.0	100.0

4.2.4. Duration of breastfeeding and source of drinking water:

The sources of drinking water for respondents in this study varied but 202 of them (22%) obtain their drinking water from boreholes, 21% from taps located in their neighbours' homes, 20% (179) from rivers and streams. Only 13% of the respondents have their drinking water from taps within their own compounds.

In relation to the duration of breast-feeding, Table 6 shows that mothers who obtain their drinking water from boreholes, rivers and streams, tend to wean off their children when they are aged 19-24 months. On the other hand, children of parents with access to tap water tend to be weaned off the breast earlier (i.e. at the age of 13 -18 months). Table 6 gives the breakdown of this relationship between the duration of breast-feeding and source of drinking water.

Table 6: Duration of breast -feeding and Source of Drinking Water

Duration of breastfeeding (months)	Source of Drinking Water							Total (%)
	Piped Water (%)	Well Water(%)	Bore -hole (%)	River /Dam (%)	Rain water(%)	Water Tanker(%)	Spring (%)	
0-6	3.5	2.3	1.4	2.4	0.0	0.0	0.0	2.6
7-12	21.6	9.5	6.4	8.9	0.0	0.0	33.3	13.0
13-18	42.3	27.7	16.8	18.7	33.3	40.0	11.1	27.8
19-24	27.8	50.0	51.4	52.2	33.3	40.0	44.4	43.2
24+	4.5	10.3	23.7	17.5	33.3	20.0	11.1	13.5

This relationship between the source of drinking water and the duration of breastfeeding is

significant ($P < 0.005$).

4.2.5. Duration of breastfeeding and type of toilet facility

The type of toilet facility owned by respondents in the survey varied from having no access to a toilet facility to owning a flush toilet facility. Majority of respondents, however, had access to the traditional ventilated pit toilet (65%) while 29.4% had no access to any toilet facility at all, with only 5.6% having access to a modern toilet facility (i.e. flush toilet).

In relation to the duration of breastfeeding, respondents who owned the traditional pit toilet or no facilities at all tended to wean off their children from the breast at the age of 19-24 months while those with modern facilities tended to do so do earlier (13-18 months). This relationship, according to a chi-square test, is significant ($P < 0.005$).

Table 7: Duration of breast -feeding and type of toilet facility

Duration of breastfeeding (months)	Type of facility			Total (%)
	Flush toilet (%)	Traditional Ventilated Pit (%)	No facility (%)	
0 - 6	4.0	2.5	2.2	2.6
7 - 12	28.0	12.6	10.9	13.0
13 - 18	42.0	29.0	22.3	27.8
19 - 24	22.0	45.4	42.0	43.1
24 +	4.0	10.2	22.0	13.4
Total	100.0	100.0	100.0	100.0

4.2.6. Duration of breastfeeding and electricity:

Only 37% of the respondents had access to electricity. The data shows that while a majority (50.6%) of children who had no access to electricity tended to be weaned off the breast at ages of 19-24 months, only 30.6% of children with access to electricity were weaned off the breast at the same time. Also, while as much as 17.8% of children who had no access to electricity continued to be breast-fed beyond 24 months, only 6% of children who had access to electricity went through the same experience. The relationship between the duration of breastfeeding and access to electricity is very significant ($P < 0.005$).

Table 8: Duration of breast-feeding and Access to Electricity

Duration of breastfeeding (months)	Access to electricity					
	No	%	Yes	%	Total	%
0 - 6	10	1.7	13	3.9	23	2.6
7 - 12	52	9.2	65	19.5	117	13.0
13 - 18	116	20.5	133	39.9	249	27.8
19 - 24	286	50.6	102	30.6	388	43.2
24 +	101	17.8	20	6.0	121	13.5
Total	565	100.0	333	100.0	898	100.0

4.2.7. Duration of breastfeeding and access to refrigeration

Access to some form of refrigeration is limited to less than 15% of the sample population in the survey. This indicates that over 80% of respondents had no access to refrigeration. For children who had no access to refrigeration, a large proportion (46.4 %) tended to be weaned off the breast at the age of 19-24 months while those with refrigeration tended to be weaned off the breast-feed earlier (13-18 months) as shown in Table 9. From the Table, it is also observed that, while 15.1% of children who had no access to refrigeration continued to breast-feed beyond 24 months of age, only 3.1% of children with refrigeration did the same. This relationship is significant ($p < 0.005$).

Table 9: Duration of breast-feeding and Access to Refrigeration

Duration of breastfeeding (months)	Access to refrigeration				Total	
	No	%	Yes	%	Total	%
0 - 6	17	2.2	6	4.7	23	2.6
7 - 12	88	11.4	29	22.8	117	13.0
13 - 18	191	24.7	59	46.4	250	27.8
19 - 24	358	46.4	29	22.8	387	43.2
24 +	117	15.1	4	3.1	121	13.5
Total	771	100.0	127	100.0	898	100.0

4.2.8. Duration of breastfeeding and sex of Household Head

Female headed households represents 35% of the sample of households, while 65% are male headed households. In relating the sex of household head to the duration of breast-feeding, the data reveals that more children from both groups of households are breastfed between 19-24 months. However, more children from female headed households breast-feed beyond 24 months (15.5%) than male headed households (9.5%) as shown in Table 10. A chi-square analysis shows a significant relationship ($P < 0.005$).

Table 10: Duration of breastfeeding by Sex of Household Head

Duration of breastfeeding (months)	Sex of household head					
	Female		Male		Total	
		%		%		%
0 - 6	13	2.2	10	3.1	23	2.6
7 - 12	62	10.5	55	17.5	117	13.0
13 - 18	161	27.5	89	28.3	250	27.8
19 - 24	258	44.1	130	41.4	388	43.2
24 +	91	15.5	30	9.5	121	13.5
Total	585	100.0	314	100.0	899	100.0

4.2.9. Duration of breastfeeding and birth order number of child.

The birth order number of children ranged from 1 to 13. This was however grouped into 3 categories as 1-2, 3-4 and 5 and above order numbers. More children were of 1st and 2nd order birth (39%), this is followed by 5th and more order birth (35%). Third and 4th order births constituted 26% of the children. This birth order number of children did not however influence the duration a child was breast-fed ($P > 0.005$). A majority of children born in any of these categories breast-fed for between 19-24 months as shown in Table 11.

Table 11. Duration of breast-feeding and birth order number of child

Duration	Birth order number						Total	%
	1 & 2		3 & 4		5 & above			
		%		%		%		%
0 - 6	15	4.3	1	0.4	7	2.2	23	2.6
7 - 12	49	13.8	33	14.3	35	11.1	117	13.0
13 - 18	113	31.9	71	30.8	66	20.9	250	27.8
19 - 24	145	40.9	97	42.1	146	46.3	388	43.2
24 +	32	9.0	28	12.1	61	19.3	121	13.5
Total	354	100.0	230	100.0	315	100.0	899	100.0

4.2.10. Duration of breastfeeding and sex of child

There was gender balance in the recruitment of children in the study while the males constituted 50.5%, the females constituted 49.5%. In relation to the duration of breast-feeding, the gender of a child did not influence its length of breast-feeding. Most children from both sex categories tended to breast-feed up to 24 months before they were weaned. The relationship between the duration of breast-feeding and sex of child is therefore not significant.

4.2.11. Duration of breast-feeding and antenatal visits

With regards to the frequency of ante-natal visits made by pregnant mothers, close to 70% of mothers made at least 4 ante-natal visits, 20% made between 1 and 3 visits and 9% did not make any visits. The rest (1%) could not tell the number of visits they made.

In relation to whether the frequency of ante-natal visits influenced the duration of breast-feeding of children, the data indicate that out of a total of 388 children who breast-fed for between 19-24 months, majority (248) were children whose mothers attended at least 4 ante-natal visits, 101 were children whose mothers attended between 1-3 visits and only 33 were children whose mothers did not make any visits to the ante-natal clinic. Six mothers in this category could not however tell of the number of visits made. The relationship between duration of breast-feeding and ante-natal visits according to a chi-square analysis proves to be significant ($P < 0.005$).

4.2.12. Duration of breastfeeding and place of delivery:

About 52% of children in this sample were born outside a health facility while 48% were born in a health facility. With regard to the place of birth in relation to the duration of breast-feeding, 46% of children born outside health facility breast-fed up to 19-24 months, 19.5% breastfed for 13-18 months, 19.5% also breastfed beyond 24 months, with 12.5% and 4.1% breastfeeding for 6-12 months and 0-6 months respectively. On the other hand, the percentage of children born in a

health facility who breastfed for 19-24 months .37.2% breastfed for 13-18 months and 13% breast-fed for 6-12 months. Only 7.2% of children born in a health facility were weaned off after 24 months. These statistics indicate that children born outside a health facility tend to be breast-fed for longer duration than those born in a health facility. A chi-square analysis reveals the relationship to be significant ($P < 0.005$).

table 12: Duration of breastfeeding and Place of delivery.

Duration of breastfeeding (months)	Non-health facility	%	Health facility	%	Total	%
0 - 6	19	4.1	13	3.0	25	2.6
7 - 12	58	12.5	59	13.7	117	13.0
13 - 18	90	19.5	160	37.2	250	27.8
19 - 24	213	46.2	175	40.6	388	43.2
24 +	90	19.5	31	7.2	121	13.5
Total	461	100.0	430	100.0	899	100.0

4.2.13. Duration of breast-feeding and Type of delivery (Caesarean and Normal Delivery)

The relationship between a normal or caesarean delivery and the duration of breast-feeding is not significant ($P > 0.005$). The data shows that only 4% of children in the study were caesarean births

4.2.14. Duration of breast-feeding and size of child at birth/ birth weight

Out of a total of 899 children who had stopped breast-feeding, only 218 (or 24.2%) had their weights recorded at birth. Of this number, 204(93.6%) were of normal birth weight (i.e. 2.5 kg or better) and only 14 (or 6.4%) were underweight (less than 2.5 kg). Table 13 indicates that while a large proportion (35.7%) of children with birth weight less than 2.5kgs breast-fed for 19-24 months, 45.1%, constituting a large proportion of children with birth weight 2.5kgs or more breast-fed for 13-18 months. The table also shows that while 21.4% of children with low birth weight breast-fed beyond 24 months, only 3.9% of children with normal birth weight breast-fed

for the same duration. In other words a large number of low birth weight children tend to breast-feed for longer duration than infants born of normal birth weight.

Table 13: Duration of breast-feeding and weight of child at birth

Duration of breast-feeding (months)	Less than 2.5kgs	2.5kgs and above	Totals
0-6	0 (0%)	7 (3.4%)	7 (3.2%)
7-12	4 (28.6%)	32 (15.7%)	36 (16.5%)
13-18	2 (14.3%)	92 (45.1%)	94 (43.1%)
19-24	5 (35.7%)	65 (31.9%)	70 (32.1%)
24+	3 (21.4%)	8 (3.9%)	11 (11.5%)
Total	14 (100%)	204 (100%)	218(100%)

Even though there seem to be some relationship between birth weight and the duration of breast-feeding, a chi-square analysis shows this relationship to be insignificant.

For children whose birth weight was not recorded at the time of birth, mothers were asked to describe the sizes of their children at birth. Out of the 899 responses given, 249 (27.7%) gave the size of their children as average, 235 (26.1%) said larger than average, 106 (11.8%) were smaller than average and 106 (11.8%) were very large. Only 19 (2.1%) said their child was very small and 2 (0.2%) could not tell. In relating the size of the children at birth to the duration of breast-feeding, not much difference exists in their duration of breast-feeding.

4.2.15. Duration of breastfeeding and Time of initiation of breast-feeding

Due to maternal, cultural and environmental factors, mothers tend to initiate breast-feeding at different times after birth. This study shows that, majority (46%) of mothers initiate breast-feeding more than 24 hours after birth, 29% within one hour of birth and 25% within 24 hours of birth. In relating the time of initiation of breast-feeding to the duration of breast-feeding, a bivariate analysis did not show any significant relationship (Table 14).

Table 14: Duration of breastfeeding and Time of initiation of breast-feeding

Duration of breastfeeding (months)	Within 1 hour	%	Within 24 hours	%	More than 24 hours	%	Total	%
0 - 6	9	3.4	4	1.7	10	2.4	23	2.6
7 - 12	46	17.5	29	13.0	42	10.1	117	13.0
13 - 18	88	33.5	65	29.1	97	23.4	250	27.8
19 - 24	89	40.0	97	43.4	203	49.0	388	43.2
24 +	30	11.4	28	12.5	63	15.2	122	13.5
Total	262	100.0	223	100.0	414	100.0	899	100.0

4.2.16. Duration of breast-feeding and Mother's Occupation.

Mothers of children in the study are mostly in to selling or sales (37.3%) and agriculture (31.7%). The rest are skilled manual-13.4, unemployed-10.9%, services-4.6%, professional-1.9% and clericals-0.2%. The data also indicates that majority of children whose mothers are in agriculture tend to be weaned off from the breast at ages 19-24 months while 18% continue to breast-feed to their 24th month. Table 16 shows the relationship between the duration of breast-feeding and mother's occupation. A chi-square analysis shows this relationship to be significant ($p < 0.005$).

Table 15: Duration of breast-feeding and Mother's Occupation.

Duration of breast-feeding (months)	Not Workin g(%)	Professio nals (%)	Clerical (%)	Sales (%)	Agric (%)	Servic es(%)	Skill manual(%)	Total (%)
0-6	4.1	0	0	1.8	2.8	2.4	3.3	2.6
7-12	12.2	29.4	50	13.1	8.4	29.3	15.7	13
13-18	23.5	35.3	50	35.8	17.9.	36.6	28.1	27.8
19-24	40.8	35.3	0	39.4	52.6	26.8	40.5	43.1
24+	19.4	0	0	9.9	18.2	4.9	12.4	13.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

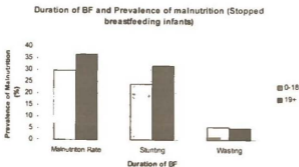
In summary, from the above analysis, the duration of breast-feeding is shown to be influenced significantly by a number of factors ($p < 0.005$). These factors include, the age, educational level and employment status of mother, place of residence, morbidity and sex of household head. Other significant factors are source of drinking water, type of toilet facility, access to electricity and refrigeration, frequency of antenatal visits and place of delivery. However, the sex of child, birth weight, twin birth and time of initiation of breastfeeding did not have any significant influence the duration of breastfeeding ($p > 0.005$).

5.0. RELATIONSHIP BETWEEN THE DURATION OF BREAST-FEEDING AND NUTRITIONAL STATUS

5.1. Relationship between the duration of breast-feeding and Malnutrition Rates

To describe the relationship between children's nutritional status and the length of breast-feeding, data on the prevalence of stunting and wasting among children by breast-feeding status and duration of breastfeeding were analysed. For the purpose of this analysis, the duration of breast-feeding was categorized into children who breastfed for 0-18 months and those who breast-fed for 19 months and above for both infants who were still breast-feeding and those who had stopped breast-feeding as presented in Figures 2 and 3.

Figure 2: Duration of breast-feeding and the prevalence of malnutrition(Stopped breastfeeding)



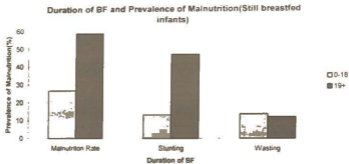
Malnutrition as used in this context refers to a situation where a child's weight for-age or height for-age fall below two standard deviations from the reference median defined by the WHO.

Figures 2 and 3 provides statistics on the prevalence of malnutrition among "children who are

still breastfeeding” and “children who have Stopped breastfeeding”. A comparison of the two figures show that, generally the prevalence of malnutrition was consistently higher among still breast-feeding children in the age group 19 months and above than those who had stopped breast-feeding at the same age. The figures indicate that approximately 60% of children who were still breast-feeding and 36.7% of those who had stopped breastfeeding in the age groups 19 months and above were reported to be malnourished. Children in the age group 0-18 months and who were still breast-feeding recorded the lowest prevalence of malnutrition (26.7%) compared with those who had stopped breast-feeding at the same age interval (29.6%). The data in both figures also show that specifically, the prevalence of stunting was also higher among children aged 19 months and above who were still breast-feeding (47%) as compared with those who had stopped breast-feeding (31.6%) at the same age. With regard to the prevalence of wasting, children who were still on breast-feeding generally recorded the highest rates of 13.6% and 12% for the two age groups respectively.

The conclusion drawn from these figures is that children who continue to breast-feed beyond 18 months of age are more likely to be malnourished than those who breastfeed for shorter duration.

Figure 3: Duration of BF and Prevalence of Malnutrition (Still breast-feeding)



5.2 Regression Analysis

5.2.1 Effects of Duration of Breastfeeding on Weight and Height

To examine the relationship between the duration of breastfeeding and nutritional status, linear regression equations were analysed. This section presents the results of the analysis. The models examined were as follows:

$$\text{Model 1. Weight} = b_0 + b_1 \text{Age} + b_2 \text{BF} + b_3 \text{Age} * \text{BF} + b_4 \text{Age}^2 + b_5 \text{Age}^2 + \text{BF}$$

$$\text{Model 2: Weight} = b_0 + b_1 \text{Age} + b_2 \text{BF} + b_3 \text{Age} * \text{BF} + b_4 \text{Age}^2 + b_5 \text{Age}^2 + \text{BF} + b_6$$

+ mother' education + b_7 type of toilet facility + b_8 frequency of other meals eaten + b_9 anthropometric index of child(wasting) + b_{10} occurrence of diarrhoea

$$\text{Model 3. Height} = b_0 + b_1 \text{Age} + b_2 \text{BF} + b_3 \text{Age} * \text{BF} + b_4 \text{Age}^2 + b_5 \text{Age}^2 + \text{BF}$$

$$\text{Model 4. Height} = b_0 + b_1 \text{Age} + b_2 \text{BF} + b_3 \text{Age} * \text{BF} + b_4 \text{Age}^2 + b_5 \text{Age}^2 + \text{BF} + b_6 \text{ frequency of other meals eaten} + b_7 \text{ anthropometric index of child(stunting)} + b_8 \text{ occurrence of diarrhoea}$$

Where: b_0, \dots, b_{10} are the coefficients. Age - age of child in months. BF - duration of breastfeeding in months

These two models (1 & 2 and 3 & 4) were used because weight and height measure different aspects of nutritional status. While weight measures short term malnutrition, height measures

long term malnutrition (G.S.S 1998).

In the above models, age was fitted as a quadratic function to capture the rate at which weight and height decrease as the duration of breastfeeding is prolonged. Weight and height are functions of age, duration of breastfeeding and some background variables. A simple regression analysis was used to estimate the coefficients.

Table 16: Effects of Age, Duration of breastfeeding and other Variables on child's Weight.

Model 1

Independent Variables	Beta	t	P. value
Age	0.961	9.845	0.000
Duration of breastfeeding	0.342	6.137	0.000
Age*Duration of breastfeeding	-0.952	-5.289	0.000
Age squared (age ²)	-0.263	-2.433	0.015
Age squared*Duration of BF	0.576	3.502	0.000

Model 2:

Age of child	0.918	9.046	0.000
Duration of breastfeeding	0.332	5.914	0.000
Age*Duration of BF	-0.906	-5.020	0.000
Age squared (age ²)	-0.251	-2.302	0.021
Age squared*Duration of BF	0.058	3.691	0.000
Education level of mother	-0.024	-1.215	0.224
Type of toilet facility	-0.036	-1.816	0.070
Times ate other foods	0.074	3.646	0.000
Anthropometric Index	-0.106	-5.866	0.000
Occurrence of diarrhoea	0.017	0.990	0.322

Regression models presented in Table16 were used to estimate the relationship between weight of the child and the duration of breast-feeding.

The results of the analysis in Model 1 indicate that, child's age and duration of breast-feeding

were both positively related to weight and that these relationships were statistically significant ($p=0.000$). From the model, a unit increase in each of the child's age and duration of breast-feeding, increases the weight of the child by 0.961 and 0.342 respectively. In other words, increases in child's age and duration of breast-feeding imparts positively on the nutritional status of a child.

Also, the interaction terms for age and duration of breast-feeding seem to be negatively associated with weight(-0.952) with statistical significance ($p=0.000$). The coefficient for the interaction terms between age² and duration of breast-feeding are positive(0.576) and statistically significant ($p=0.000$). The analysis further shows that, after the age of 18 months, however, a unit increase in the duration of breast-feeding, decreases the weight of the child by 0.264kgs, indicating diminishing rate of change in weight gained by the child ($p=0.015$). This is explained by the coefficient of age² shown in model 1. In essence, model 1 shows that prolonged breast-feeding up to 18 months of age imparts positively on the weight of a child. After this age however, a unit increase in the duration of breast-feeding contributes negatively to the weight of the child. This finding is in contrast with that of Nube and Asenso-Okyere whose finding show that after 12 months of age, the duration of breast-feeding contributes negatively to a child's nutritional status.

This is due partly to the fact that the data source for these studies differ. While Nube and Asenso-Okyere made use of the Ghana Living Standard Survey Data of 1988/9, this current study made use of the Ghana Demographic and Health Survey data of 1998.

To assess whether the pattern discussed in model 1 is still significant after considering the effects of background variables on weight, a second set of regression model (Model 2) was fitted to include variables on mother's education, type of toilet facility, frequency of meals eaten, anthropometric index of child (wasting) as well as the occurrences of diarrhoea.

The results of the analysis indicate that, mother's education, type of toilet facility, frequency of meals eaten, anthropometric index of child (wasting) as well as the occurrences of diarrhoea were statistically significant. The coefficients however differed. Mother's education, type of toilet facility and child's anthropometry were negatively associated with weight, while the occurrence

of diarrhoea and the frequency of other meals eaten by the child were positively associated. The analysis indicated that, where a mother has no form of formal education, the weight of her child decreases by 0.024kgs. Also, where a household has no access to toilet facility the weight of the child decreases by 0.036kgs. Furthermore, where a child is wasted, its weight is decreased by 0.106kgs. On the other hand, a unit increase in the frequency of meals eaten by a child increases the weight by 0.074. Also, the absence of the occurrence of diarrhoea in the past two weeks preceding the survey increases a child's weight by 0.017kg. In other words, lack of education, lack of toilet facility and where a child is wasted contributes negatively to a child's weight and for that matter, its nutritional status, while increased frequency of meal and absence of the occurrence of diarrhoea contributes positively to a child's nutritional status.

With adjustments for these background variables, the statistical significance for Age² has slightly changed but remains statistically significant ($p=0.021$).

With regards to the coefficients, the interaction terms for age and duration of breast-feeding was still negatively associated with weight(-0.906) while that of age² and duration of breast-feeding is positively associated (0.058) and these are all significant($p=0.000$). With regard to age² interaction term, Model 2 indicates that the coefficient remains negative, indicating that a unit increase in the duration of breast-feeding after 18 months decreases the weight of a child by 0.251kgs ($p=0.021$).

In summary, analysis of models 1 and 2 show that there are statistically significant relationships between age, duration of breast-feeding, mother's education, type of toilet facility, frequency of meals eaten by child, anthropometric index of the child (wasting) as well as the occurrence of diarrhoea on the weight of a child. The models show that even after controlling for background variables, there is still a significant relationship between the duration of breast-feeding and the weight of a child. The models show that the duration of breast-feeding up to 18 months contributes positively to child's weight. However, after this age continued breast-feeding does not enhance better nutritional status.

Table 17: Effects of Age, Duration of breast-feeding and background Variables on child's Height.

Model 3:			
Independent Variables	Beta	t	P. value
Age of child	1.317	18.528	0.000
Duration of breastfeeding	0.382	9.4111	0.000
Age*Duration of breastfeeding	-1.106	-8.438	0.000
Age squared (age ²)	-0.402	-5.111	0.000
Age squared*Duration of breastfeeding	0.685	6.212	0.000
Model 4:			
Age of Child	1.367	20.013	0.000
Duration of BF	0.413	10.936	0.000
Age * Duration of BF	-1.129	-9.298	0.000
Age squared (age ²)	-0.456	-6.208	0.000
Age squared*Duration of BF	0.713	7.005	0.000
Times ate other foods	0.056	4.108	0.000
Anthropometric Index(stunting)	0.241	-19.750	0.000
Occurrence of Diarrhoea	0.019	1.602	0.109

As in the case of weight, the relationship between the duration of breast-feeding and height was also assessed using the same quadratic equation specified in models 1 and 2, but this time using height as the dependent variable. As in the case of weight, model 3 also shows that the statistical significance of Age, duration of breast-feeding, Age*Duration of breast-feeding were high ($p=0.000$). The coefficient of Age and duration of breast-feeding were both positive indicating a generally positive association between Age and duration of breast-feeding on one hand, and height on the other. In other words, a unit increase in the age of a child increases the height by 1.317cm. Similarly, a unit increase in the duration of breast-feeding, increases height by 0.382cm. The interaction terms for Age and duration of breast-feeding however, show a negative relationship (-1.106) while the interaction between age² and duration of breast-feeding shows a positive relationship with height (0.685) with statistical significant ($p=0.000$). The coefficient for age² in the model shows that after 16 months of age a unit increase in the duration of breastfeeding diminishes the rate of change in height gained by the child.

The implication of the analysis in Model: 3 is that, the duration of breast-feeding contributes positively to height up to about 16 months of age. After 16 months however, continued breast-feeding imparts negatively on the height of the child.

As in the case of weight, background variables were introduced(Model 4) and a second set of regression was fitted to assess the impact of these background variables on height. The analysis shows that, the frequency of other meals, anthropometric index of child (stunting) and the occurrence of diarrhoea were statistically significant ($p=0.000$).

Model 4 indicate that a unit increase in the frequency of meals eaten by the child contributes 0.056cm to height. Also, where a child is stunted its height is decreased by 0.241cm. The absence of the occurrence of diarrhoea also contribute 0.019cm to the child's height. The interaction between age and duration of breast-feeding was negatively associated with height (-1.129) while age^2 and duration of breast-feeding was positively associated with height(0.713). The coefficient of age^2 however indicate that increase in the duration of breast-feeding up to age 16 months contributes positively to height, but thereafter a unit increase in the duration of breast-feeding diminishes the height gain of the child. In other words, the impact of age and duration of breast -feeding on height of the child has not changed much after controlling for background variables. A comparison of the Models in Tables 16 and 17 indicate that there is significant relationships between the duration of breast-feeding and the weight and height of a child. The models show that the duration of breast-feeding contributes positively to the nutritional status of children up to 18 months (for weight) and 16 months (for height), after which the positive contribution made by continued breast-feeding starts to diminish.

The models also show that, after controlling for background variables, the impact of age and

duration of breastfeeding on weight and height did not change.

Tables 16 and 17 also show that, while the relationship between mother's education and type of toilet facility was significantly related to weight the same could not be said for height. In other words, there was no significant relationship between mother's education, type of toilet facility and height. However, the frequency of other meals eaten, anthropometric index of the child and the occurrence of diarrhoea were significantly related to both weight and height.

5.3. Discussion of Findings

The findings of this study suggest that, the duration of breastfeeding is affected by factors relating to the mother, the environment and the child. The results show that mothers with higher educational levels tend to breast-feed for shorter durations compared with mothers with lower or no form of formal education. This finding is consistent with findings by Nube and Asenso-Okyere (1996) and Laura et al (1996). This association can be attributed to the fact that mothers with more years of schooling tend to occupy higher managerial positions which make a lot of demands on their time to the detriment of their families, and nursing children, for that matter. On the other hand, mothers with little or no form of education, either tend to do lower-paid jobs or tend to be self-employed, which leaves them ample time to breastfeed for longer durations.

The study also revealed the tendency for older mothers to breastfeed for longer durations than younger mothers. This stems from the fact that younger mothers may not want to end up with sagging breasts, which are associated with prolonged breastfeeding. They are also likely to be exposed to breast-milk substitutes which they believe can satisfy the nutritional requirements of their infants. On the other hand, older mothers tend to breastfeed for longer durations partly

because they might have realized the superior benefits of breast milk over its close substitutes and therefore place less importance on the aesthetic value of their breasts. The tendency for unemployed mothers or mothers whose main occupation is farming to breast-feed for long durations may be due to the fact that they may have all the time available to continue breast-feeding their children (in the case of the unemployed) or have the option of carrying their nursing children with them while on the farms.

The duration of breast-feeding was also shown to be longer among rural infants than their urban counterparts. This can also be partially explained by the fact that rural mothers are usually of lower educational backgrounds and are mostly either self employed or do farm work so they are not necessarily alienated from their nursing children for long hours. Also, in the rural areas where traditional norms are still held in high esteem, women are encouraged to breast-feed their children for as long as the latter like it. On the other hand, owing to urbanization and modernization as well as the pressure on the time of working mothers, the duration of breast-feeding tend to be shorter in the urban than the rural areas.

With the on-going promotion of breast-feeding and the Baby Friendly Hospital Initiative, there is the need for some cultural revival among mothers to embrace some of our cultural traditions that promote better child feeding practices.

Mothers who are delivered of their babies outside health facilities tend to breast-feed for longer periods than mothers who have their babies born in health facilities. This finding is rather unusual since it is assumed that mothers who are delivered of their babies in health facilities have the greater opportunity to be educated on the benefits of breast-feeding during their antenatal visits and after delivery than mothers who have their babies outside health facilities. This

assumption is supported by findings from this study that mothers who attended antenatal clinics during pregnancy tended to prolong breast-feeding compared with mothers who either did not receive any antenatal care at all or received care only once or twice. The implication may be that mothers who have their babies out-side health facilities are likely to be those from the rural areas where health facilities are woefully inadequate or in some cases totally unavailable. Access to a health facility, tap water, electricity and refrigeration are also indicators of an urban lifestyle where mothers tend to breast-feed for shorter durations than mothers who do not have access to these facilities.

As regards the relationship between the duration of breast-feeding and the nutritional status of infants, the results of this study show that the duration of breast-feeding is significantly and negatively associated with the nutritional status of children. The data indicate that prolonged breast-feeding beyond 18 months of age impacts negatively on the nutritional status of children. To confirm this, the relationship between the duration of breast-feeding and the prevalence of malnutrition was also analysed. The result of the analysis confirmed that generally, the prevalence of malnutrition is higher among infants who breast-feed beyond 18 months of age in comparison to infants who breast-feed for shorter periods. These findings were consistent with the findings by Brakohapa et al (1988), Laura et al (1996), Simondon et al (2001), Victora et al (1984) and Blend and Bari (1989). Nube and Asenso-Okyere (1996), however, found this negative association between prolonged breast-feeding and the nutritional status at the age of 12 months. In contrast to these findings, studies by Cousens et al, (1993) and Taren and Chen,(1993;) found a positive association between prolonged breast-feeding and nutritional status of children. The negative association between prolonged breast-feeding and nutritional status may be partially explained by the fact that children who continue to breast-feed beyond 18 months of age

may be deprived of adequate qualities and quantities of supplementary foods either because of their impoverished situation or simply because their mothers are ignorant of the need to enrich and give adequate meals to supplement breast-feeding. It is also possible that such children may not have developed good appetite for other meals owing to delayed introduction of supplementary foods. This can predispose the children to feeding difficulties and over-reliance on breast-milk both of which result in impaired growth as a result of inadequate foods (Brakohiapa et al, 1988). According to Victora et al (1984), another possible reason for the negative association between prolonged duration of breast-feeding and nutritional status may be the fact that some mothers tend to produce milk with lower fat content which is inadequate to meet the nutritional requirements of their children. Other reasons given by some studies are that as a result of past events such as infection by measles, some children may have an overall poor nutritional status and this can cause their mothers to continue to breast-feed them for longer duration rather than the reverse situation of prolonged breast-feeding resulting in malnutrition (Simondon et al, 2001).

The study further advanced a significant association between a mother's education, the type of toilet facility, the frequency of other meals, a child's anthropometric index as well as the occurrence of diarrhoea on the one hand and the nutritional status of the children on the other hand. The implications of the above findings are that, compared with highly educated mothers, mothers with little or no form of formal education are less likely to have access to information on good nutrition and health. Also, they may not also have access to adequate qualities and quantities of supplementary foods owing to their ignorance or low levels of incomes.

Access to a toilet facility is an indication of the levels of hygienic/ sanitation and income of a given household. By implication, a household with toilet facilities tend to have better hygienic

practices which are essential in enhancing the nutritional status of children than a household without any toilet facility. Also, foods from higher-income households may be of better nutritional quality than those from lower-income households (Nube and Asenso-Okyere, 1996). Educating members of the public on the need to improve upon domestic and communal sanitation will go a long way to help reduce diseases associated with poor sanitary environments. As recommended by the WHO (1984), breast milk, after the age of 4-6 months, is inadequate to meet the nutritional requirements of children and therefore there is increased need to supplement breastfeeding as the infant grows. This study supports this recommendation by indicating that infants who receive food supplements more frequently (not less than 4 times daily) tend to be better nourished than children who receive them less frequently.

This study further reveals that in environments where diarrhoea diseases are endemic, the nutritional status of infants are poor. This is partly due to the fact that children with such infections may lose their appetite for other meals and therefore deprive themselves of adequate supplementary foods.

Mothers can be encouraged to give their children foods and medicines that boost appetite. Health workers can also encourage mothers to use a combination of local cereals to prepare less expensive but nutritionally balanced and palatable meals for their children. Mothers should also be made to understand the need to introduce their children to the different types of food gradually so that, the latter can develop liking for each of the varieties of food supplements.

6.0 Summary and Conclusions

6.1 Summary

This study set out to investigate the relationship between prolonged breastfeeding and the nutritional status of children in Ghana. This stems from the fact that in spite of conflicting research findings on the benefits of prolonged breastfeeding, there is intensive breastfeeding campaign going on in the country.

The main objectives of the study were to examine:

- The various ages at which infants in Ghana are completely weaned off the breast;
- The factors that affect the duration of breast-feeding;
- The relationship between prolonged breastfeeding and the nutritional status of children, and
- Other factors that influence the nutritional status of children.

The 1998 GDHS data set was used in this study. Specifically, data on breastfeeding and other child feeding practices, childhood illnesses and anthropometry as well as some background information on mothers were utilized in this study. In all a total of 2108 children aged 0-3 years were involved.

The data were analysed using the SPSS soft-ware . Bivariate analysis and linear regression models were used in analysing the data.

Findings of the study show that almost 100% of Ghanaian children are breastfed for some time of their lives. The mean duration of breastfeeding was 19 months with mothers from urban areas and

higher education breastfeeding for shorter periods than their counterparts. Other factors that significantly influenced the duration of breastfeeding included the age, educational level and employment status of mother, place of residence, morbidity and sex of household head. Other significant factors are source of drinking water, type of toilet facility, access to electricity and refrigeration, frequency of antenatal visits and place of delivery.

The study further revealed that breastfeeding beyond 18 months of age is associated with increased risk of malnutrition. This finding is consistent with other studies from Ghana (Brakohiapa et al., 1988 and Nube and Asenso-Okyere, 1998) and other countries. The negative association between prolonged breastfeeding and nutritional status may be partially explained by the fact that children who continue to breastfeed beyond 18 months of age may be deprived of adequate qualities and quantities of supplementary foods either because of their impoverished situation or simply because their mothers are ignorant of the need to enrich and give adequate meals to supplement breastfeeding. It is also possible that such children may not have developed good appetite for other meals owing to delayed introduction of supplementary foods. This can predispose the children to feeding difficulties and over-reliance on breast-milk both of which result in impaired growth as a result of inadequate foods (Brakohiapa et al,1988). Other factors that significantly affected nutritional status according to this study were mother's education, child's anthropometry index, type of toilet facility and the occurrence of diarrhoea.

6.2. Conclusions

In conclusion, the results of the findings presented in this study show that, there is some evidence to suggest that prolonged breastfeeding beyond 18 months of age in Ghana is positively

associated with increased risk of malnutrition even after controlling for confounding variables. Also, several factors including maternal age, education, employment, place of residence, access to basic facilities such as safe water, toilet, electricity as well as refrigeration, are important factors that influence the duration of breast-feeding.

The policy implication from this study is that even though the promotion of breast-feeding is in the right direction, there is the urgent need for health workers to emphasize the need for mothers to give their children adequate qualities and quantities of supplementary foods in addition to breast-milk. Mothers should also be made to consider breast-feeding as a secondary source of food (energy) for their children after the first six months of age. This will encourage the children to develop better appetite for supplementary foods from which they derive their daily energy requirement from.

6.3 Weaknesses of the Findings

In spite of the above findings and conclusions, it is important to state that the findings had the following limitations:

In the first place, the GDHS data were not designed to test the relationship between breast-feeding and the nutritional status of infants. Therefore, fundamental issues that relate directly to nutrition were not considered. For instance, even though the data showed the frequency of other meals eaten, the qualities and quantities of these supplementary foods fed to infants were not ascertained in the study.

Secondly, the data provided by respondents consisted of extempore responses based on recall rather than documentary proof and so are subject to errors. A longitudinal study would have been able to closely monitor the subjects (infants) in the study to gather more accurate and precise data

on infant feeding practices and health to be able to draw more definite and accurate conclusions. Also, the study could not control all covariates which could have been strongly associated with infants' nutritional status.

Lastly but not the least, the study was also subject to some methodological errors. The study utilized only bivariate and linear regression models in the analysis of the findings. Perhaps better analytical tools such as the proportional hazard model could have been used in this particular analysis.

In view of these limitations, it is suggested that further research be carried out using different methodological approaches, such as longitudinal/ observational studies in addition to collecting more accurate information on the qualities and quantities of complementary foods consumed by infants in the study. This will facilitate the support or rejection of the association between prolonged breast-feeding and the incidence of malnutrition. Further studies can also be carried out to assess the impact of prolonged breast-feeding on maternal health and nutritional status so as to ensure that extended breastfeeding is not done at the expense of mothers' health.

6.5. Recommendations

The following recommendations are proposed based on the findings of the study:

1. There is the need to extend maternity leave for nursing mothers to enable them breastfeed for longer durations. Alternatively, the creation of nursing bays and "nursing breaks" at work places will go a long way to address the issue of breastfeeding for longer durations among working mothers. This stems from the fact that mothers with high educational qualifications and those who occupy higher managerial positions tend to breastfeed for shorter durations.
2. There is the need for the Ministry of Health to incorporate nutrition education in its **Maternal and Child Health (MCH)** programmes to deal with the causes of poor nutrition among children.

Here, mothers should be given comprehensive education on the need for, and the preparation of supplementary foods for their growing children. Mothers should also be educated on the need to avoid delayed introduction of these supplementary foods to their children. This will go a long way to arrest the problem of malnutrition arising from inadequate and delayed introduction of supplementary foods.

3. Intensive public health education on the need to keep our environment clean will do a long way to reducing the level of infection especially among children in communities where malnutrition is endemic.

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