ANALYSIS OF POSTPARTUM VARIABLES IN KENYA, EVIDENCE FROM KENYA DEMOGRAPHIC AND HEALTH SURVEY (1989)

BY

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DECLARATION

This is my original work and has not been presented for a degree in any University.

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DEDICATION

To my parents, Thomas and Gaudensia Okwayo, for their sacrifice and persistent encouragement without which it would not have been possible to reach this level.

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ABSTRACT

The objectives of this study were three-fold. First, to estimate the mean duration of postpartum variables using life table technique and Mosley prevalence method. Second, to examine whether there exists a relationship between durations of breastfeeding and postpartum amenorrhea by applying Bongaarts' model. Third, to evaluate the effect of mothers' socioeconomic, socio-cultural and demographic characteristics on postpartum practices. The data used in this study is the Kenya Demographic and Health Survey of 1989.

The mean duration of breastfeeding, postpartum amenorrhea and postpartum sexual abstinence were estimated for various variables at the national level in Kenya. This was so because the sample size used could not enable the analysis to be carried out at the provincial or district level. These estimates are derived by life table and mosley prevalence methods, after which the two sets of estimates are compared.

Bongaarts' model was used to estimate the expected durations of amenorrhea from observed durations of breastfeeding, thereby, comparing the expected durations of amenorrhea with the observed durations. Simple regression analysis was used to estimate the correlation coefficient (R^2) of the two sets of data.

The variables that were used at the national level include; level of education, place of residence, work status, parity, age of the mother at child's birth, sex of the child, region (provinces), religion, ethnicity and marital status.

A multiple regression analysis has been used to evaluate the effect of each variable on duration breastfeeding, amenorrhea and sexual abstinence separately. In regression analysis contraceptive use was included to the above mentioned variables.

The findings of the study show that durations of all the three postpartum variables are decreasing. The study asserts that variables which negatively affect durations of postpartum variables are mothers' level of education, work status and place of residence. However, mothers'

age at the child's birth is found to be positively related to duration of postpartum practices. Regression analysis shows that all socio-economic and demographic variables considered in the analysis have a considerable effect on duration of postpartum variable. The most notable finding is that the duration of amenorrhea is mainly determined by the duration of breastfeeding.

The study recommended that breastfeeding education should be incorporated in school syllabus at secondary level. Programmes on advantages of prolonging breastfeeding duration be intensify both on print and mass media to increase public awareness.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE
STATEMENT OF PROBLEM, OBJECTIVES AND SIGNIFICANCE OF THE STUDY

1.1 Introduction

At a time when there are large programs and plans for reducing national fertility levels, it is remarkable how little attention is given to determining the joint distribution and concomitant of the duration of lactation, the duration of postpartum amenorrhea and the duration of postpartum sexual abstinence which are among the factors determining birth rates for a national population.

Following a live birth, a woman generally experiences a six-week period of amenorrhea related to the hormonal concomitant of pregnancy. This amenorrheic state may be extended by the practice of breastfeeding, the duration of the amenorrhea being strongly correlated with the duration of lactation. In developing countries where prolonged breastfeeding is practised, postpartum amenorrhea has been observed to last between 18 to 24 months on the average. Such extended intervals help to maintain fertility rates below those observed in areas of developed world among women not practising contraception. This natural fertility regulation has prompted researches for the factors contributing to prolonged maintenance of postpartum amenorrhea.

Breastfeeding is perceived by the parents and the community as good for the welfare of the child. The primary purpose of breastfeeding is infant nourishment. Breastmilk is an absolute necessity for the survival of the child, given the poor maternal status of most developing societies. In the rural areas most of the food items are carbohydrates; breastmilk therefore offers the much needed protein for the young ones. Where animal milk and high protein food such as egg and meat can be found in sufficient quantities, they are not normally given to the young because of the myth that such delicacies can lure them to stealing when they become adults.

Among most ethnic groups in Kenya, during breastfeeding cohabitation is normally prohibited for fear of poisoning the milk. It is generally believed that the semen can poison the mothers milk. Postpartum abstinence is sometimes needed to guarantee the rather long duration of breastfeeding. When premature pregnancy occurs, breastfeeding is automatically terminated because of the belief that the pregnancy may affect the health of the baby. The other reason why mothers breastfeed their babies in traditional society is socio-psychological. It is generally believed that breastfed babies develop certain sentiments towards their mothers, and when the child grows up the sentiments are so strong that they are often translated into physical and financial reward for the mothers.

In traditional societies, the duration of breastfeeding tends to be long, full, unsupplemented, frequent and given at short intervals. However, the availability of modern breastmilk substitutes, and the parents ability to buy them and the inconvenience of breastfeeding for the mother have serious implications on the duration, frequency and intensity of breastfeeding today. Breastfeeding is convenient to mothers in a traditional economic system because the activities they perform allow frequent and intense breastfeeding. It has been established that breastfeeding tends to reduce fertility (Van Ginneken ,1974; Simpson-Hebert and Huffman ,1981). This has been accepted as one of the reasons why fertility in traditional societies was below the national potential.

It is the aim of this work to show the current situation on postpartum variables and its determinants for comparison purpose both over time and with other estimates from other countries.

1.2 Statement of the problem

The problem in Kenya pertains to persistent high fertility levels despite the introduction of family planning programme. The main cause of high fertility levels in Kenya at this time when it is undergoing development transformation is the reduction in periods of breastfeeding and postpartum abstinence which are not compensated for by contraception. This has led to shortening of birth intervals thus making the fertility levels to be higher.

The reduction in duration of breastfeeding has been accelerated by the improvements in socio-economic factors , for example, the introduction of commercialised food for infants (which are substitutes for breastmilk) at an early stage of the infancy. This has not only reduced the frequency of breastfeeding in a day but also its intensity, and has made mothers to stop breastfeeding after relatively shorter durations than had been observed earlier. It has been prompted by mothers taking up office work or work which is far away from home. This forces mothers to breastfeed their infants rarely and as a result introduce breastmilk substitute at relatively early age.

Modernization has changed people's way of living more significantly in the urban areas. Traditional postpartum abstinence is no longer observed among most urban populations. This has been so due to the introduction of perfumes and other cosmetics which make breastfeeding mothers in urban areas more attractive than those in traditional societies, alternatively, it could be as a result of intimacy among the spouses and most marriages in urban centres are monogamous . At present, there is a sharper decline in the practice of sexual abstinence after a birth than the decline in the duration of either breastfeeding or postpartum amenorrhea.

1.3 Objectives of the study

General Objective

The main objective of this study is to examine the duration of breastfeeding, postpartum amenorrhea and abstinence by mothers' various socio-economic, socio-cultural and demographic characteristics in Kenya. It is also aimed at establishing the relationship between postpartum variables.

Specific Objectives

1. To estimate the mean duration of breastfeeding, postpartum amenorrhea and abstinence both at national and for various variables.
2. To examine whether there exists a relationship between durations of breastfeeding and postpartum amenorrhea.
3. To find out which of the mothers' characteristics significantly affect duration of breastfeeding, postpartum amenorrhea and sexual abstinence.

1.4 Significance of the study

From the studies that have been carried out both in developed and developing countries, breastfeeding has been shown to be the best form of nutrition for the young infant. This is because of its nutritional quality, protection against a number of infections particularly gastroenteritis.

Breastfeeding duration has been shown to have an influence on fertility through lengthening the period of postpartum amenorrhea. It also affects fertility through its associations with sexual abstinence. In many societies, notably Africa, cultural norms prohibit sexual intercourse for nursing mothers. It is believed in those cultures that sexual intercourse during nursing period could make

the semen contaminate the breastmilk and thereby endanger the health of the baby.

Durations of breastfeeding and abstinence practises are now known to be on the decline in many developing countries and more rapid in urban areas. This decline is being associated with changes in socio-economic, socio-cultural and demographic conditions. The effect of such changes on postpartum practices is the attention of this study.

1.5 Scope and limitations

This study focuses on all the districts that were covered by the Kenya Demographic and Health Survey. However, the study focuses on the fecund married women aged between 15 and 49 years. This is the age group that is considered to be demographically fertile. Socio-economic, socio-cultural and demographic characteristics of the mothers and how they affect postpartum practices will be considered.

The study is limited in that though it is of cultural nature, no anthropological or sociological explaination is made on the cultural or ethnic variation.

The study is limited in that, it utilizes secondary data which was collected by a different organization. This data may contain both content and coverage errors which are beyond the scope of the author. Due to the nature of data available and methodology used (life table technique), the mean durations of postpartum practices may be shorter than expected. The methodology assumes that all the events happened at the same time and they stop one at a time until all of them experience extinction. However, this is not the case with breastfeeding because some infants born are never breastfed, this may lead to estimation of shorter durations of breastfeeding. Similarly, durations of amenorrhea for mothers whose infants die at birth are likely to be shorter.

CHAPTER TWO
LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 LITERATURE REVIEW

This section reviews the works that have been done on the determinants and effects of postpartum practices and how breastfeeding duration affects birth intervals which eventually affect fertility. We shall examine the works that have been done in the rest of the world and then look at those that have been carried out in Kenya.

2.1.1 The Rest of the World

Though the duration and intensity of breastfeeding has been declining in the recent past, many research works that have been done show strong exposition that it is important. One such exposition of breastfeeding as an aid to infant health and fertility is provided by Buchanan (1980). He contends that breastmilk is highly nutritious, providing all the elements needed for the infant's health during the first six months of life and many of those needed for months thereafter. It is protective due to its composition and its content of immunologic substances, against bacterial infection of the gastro-intestinal tract, allergies, obsuty and certain metabolic and other disorders. Both these advantages are not provided by any food other than mothers' milk. He goes further to say that it is safe from bacterial or other spoilage common in tropical areas where refrigeration of food and sterilization of equipment is often not possible and convenient since the mother can feed the infant on demand.

Breastfeeding, although a natural process requires a lot of practice, patience, encouragement and advice especially for a mother nursing her first child. In many cultures, relatives and friends who have breastfed before provide the needed information, advice and emotional support. However, in urban areas, this support is often lacking and many mothers are only advised by medical

personnel whose attitude cannot be assumed to be supportive.

Both the milk production and its output are dependent upon the suckling production process, including its frequency, intensity and duration. The importance of frequency of suckling on milk production is better understood than that of the other two factors (Huffman, 1984). Factors that are known to decrease suckling frequency include the supplementation of the child's diet, practice of scheduled feedings, lack of night-time feedings and the use of feeding bottles and pacifiers. Some researchers have argued that maternal nutrition indirectly affects suckling by enabling a well nourished woman to produce more breastmilk with less suckling than one who is poorly nourished (Whitehead, 1983). It has been argued, however, that, although severe illness or malnutrition of the mother can cause failure of lactation, it is only under the conditions of extreme famine that women are unable to breastfeed, and hence maternal nutrition and health may not in general, have an important demographic effect (Gray 1983).

Apart from physiologic process which govern breastmilk production and maintenance, sociological and behaviourial factors also influence a woman's decision to initiate and terminate breastfeeding. A framework which illustrate the determinants of infant feeding practices developed by Winikoff and her colleagues (Salimano 1982) was adopted by Huffman (1984) to explain the factors that are associated with the prevalence of breastfeeding. Education, urbanization, and income are recognized as the principal factors affecting the incidence and duration of breastfeeding. However, they act through the intervening variables of socio-cultural, health services, employment status of women and availability of breastmilk substitutes.

Women in rural areas are more likely to initiate breastfeeding and to breastfeed for longer durations than those in urban areas. Several studies have shown that the mean duration of breastfeeding

in urban areas of the less developed countries is shorter than in rural areas. This effect of urbanisation is significant even when other socio-demographic factors are controlled (Jain and Bongaarts 1981,Jain et al 1970, Lucas et al 1977). The reasons for this independent negative effect of urbanisation on breastfeeding is not very clear , but, some studies have suggested that the life-style in urban cities are somehow incompatible with breastfeeding (Raphael et al 1979).

Others have however stated that the decline in breastfeeding reflects a subconscious attempt to move from the traditional to the modern cultures (Jelliffe and Jelliffe,1978.). This variation in duration of breastfeeding may also be due to higher educational and employment opportunities for women in urban areas as well as greater use of breastmilk substitutes. Nevertheless, urbanization does not seem to have as great an influence on duration of breastfeeding as education.

Several studies that were carried out in less developed countries have indicated a very strong negative relationship between education (more especially female education) and breastfeeding. The duration of breastfeeding tends to go down as the education of mother increases. Jain and Bongaarts (1981) used the data from World Fertility Survey (WFS) and estimated the mean duration of breastfeeding for mothers with three children, different educational levels in eight countries. For each country, mothers with no education had a longer mean duration than the grand mean, whereas those with a secondary or a higher education had a shorter mean duration. They found that, for their data, the difference between those with no education and those with only primary education was generally less than that between those with primary education and those with secondary education or higher education. They concluded that the negative effect of education on breastfeeding was stronger above primary level. Similar findings have resulted from surveys conducted in the following countries: Taiwan (Jain et al, 1970); Algeria (Tabutin, 1973); Nigeria (Lucas, 1977; Dow, 1977; Lesthaegte et al, 1981); Kenya (Lesthaegte et al 1981,

Minyancha,1989) and several other African countries (Cantrelle et al, 1978, Gaisie, 1981).

Women's work as an intervening variable affects breastfeeding practice. There are several ways in which women's work may affect breastfeeding practices. These include type of work (e.g wage or non-wage,farm or non farm), place of work and relationship with employers. The inconvenience of breastfeeding for women employed outside their home is generally accepted as a major factor in recent decline of breastfeeding practice, particularly in the urban areas of less developed countries (Jellife, 1962). Some authors have suggested that women's employment status has little or no independent effect on breastfeeding (Van Esterik and Grunier,1981; Jain and Bongaarts,1981).

Jain and Bongaarts (1981), using WFS data for eight countries found that, after adjusting for age, parity, education, place of residence and husband's occupation, work status or place of work of the mother had only a very small effect on the duration of breastfeeding. In Thailand, women who engaged in non-agricultural work, whether for wages or not breastfeed least and women working on farms, especially family farms breastfeed the most, with non-working mothers being intermediate (Knodel and Devavalya, 1980). Although there is generally a negative association between women's wage-earning, non-agricultural work and breastfeeding; this association becomes very weak when adjustment is made for education and region. Other studies have indicated that breastfeeding tends to decrease as the distance of women's work places from their homes increases (Popkin and Solon, 1976). Some studies done show that breastfeeding has a contraceptive benefit. Lathan (1972) carried out a study among Turkey women and found that they often breastfed their infants as a means of birth control, believing that it will delay the next pregnancy. On the other hand Knutson and Mellbin (1972) carried out a study in Ethiopia. Their finding was that a common reason for the early termination of breastfeeding was that "otherwise

the mother will not have more children".

Buchanan (1980) reports that breastfeeding is effective in prolonging postpartum amenorrhea and therefore in providing some protection against pregnancy; which in fully breastfeeding women may last for nine months or longer following delivery. He further found out that breastfeeding women average ten months of postpartum amenorrhea as compared to three months for non-breastfeeders. He showed that the contribution of breastfeeding could be compared very effectively with other family planning methods in providing some time of protection.

Most of the studies done in the developing countries have shown a declining trend in duration of breastfeeding. Ibrahim Ahmen (1984) carried out a research among Sudanese women and found that the prevalence and duration of breastfeeding was nearly universal. He established that nine out of ten women reported breastfeeding for at least six months and about four-fifths reported a duration of at least twelve months, and the mean duration of breastfeeding increased with age. On the other hand in societies where infant and child mortality rates are high, women do not breastfeed their children, if so but at a very low degree. Krishina (1984) carried out a study among the Nepal women; his findings were that 3.6% of women interviewed did not breastfeed their children due to death of infants and serious health conditions. The observed breastfeeding duration was 21.3 months and that estimated by life table technique was 23.01 months.

Anrudh (1981) established that the average durations of breastfeeding among women who used contraceptives was generally lower than among those who did not during the last closed birth interval. This association is believed to result from the physiological effect of hormonal contraception on lactation, especially birth control pills with high oestrogen content which have been shown to inhibit the production of prolactin. This hormone is an essential link between the suckling stimulus a women receives when she breastfeeds her baby and the maintenance of

lactation. He further found that education and urban residence of the mother were associated with a shorter duration of breastfeeding. Average duration of breastfeeding was longer for women who had no education and were living in rural areas and shorter for those who lived in urban areas and had at least seven years of education (schooling). This was noted among women in Bangladesh, Indonesia, Sri Lanka, Jordan, Peru, Guyana, Colombia and Panama. Shah (1980), considered only illiterate women in Pakistan and found that the impact of husband's education level did not seem to have much influence on their breastfeeding behaviour, but women whose husbands were in secondary or higher level of education tended to breastfeed for fewer months as compared to their counterparts in the primary or no education category. In Sudan, the mean length of full breastfeeding decreased as the education level increased, that is, women with higher educational level (primary complete and above) had 2.4 months less than those without any education.

Husband's occupation has been found to have much influence on the duration of breastfeeding especially in the studies done in the developing countries. This is because more educated men have greater chance of being employed in higher paying occupations and thus have a greater chance of buying the commercialised food for infants. In such cases, women tend to supplement other foods for breastmilk at very early ages of the children, as evidenced by a study carried by Anrudh et al (1981) in Bangladesh, Indonesia, Sri Lanka, Jordan, Peru, Guyana, Colombia and Panama. They found out that women whose husbands were in the professional and clerical occupation breastfed for shorter durations. A similar pattern was observed by Ibrahim et al (1984) among Sudanese women, where women married to non working men breastfed longest followed by those in the farming and fisheries occupation.

The relationship between women's occupation and breastfeeding has been established. However, distinction should be made between work that requires regular sustained separation between

mother and infant, and the work that does not. Popkin et al. (1981) conducted a study in Cebu and Phillipines and observed that mothers breastfed more if they worked close to their homes, but practised more mixed feeding (breast and bottle) earlier if they work far from home. The same pattern was observed in Rwanda and Central Africa by Monique et al, (1974) where rural women in constant contact with their babies on their backs could breastfeed at any-time; whereas in urban areas the babies had less physical contact with the mothers and were breastfed following a more or less regular time schedule. This difference in breastfeeding habits led to difference in the occurrence of conceptions.For example, in the rural group 75% of conceptions occurred between 24 and 29 months of postpartum while in the urban areas 75% of conceptions occurred between 6 and 15 months of postpartum. The effect of breastfeeding on delaying pregnancy has often been experienced by women in the developing countries and this is normally seen in the absence of contraception (Mayling et al 1980). The duration of breastfeeding influences the length of birth intervals through the intermediacy of postpartum amenorrhea. The return of menses after postpartum can be used as an estimate of the time of return to fertility.

The effect of lactation on fertility comes from studies which show that the period of survival of one child is positively associated with the succeeding birth or pregnancy interval in non-contracepting populations. If a child dies soon after birth, lactation ends. This in turn leads to a reduction in the period of amenorrhea and an early conception. In the studies done in various countries, Anrudh et al (1981) found that one month of breastfeeding added 0.7 months to birth interval in Sri Lanka, 0.5 months in Indonesia, 0.45 months in Colombia and Panama, 0.4 months in Bangladesh and Peru, 0.3 months in Jordan and Guyana. Cantrelle et al, 1971; carried a study in Senegal and found that the interval between two births increases by atleast 9 months when the age of child at weaning increases by one year. In the same study, the average birth interval increased from 25 months amongst those women who breastfed their children for less than a year

to 41 months amongst those who breastfed their children for 33 to 35 months. The use of regression model showed that one month of breastfeeding added about 0.75 months to birth interval. In the absence of breastfeeding, postpartum amenorrhea commonly lasts about two months on average (Tyson et al, 1976; Bonnar et al, 1975; Potter et al 1965; Salber et al, 1966, Perez et al, 1971). Where breastfeeding is prolonged and intensive, the average postpartum amenorrhea can last from between one and two years (Chen et al, 1974, Huffman et al, 1978). Prolonged breastfeeding can thereby increase the average interval between births by upto 18 months.

Postpartum abstinence, on the other hand, is the deliberate absentation from sexual intercourse following a birth. In several tropical African societies, this practice is dictated by traditional taboos on sexual intercourse following a birth (Schoemaeckers et al,1981). It is believed in those societies that the spacing of births and protection of the survival chances of the already born infant are enhanced by postpartum sexual abstinence. For example, among the Yorubas of Nigeria, it is believed that sexual intercourse during breastfeeding could contaminate the breastmilk and thereby endanger the health of the young child.

Jain et al (1979), carried out a survey using a sample size of 5,000 married women between ages 20 and 39 years living in Taiwan and the information about lactation and period of postpartum amenorrhea that referred in the last-but-one live birth prior to the interview. The findings showed that one month of breastfeeding added 0.74 months to birth interval. Among these women, 5% did not breastfeed their last-but-one child and this led to their postpartum amenorrhea period of 4 months and birth interval of 24.8 months; whereas those who breastfed had postpartum amenorrhea and birth interval periods of 10.5 months and 30.5 months respectively. In the same sample size, he showed the linear relationship between length of lactation and the period of

postpartum amenorrhea;

$$P = 4.4 + 0.4L$$

where: P and L stand for the period of postpartum amenorrhea and length of lactation respectively.

Since lactation influences the period of postpartum amenorrhea, as is shown by the regression equation, it is genuine to say that the entire effect of lactation on the birth interval is transmitted through its impact on the period of postpartum amenorrhea.

2.1.2 Studies done in Kenya

Mosley et.al. (1982) carried out a study in Kenya using the Kenya Fertility Survey (1977/78) data and found that as birth interval became shorter fertility went up and if this continued then Kenya's marital fertility would go up by 25 per cent. The mean duration of breastfeeding for the whole country was 16.5 months, whereas women aged below 25 years breastfeed for 20.6 months. In the same study he noted that the average birth interval increased with maternal age, that is, the birth interval for all the women was 33.7 months, 28.6 and 35 months for women aged under 25 and over 35 years respectively. The results also showed that breastfeeding practice was on the decline.

According to CBS report of Child Nutrition Survey in rural Kenya, 1977 (Social Perspectives Vol.2 No 4), the breastfeeding duration for rural women was 15 months. There was also a variation by ethnic groups as follows: Meru (17.1 months), Luo (16 months), Kalenjin (15.0 months), Luhya (14.9 months), Kikuyu (13.9 months), Chonyi (12.7 months). A variation in breastfeeding duration by family occupation showed that families not employed in agriculture as a main occupation breastfeed for shorter periods.

The birth interval in Kawangware, an urban residential area in Nairobi ranged from 19.3 to 33.2 months for the age groups 15-19 and 60+ respectively whereas the total mean was 26.9 months Sempebwa E.K, (1981). Younger women tended to supplement breastmilk with other foods much earlier and this made younger women to breastfeed for shorter durations as compared to relatively older ones. Age groups 15-19 and 40+ introduced supplementary foods when the babies were 3.2 and 7.2 months old on average respectively. Women in Kenya have no longer breastfeeding preference for boys apart from uneducated rural women who have no access to income that still favour boys in terms of longer breastfeeding durations (Mburugu et al 1987).

Otieno A.O. (1989) carried out a study in Siaya district and found that on average women breastfed for 17.7 months. The study established that breastfeeding duration increases with an increase in mother's age and parity. The variables that were negatively related to breastfeeding duration were parent's occupation and educational attainments. The study further showed that women who were catholics breastfed for longer periods as opposed to their counterparts in the protestant category of religion. His regression analysis showed that survival status of the child was found to be inversely related to the breastfeeding practice and was the principal determinant of breastfeeding duration explaining 26.4 per cent of the total variation.

The duration of both postpartum amenorrhea and the unovulatory period is dependant on the duration, frequency and intensity of breastfeeding. There is a generalization, though far from perfect, relating the relationship between the duration of breastfeeding (regardless of frequency and intensity) and postpartum amenorrhea, one month difference between two populations in their mean duration of breastfeeding corresponds on average to about one half difference in their mean duration of amenorrhea (Page, Lesthaghe and Shah 1982). It has also been observed that in the absence of breastfeeding, postpartum amenorrhea normally lasts for about two months whilst it

can average between one and two years where breastfeeding is prolonged and intensive (Page at el 1982). Besides its physiological impact, breastfeeding can also have an impact on fertility through its effects on postpartum abstinence since in traditional Kenyan society, sexual relations are either totally prohibited or restricted for a nursing mother for a period that ranges from a few months to two to three years.

2.1.3 Fertility decline: The demographic Transition Theory Perspective

The two major components of population growth are fertility and mortality and most basic research works on these components and population growth have been guided by the theory of demographic transition (Coale, 1974).

This theory was developed from what was known as the demographic history of Northern and Western European countries as they experienced the Industrial Revolution. It can be described as the movement from one equilibrium level of vital rates (i.e birth rates and death rates) to another. According to the theory, there are two phases of the transition; the first phase is the mortality decline when fertility remains nearly constant, while the second is the decline in both fertility and mortality. There is a time lag between the first phase and the second, and it is because of this period lag that results in the rapid population growth. It is further believed that the decline in vital rates is associated with economic development.

When the theory was first developed, it was assumed that in initial state, pre-industrial societies or nations were characterised by high birth rates and high death rates and a relatively stable population size. As the nations industrialized and urbanized, changes in fertility and mortality occurred. Within the transitional stage of modernization, the death rates fell to a low level while the fertility rates remained high for sometime causing a rapid population growth. Finally, fertility

also fell and as these nations became more modernized, the birth rates declined to the low level of death rates resulting in stable or slow growth rates.

These assumptions, however, have been challenged by a recent detailed investigation of the historical experience of Western Europe (Coale, 1973, 1975; Knodel, 1974). There are evidences which indicate that the decline in mortality does not always precede the decline in fertility. Moreover, even if the assumptions were to hold, it would be unrealistic to expect that developing countries would accomplish in a few decades and in the same manner what took the West more than a century to accomplish (Teitelbaum, 1975; Caldwell, 1976). Also, it has failed to establish any determinate threshold value of mortality above which fertility will not decline or below which it definitely will. Many developing countries had witnessed a very rapid decline in mortality without any appreciable decline in fertility during the last two decades. The adoption of cheap public health and medical technology (rather than their development) had contributed a lot to the mortality decline in most of these countries.

Although the demographic transition theory lacks universally explanatory and predictive power, it has served and would continue to serve a valuable role as a guide in fertility and mortality research (Coale,1973). However, if the theory is to increase its applicability to developing countries, it must consider the fact that different aspects of modernization changes or developmental changes affect the components of population growth differently, and since these changes take place at different times, the timing of the decline in fertility and/or mortality would vary from one society to the other. It should, therefore, be necessary to specify those aspects of the process of modernization which affect the components of population growth, and to establish the conditions under which they operate in different cultures and societies (Liell, 1965).

2.1.4 Summary of Literature Review

In summary of literature review, we note that most of the studies done in the developing countries have shown a declining trend in duration of breastfeeding. Studies done world wide have identified level of education, urbanization and income of the mother as the principal factors affecting the incidence and duration of breastfeeding. Studies carried out in developing countries show the negative effect of education on breastfeeding and that it is strong above primary level. They also reveal that rural women breastfeed their children for longer durations than those in urban areas. The reasons given in most studies are higher educational and employment opportunities for women in urban areas as well as greater use of breastmilk substitutes. In Kenya, women's level of education is found to be inversely related to the duration of breastfeeding (Minyacha (1988) and Mosley (1982)). They have also noted that women's work as an intervening variable affects breastfeeding practice; these include wage or non-wage, farm or non-farm, place of work and distance of place of work from home. Mother's age at the time of child birth is found to influence the duration of breastfeeding and most studies show that it has a direct relationship with the duration of breastfeeding.

The other two postpartum variables have been shown to be dependent on length of breastfeeding period (Bongaarts 1983). Bongaarts has established a linear relationship between durations of lactation and postpartum amenorrhea (one month difference between two populations in their mean durations of breastfeeding corresponds on average to about one half difference in their mean duration of amenorrhea).

Though there is no contradictory findings on the studies done elsewhere on postpartum variables and their determinants; this study has been deemed necessary because no such study has been done since 1982 when Mosley conducted one. It is the aim of this work to show the current

situation on postpartum variables and its determinants for comparison purpose both over time and with other estimates from other countries.

As indicated in the literature reveiw, suckling pattern can affect the initiation and duration of breastfeeding through physiologic mechanisms. Sociological and behavioral factors also influnce the women's decision to initiate and terminate breastfeeding which in turn affects the duration of other postpartum variables. Winikoff and her colleagues (Salimano, 1982) have described a framework illustrating the determinants of infant feeding practices. In this study, we have adapted that framework for our purposes as it explains how socioeconomic, sociocultural and demographic characteristics of the mother affect the duration of her postpartum practices. The effects of urbanization, maternal education, and socioeconomic status like income among others act through the intervening variables of health services, employment status of women, sociocultural factors, and availability of breastmilk subsititutes to affect the incidence and duration of postpartum practices. The pathways between the various segments of this framework can operate in both directions.

It can be assumed that sociocultural practices is beyond the scope of policymakers involved with population growth to readily control. It can also be assumed that increasing socioeconomic factors like women's education and income are desired outcomes, although they may be associated with declines in breastfeeding and other postpartum practices. Therefore, we assume the phenomena which are likely to continue affecting the duration of postpartum variables are:

1. Sociocultural environment,
2. Health care services
3. Mothers working pattern's
4. Knowledge and availability of breastmilk substitutes.

2.2 Theoretical framework

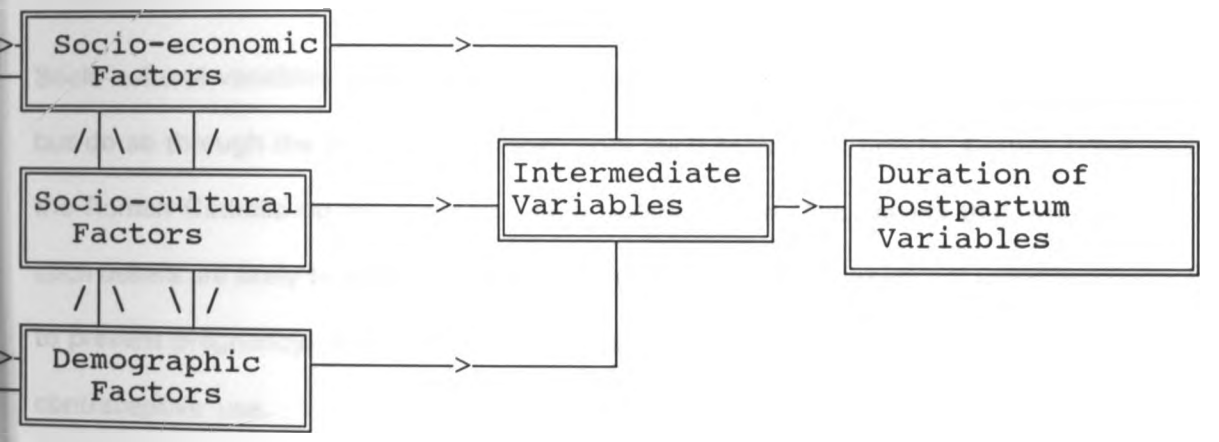
The incidence and duration of postpartum variables in a population is affected by a set of biological, cultural and economic factors. These factors affect postpartum variables mainly duration of breastfeeding through intervening variables such as health services, employment status of women, sociocultural factors and availability of breastmilk substitutes (Salimano, 1982).

2.3 Theoretical statement

From the foregoing literature review and theoretical framework, the following theoretical statement and conceptual model can be developed:

"Postpartum variables are likely to affect the fertility of any given place or region by socio-economic, socio-cultural and demographic differentials".

Figure 2.1 Conceptual model



Source: Huffman (1984): Determinants of breastfeedinf in developing countries, Overveiws and policy implications. Studies in Family Planning 15(4): 170 - 184.

2.4 Conceptual model

The socio-economic, socio-cultural and demographic variables do not affect duration of postpartum practices directly, but they do so indirectly through the proximate determinants such as knowledge of and availability of breastmilk subsititutes. For example, a woman's level of education does not affect her breastfeeding duration directly, but educated women are more likely to be working hence they will be buying breastmilk substitutes often hence the intensity and frequency of breastfeeding will reduce. This will lower both the incidence and duration of breastfeeding as compared to those with no education. An educated woman is also likely to access any contraceptive service since she has an income. She is also likely to be well informed about contraceptive methods and can therefore use any suitable one. The fact that most educated women are working means that they are occupied during the day such that when they come home in the evening, they are too tired to indulge in sexual intercourse frequently. All these help in reducing the durations of postpartum variables.

Socio-cultural variables such as religion cannot affect durations of postpartum practices directly but do so through the proximate determinants such as cultural beliefs. Certain religions such as the Roman Catholic do not approve use of contraception. This means that women who uphold such beliefs are likely to breastfeed for longer durations since they are not using any contraceptive to prevent pregnancy. This example shows clearly how postpartum duration is affected by non-contraceptive use.

The above three examples explain how duration of postpartum practices is affected by socio-economic, socio-cultural and regional variables through the proximate determinants such as contraceptive use and frequency of intercourse. The above argument was adopted by Winkoff (Salimano, (1984). He argued that the intermediate postpartum variables (proximate determinants)

affect incidence and duration of postpartum practices directly and if it changes then the durations necessarily change as well.

2.5 Definition of key analytical concepts

Socio-cultural factors:

These are factors which govern a people's way of life in a society. In this study the socio-cultural factors considered as influencing fertility are religion, marital status, region(province) and ethnicity.

Socio-economic factors:

These refer to indices of socio-economic status. The variables considered in this study are level of education, place of residence and work status.

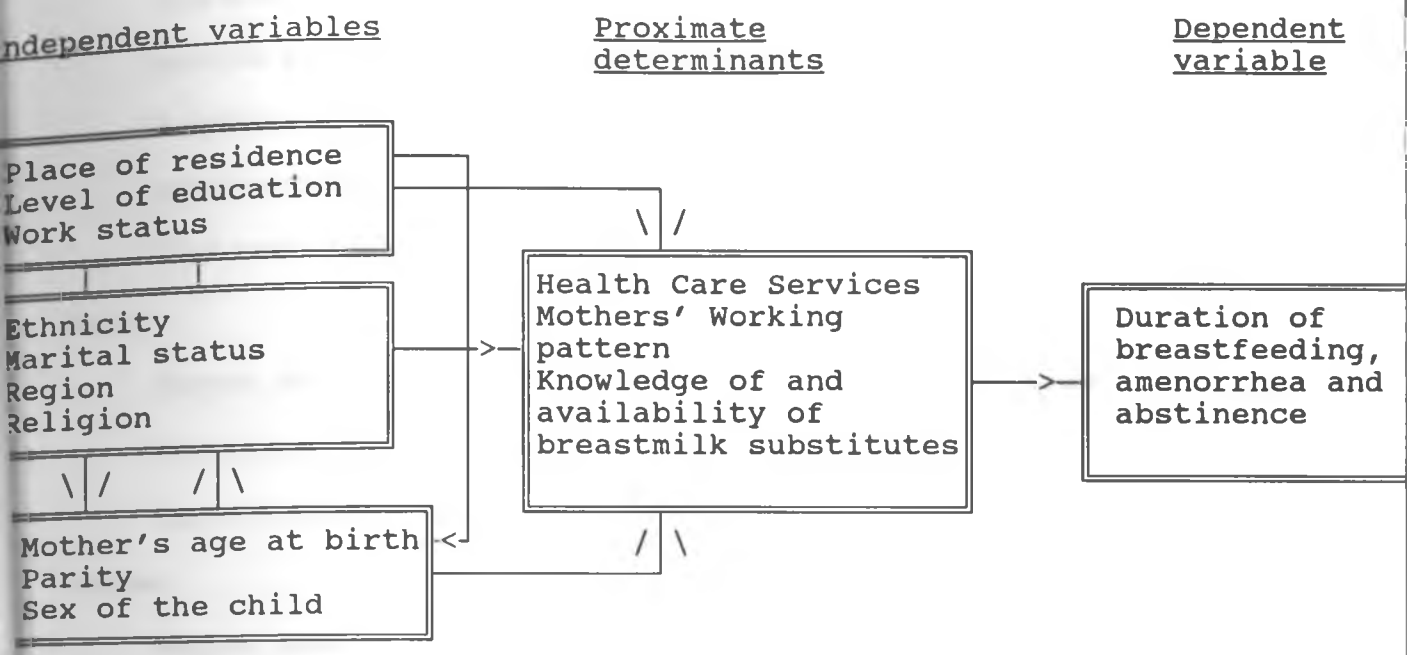
Demographic factors:

These include age of mother at child's birth, parity, and sex of the child.

2.6 Conceptual hypotheses

1. The length of postpartum practices are likely to be affected by socio- economic characteristics of the mother.
2. The length of postpartum practices are likely to be affected by mothers' socio-cultural characteristics.
3. The length of postpartum practices are likely to be affected by mother's demographic characteristics.

2.2 Operational Framework



Source: Modified Huffman model (1984)

2.6 Definition of operational concepts

Education:

Here, education is defined as formal schooling and the educational attainment of women aged 15-49 years has been considered. Educational attainment of the respondents is important because it influences attitudes towards duration of breastfeeding and age at introduction of supplementary food stuffs. Formal education is measured by the number of years of formal schooling and the highest standards of education achieved. In this study, education is categorized into none, primary and secondary and above.

Work status:

This is a classification of people or groups on the basis of their involvement in wage employment. The specific aspect of work status which is of importance in this study is whether an individual is working or not.

Place of residence:

This refers to classification of people or groups on the basis of where they reside. The particular aspect of place of residence which is useful in this study is whether an individual is residing in an area classified as urban or not urban (rural). According to the 1979 census, an urban centre is defined as a place with a population of atleast 2000 people. On the other hand a rural area is a place which is not classified as urban.

Regions:

Regions are specifically delimited administrative regions in the country. The regions considered in this study are the administrative provinces of Kenya namely; Nairobi, Central, Coast, Nyanza, Eastern, Western and Rift Valley.

Religion:

Religion refers to peoples spiritual relationship with God. In this study, religion is categorized into catholics, protestants, muslims, no religion and other religions. These will be used as comparison units in this study.

Ethnicity:

An ethnic group is a group of people having common traditions. Such a people share a common language and cultural practices and they usually reside at a common place. In this study ethnicity is categorized into Luhya, Luo, Kalenjin, Kikuyu, Kamba, Kisii, Meru/Embu, Mijikenda/Swahili and others. These will be the units of analysis for comparison purposes.

Contraceptive use:

Use of contraception refers to the conscious efforts of women to avoid pregnancy or conception through the methods such as rhythm, withdrawal, oral pills, IUD, injection and others. It is generally believed that the use of contraception has a negative impact on fertility or family size. It is used to space or to terminate births.

Parity:

Parity is the number of children ever born to the respondent at the time of interview.

Postpartum amenorrhea:

Postpartum amenorrhea is the period in which the normal pattern of ovulation and menstruation is absent immediately after giving birth. The length of this period is affected by the type and intensity of breastfeeding but not by postpartum abstinence.

Breastfeeding:

Breastfeeding is considered to be the changes in physiological mechanisms of a woman's body adduced to suckling. Suckling of the breast stimulate the sensory nerve ending located in the region of the nipple. This results into impulses being sent to the pituitary gland which responds by producing prolactin hormone. The hormone is carried by the blood to the mammary gland where it increases the production of milk. The amount of this hormone in the blood depends on the type and intensity of breastfeeding. The other function of prolactin hormone is that it inhibits the production of follicle stimulating hormone responsible for the development of the new egg in the ovary and the thickening of the uterus. Therefore the longer the length of full breastfeeding the longer the duration of postpartum amenorrhea.

Postpartum infecundable period:

Postpartum infecundable period is the period that follows immediately after giving birth. A woman experiences unovulatory period in which the normal pattern of ovulation and menstruation is absent. In a few societies, the total infecundable period is longer than the anovulatory interval due to the practice of postpartum sexual abstinence beyond the time of the postpartum ovulation.

Postpartum sexual abstinence:

Postpartum sexual abstinence is the avoidance of sexual intercourse immediately after the

birth of a child.

2.7 Operational hypotheses

1. Mother's level of education is negatively related to the duration of postpartum practices.
2. Mothers who are currently working are likely to have shorter durations of postpartum practices than those not currently working.
3. Mothers who live in the rural areas are likely to have longer durations of postpartum practices than those in the urban areas.
4. There is no variation on durations of postpartum practices by religion, region and ethnicity in Kenya.
5. There is no variation on durations of postpartum practices by mother's marital status.
6. The age of a woman at birth of a child is positively related to the duration of postpartum practices.
7. Parity is positively related to the duration of postpartum practices.
8. Mothers of female children have shorter durations of postpartum practices than those of male children.

CHAPTER THREE
SOURCES OF DATA AND METHODOLOGY

3.1 SOURCE OF DATA

3.1.1 Introduction

The source of data used in this study is the Kenya Demographic and Health Survey. This is a national survey which was conducted between December 1988 and May 1989. The main aim of the survey was to collect data on fertility, mortality, family planning and maternal and child health in Kenya.

The survey was conducted by the National Council for Population and Development (NCPD) in collaboration with the Central Bureau of Statistics (CBS) and the Institute for Resource Development (IRD). Funds for the survey came from two sources, the United States Agency for International Development (USAID) office in Kenya, and IRD through its contract with USAID Washington. IRD also provided technical assistance throughout all stages of the survey. The survey covered 7150 women aged 15 -49 years and a sub sample of 1116 husbands of these women selected from a sample covering 95 per cent of the population. The purpose of the survey was to provide planners and policy makers with data useful in making informed programme decisions.

The sample for the KDHS was based on the National Sample Survey and Evaluation Programme (NASSEP) master sample maintained by the CBS. The KDHS sample was national in coverage, with the exclusion of North Eastern province and four Northern districts which together account for only about five percent of Kenya's population. The KDHS sample was designed to produce completed interviews with 7500 women aged 15 - 49 and with a sub-sample of 1000 husbands of these women.

In the first stage, 1979 census enumeration areas (EAS) were selected with probability proportional to size, the selected EAS were segmented into the expected number of standard sized clusters, one of which was selected at random to form the NASSEP cluster. The selected clusters were then mapped and listed by CBS field staff. In rural areas household listings made between 1984 and 1985 were used to select the KDHS household while pretest staff were used to relist households in the selected urban clusters.

Despite the emphasis on obtaining district-level data for planning purposes, it was decided that reliable estimates could not be produced from the KDHS for all 32 districts in NASSEP, unless the sample was expanded to an unmanageable size. However, it was felt that reliable estimates of certain variables could be produced for the rural areas in the 13 districts that had been initially targeted by the NCPD Kilifi, Machakos, Meru, Nyeri, Muranga, Kirinyaga, Kericho, Uasin Gishu, South Nyanza, Kisii, Siaya, Kakamega and Bungoma. Thus all 24 rural clusters were selected for inclusion in the KDHS sample in each of these 13 districts. About 450 rural households were selected in each of these districts, just over 1,000 rural households in other districts, and about 3,000 households in urban areas, for a total of almost 10,000 households.

The KDHS utilised three questionnaires, one to list members of the selected households (household questionnaire) : another to record information from all women aged 15-19 who were present in the selected households the night before the interview (women's questionnaire) and the third to record information from the husbands of interviewed women in a sub sample of households (husbands questionnaire).

A total of 9,836 households were selected in the Kenya Demographic and health survey. Of these 8,343 were identified as occupied households during the fieldwork and 8,173 were successfully

interviewed. Respondents for the individual interview were women age 15-49 who had spent the night before the interview in the selected household. In the interviewed households, 7,424 eligible women were identified and 7,150 were successfully interviewed. In general, few problems were encountered during the interviewing and the response rate was high 98 percent for households and 96 percent for individual female respondents. In addition, 1,116 husbands were interviewed out of a total of 1,397 eligible for a response rate of 81 percent . Eligible husbands were defined as those who spent the night before the interview in the selected households and whose wives were successfully interviewed. Every other household was considered eligible for the husband's interview.

The data from the survey which is used in this study include mothers' current place of residence, level of education, religion, ethnic origin (tribe), religion (province), current work status, age of mother at child's birth and parity. Also to be used are durations of breastfeeding, amenorrhea and sexual abstinence; number of children born in the last 3 years prior to the survey and the number of women currently breastfeeding, amenorrheic and abstaining.

3.1.2 Data quality

Kenya Demographic and Health Survey was designed to provide high quality and reliable data. The questionnaires after being reliably designed were translated into the language of the communities to be surveyed. The quality test of the translation were conducted by pretesting them on the respective communities. Use of highly trained personnel was also aimed at enhancing the quality of the data. The use of the computers in the data entry, editing and tabulation further improved the quality of the data.

Results of the sample surveys usually suffer from two types of errors these are:

1) Non-sampling errors, and

2) Sampling errors.

Non-sampling error is due to mistakes made in carrying out field activities such as failure to locate and interview the correct household, errors in the way the questions are asked, misunderstanding of the questions on the part of either the interviewer or the respondent, data entry errors etc. These errors can only be minimized in a survey but cannot be avoided and are usually difficult to evaluate analytically. These were minimized by training the research assistants to a very high level so that they could interpret the questions correctly to the respondents. Research assistants were taken from respective ethnic groups so that interviews could be carried in vernacular.
Sampling error is a measure of variability between all possible samples. The advantage here is that the error can be estimated from the survey results. Sampling error encountered in the KDHS were computed by use of some complicated statistical methodology. It was noted that the relative standard error for most estimates of the country as a whole was not large.

The sample size used in the survey both at the district and provincial levels was very small and no generalised study could be carried out at these levels. The sample size only provides for the analysis at the national level. In districts like Kisii, as low as 140* people were interviewed and this can not portray the demographic characteristic of the whole region. The survey included only a few questions relating to mortality aspects, hence detailed analysis on mortality can not be carried out by the use of this data.

In age reporting, it was noted that the proportion of the population age, 0-4, was lower than the percentage age 5-9. It was also lower than the proportion age 0-4 from other sources (previous

surveys). This was found to be partly due to displacement of younger children into the 5-9 age group. It was also noted that women aged 15-19 were displaced to age group 20-24. There were also displacement of women from age group 45-49 to 50-54.

In the case of age heaping, Wipples Index was used to detect the degree of heaping. It was found that age heaping was slightly more than in KCPS of 1984 but lower than 1979 census. Preference for ages ending with 0 and 5 and to a lesser extent 2 and 8 were apparent for both males and females.

3.2 METHODOLOGY

3.2.1 Introduction

Durations of breastfeeding, postpartum amenorrhea and postpartum sexual abstinence can be estimated using two types of data:

i) retrospectively reported durations, and

ii) current status information on whether or not a child is still breastfeeding, whether or not his/her mother is still abstaining and whether or not menstruation has resumed following the birth of the child. The information on current status is used along with the age of the child at the time of survey.

The analysis of retrospective data can be based on those children whose mothers are no longer breastfeeding (or amenorrheic or abstaining) at the time of the survey and those whose mothers are still breastfeeding at the time of survey. For those in the former category, the retrospectively reported durations of the postpartum variables are taken as their "survival" times, while, in the case of the latter category the age of the children at the time of survey are considered as their survival times, however, they are treated as "censored" observations.

The procedure of handling censored data for a non-renewable event like cessation of breastfeeding are the well known techniques of life-table construction that take into account the duration of exposure of the censored cases (Smith 1980).

3.2.2 Life Table survival analysis: Retrospectively reported durations (with censored observations)

The classic procedures for handling censored data for a non-renewable event like cessation of breastfeeding are the well known techniques of life-table construction that take into account the duration of exposure (number of months elapsed since the birth in question) is known for all cases and the time to event or survival time known for all those who have already experienced the event (here age at weaning for those children who have already been weaned). One can easily estimate the conditional probability of experiencing the event (weaning) between exact duration x and x + 1 as:-

$$[{}_1q_x] = \frac{[{}_1D_x]}{[{}_1N_x]}$$

where:-

${}_1N_x$ is the number of cases who have been exposed throughout the interval x to (x + 1) to the risk of experiencing the event.

${}_1D_x$ is the subset of these cases who actually experienced the event during this interval.

From the ${}_1q_x$ values , the estimated probability of not experiencing the event before exact age x, the "survival " function can immediately be calculated as:-

$$l_x = \prod_{i=o}^{x-1} (1 - {}_1q_x)$$

The first differences yield the estimated proportions, ${}_1d_x$, experiencing the event in the interval between x and $(x + 1)$.

Assuming that on average they experience the event at the mid point of the interval, the mean time elapsed before experiencing the event is estimated as:-

$$e_0 = \sum_{x=1} [{}_1d_x] \, (x + 0.5)$$

Alternatively, the mean duration can be estimated directly from the l_x values, making the same assumption, using the equivalent expression

$$e_0 = 0.5 + \sum_{x=1} l_x$$

The analysis of breastfeeding differs, however from classic live-table method in one important respect. The construction of decrement tables conventionally applies to a real or synthetic cohort of persons, all of whom are exposed to the risk of experiencing the event in question. The above expressions exclude any case that were never exposed to this risk. For mortality, for example, life-table refers conventionally to live births; still born children (children born with a duration of life of exactly zero) are excluded. For a number of phenomena, however, of which breastfeeding is one, the sub-group of which exact duration zero is also of interest. This category should not be excluded while we are calculating the overall mean duration of breastfeeding. We are often more interested in estimating the distribution by duration of breastfeeding (including those who were never breastfed) than in the distribution by age at weaning among those at risk of weaning i.e restricted to those who were breastfed. Expressed another way, instead of being most interested

in the proportions still being breastfed at age x months among those children who were breastfed, we are more interested in the proportions being breastfed at age x, months among all children in question, whether or not they were breastfed. We shall refer to this latter proportions as l'x, it is defined simply as:-

$$l'_x = E\prod (1 - {}_i q_x)$$

where:-

E is the proportions ever breastfed. The first differences ${}_i d_x$ give the proportions breastfed for each interval x to (x+1), whom we assume to have had an average duration of (x+0.5) months. (1-E) gives the proportions with a duration of breastfeeding of zero. The duration of breastfeeding can therefore be estimated as the impact of modernizing influences on breastfeeding and postpartum sexual abstinence.

Postpartum information relates to the last three live births.

Naturally, not all the respondents had children by the time of the surveys, so this study involves only subset of the data.

The data required for this method:

1) The total number of children that were born between three years before the survey and at the time of survey.
2) The data for child and the corresponding duration within which he/she was breastfeed.
3) The number of cases that were censored in each interval (x,x+n).
4) The number of cases at risk of termination during the interval (x,x+n).
5) The number of cases that were actually terminated in the interval (x,x+n).

6) The proportion of children who were breastfed.

The data should be available both at the national level and by various characteristics.

Weaknesses of KDHS data that could not enable the use of this method in this study

This is the best method for handling survival analysis cases such as duration of breastfeeding. However, by the use of secondary data that was collected and coded by different organization, some of the variables needed for the use of this method were not well differentiated. In the survey there was no difference between the number of cases that were censored in each interval (x, x+n) and the number of cases that were actually terminated in the interval (x, x+n). Due to this difficulty, abridged life table technique and Mosley Prevalence method are used for estimating the durations of postpartum practices.

3.2.3 Abridged Life-Table Technique

The basic information required to construct abridged life table is cross tabulation of all women by duration of exposure and termination status. The abridged life table is also applicable here because the duration of postpartum variables are grouped in three months interval, thus overruling the use of conventional life table, also the quality of data is not very good as these data are prone to preference of certain months for reporting events. All these shortcomings can be solved by the use of abridged life table which is used to smoothen data for a given interval.

"Duration of exposure" means the interval from birth to when breastfeeding stops and "termination" means a variable indicating whether exposure was terminated by weaning. The duration of exposure was grouped into three months intervals which therefore gives the rationale for constructing an abridged life table for this study.

Following the life table notation the symbol '*x*' is used to refer to duration in exact months and '*n*' to refer to the width of the intervals of exposure. For the first interval of exposure the entry is simply the total number of women who at least had a birth within the three year period prior to the survey and who also reported that they breastfed their infants. For each subsequent interval the number observed at duration $x+n$ is calculated as the number observed at duration *x* minus those who stopped to breast feed between *x* and $x+n$.

i.e $l_{x+n} = l_x - {}_nd_x$

where:-

l_x- Is the number of women observed at the beginning of the interval$(x, x+n)$.

${}_nd_x$- Is the number of women who would stop to breastfeed within the indicated period of length *x* and $x+n$ out of the total number of women assumed in the table.

${}_nL_x$- Is the number of person months that would be breastfed within the indicated month interval *x* and $x+n$ by the cohort of women assumed in the table; and is obtained using the formula

${}_nL_x = n(l_x + l_{x+n})/2$; where n is the interval length.

T_x- Is the total number of person months that would be breastfed after the beginning of the indicated month interval by the cohort of women assumed.

$e_{(x)}$ - Is the average length of breastfeeding for a person observed at the beginning of the indicated month interval. The tables calculated in this study are single decrement life tables. The same procedures will be used to estimate the durations of postpartum amenorrhea and sexual abstinence.

The data required for this method:

1) The total number of women who have given birth three years prior to the survey.

2) Duration of breastfeeding for each woman for all the children she had given birth to in the last

three years.

3) Mother's duration of breastfeeding in months by her various socio-economic and socio-cultural and demographic characteristics.

4) The number of cases at risk of termination during the interval (x,x+n).

5) the number of cases that were actually terminated in the interval (x,x+n)

The data should be available both at the national level and by various characteristics.

3.2.4 Mosley Prevalence Method

The mean duration of breastfeeding for the categories of each of the characteristics was estimated using the approach developed by Mosley et. al.(1982). We define the mean duration as the total number of women who are currently breastfeeding divided by the average number of births per month. The average number of births per month was calculated from the reported number of births over a period of three years (1 - 36 months preceding the survey). This approach has been found to produce reliable and consistent estimates (Ferry and Smith, 1983). The estimates seem to compare favourably well with estimates derived from the more laborious methods especially when the average number of births per month is based on births in the three years preceding the survey (Page, Lesthaege and Shah, 1982; Ferry and Smith, 1983).

3.2.5 Relationship between duration of breastfeeding and postpartum amenorrhea.

The relationship between duration of breastfeeding and postpartum amenorrhea is not one-to-one. The resumption of menstruation cannot be delayed indefinately by breastfeeding. After a certain period, menstruation returns irrespective of whether or not the child is being breastfed thereafter. In general, one month of breasfeeding adds between one-quater and three-quarter months to the duration of postpartum amenorrhea (Van Ginneken, 1974; Jain and Sun, 1972; Leridon, 1972). Bongaarts (1983, 1983) recently found that the relationship between breastfeeding and

postpartum amenorrhea (at the aggregate level) is exponentially given by:

$$A = 1.753 \exp (0.1396B - 0.001872B^2; R^2 = 0.96$$

where A is the duartion of amenorrhea and B is the duration of breastfeeding. It is found that the impact of breastfeeding in prolonging the duration of amenorrhea is minimal if the duration of lactation is less than six months and only increases significantly after about 10 monthjs (Jain and Sun, 1972).

3.2.6 Multivariate analysis

3.2.6.1 Multiple regression analysis

The ordinary least square regression is used in this study. Regression analysis shows the strength and direction of independent variable on dependent variables. To be able to establish the direct relationship between selected socio-economic, socio-cultural and demographic factors on postpartum variables multiple regression analysis was used.

Multiple regression assumes that the underlying relationships among the variables are linear and additive. Thus the model is of the form:-

$$Y_i = ß_0 + ß_1X_1 + ß_2X_2 + \bullet\bullet\bullet + ß_kX_k + e_i$$

Where:-

$ß_0$ is a constant term.

$ß_i$ is the regession coefficient of the independent variable i.

e_i is error term which is assumed to be normally distributed with a mean of zero and standard deviation of 1.

The expected values of the dependent variable Y can be obtained and its relation to the actual value calculated through multiple correlation coefficient, R^2, given by:-

as in simple regression.

$$R^2 = 1 - \frac{SSres}{SSy}$$

where:-

R^2 is the coefficient of determination that shows the amount of variation in the dependent variable Y, that is explained by the independent variables.

3.2.6.2 Testing of statistical significance

F-TEST

This is used to test the null hypothesis, that all k independent variables considered together do not explain a significant amount of variation in the dependent variable Y.

$H_0 : \beta_1 = \beta_2 = \beta_3 = \bullet\bullet\bullet = \beta_k = 0$

Versus H_1 : Not H_0

The statistical test employed for the overall test is:

$$F = \frac{\frac{SSreg}{k}}{\frac{SSres}{(n-k-1)}}$$

$$= \frac{\frac{R^2}{k}}{\frac{(1-R^2)}{(n-k-1)}}$$

where:

SSreg is the sum of squares explained by the entire regression equation.

SSres is the residual (unexplained sum of squares)

K is the number of independent variables in the equation.

n is the total sample size.

The F ratio test is distributed approximately as the F distribution with degrees of freedom k and n-k-1.

Assumptions of Multiple Regression

1. The dependent variable and the independent variables should be normally and randomly distributed.
2. The independent variables have to be linearly related to the dependent variable.
3. That there is minimal or no multi-collinearity among independent variables .
4. The dependent variable must not be dichotomous. But can be ratio or interval form.

Shortcomings of Multiple Regression

The main problem with multiple regression is that of multi-collinearity, defined as the interactions of the independent variables. The problem arises when independent variables overlap. When the independent variables overlap more, the reliability of the regression coefficient is lower. This problem was overcome by computing variance-covariance matrix and dropping one variable when correlation coefficient of the two variables is greater than 0.6. However, in this study none of the variables showed this.

When using a stepwise regression there arises a problem , that is, the procedure indicates the variables to be included. The researcher does not have absolute control over what he is doing. However, stepwise regression only analyses those variables that contribute significantly to the explanation of the dependent variable.

$_nd_x$ -: is the number of women who stopped breastfeeding within the indicated period of length x and $x+n$ out of the total number in the table. According to Table 4.1.1 there would be 410 women who would stop breastfeeding between 3 and 5 months.

L_x -: is the number of person months that would be breastfed within the indicated month interval x to $x+n$ by the cohort of women in the table. According to Table 4.1.1 person months that would be breastfed between 3 and 5 months is 11025.

It is obtained by using the formula:

$_nL_x = n(l_x + l_{x+n})/2.$

where n is the interval length. According to Table 4.1.1, person months that would be breastfed between 3 and 5 months is 3*(410 + 371)/2 = 11025.

T_x -: is the total number of person months that would be breastfed after the beginning of the indicated month interval by the cohort of women assumed. According to Table 4.1.1 shows that 4305 women would breastfeed for 53964 months after 3 months of breastfeeding.

$e_{(x)}$ -: is the average duration of breastfeeding a woman is expected to experience at the beginning of the indicated month interval. Thus a woman who has just given birth is expected to breastfeed for 15.38 months.

Table 4.1.1 Life table for mean duration of breastfeeding of women

Interval(Months)	lx	ndx	nLx	Tx	e(x)
0-2	4305	425	12277.5	66241.5	15
3-5	3880	410	11025	53964	13
6-8	3470	400	9810	42939	12
9-11	3070	371	8653.5	33129	10
12-14	2699	580	7227	24475.5	9
15-17	2119	383	5782.5	17248.5	8
18-20	1736	505	4450.5	11466	6
21-23	1231	340	3183	7015.5	5
24-26	891	430	2028	3832.5	4
27-29	461	259	994.5	1804.5	3
30-32	202	84	480	810	4
33-35	118	70	249	330	2
36-38	48	45	76.5	81	1
39-41	3	3	4.5	4.5	1
		4305			.5

In the above table the average duration of breastfeeding at the national level is 15.4 months, this duration is much lower than in KDHS report which showed an average breastfeeding duration of 19.4 months for the whole country. In KDHS report, prevalence method was used to estimate these durations and this is why the estimates of this study are lower as compared to those of KDHS report of 1989. Similarly, the estimated durations are lower than 16.5 months that was estimated by Mosley et al (1981) using KFS of 1978. This shows that the practice is on the decrease in Kenya. The durations of postpartum amenorrhea and sexual abstinence are 9.84 and 5.42 months respectively.

The procedure used in estimating the duration of breastfeeding by life-table is adopted for estimating durations of postpartum amenorrhea and sexual abstinence.

4.1.2 Mean duration of postpartum variable by mother's age

Looking at the results, mother's age is found to be directly related to the duration of breastfeeding. The mean duration of breastfeeding for mothers who are 15-19 years old is 10.41 months and increases monotonically with an increase in age to 20.09 months for mothers who are 45-49 years

old. The findings have the same trend and pattern as in other studies. Mosley (1981), Minyacha (1986) and Otieno (1988) carried out similar studies in Kenya and got similar results though their figures were fairly high. This variation can be explained by the nature and quality of data required for life table construction. Life table construction requires retrospective data which in most developing countries is not devoid of digital preference, memory lapse, recall bias; all which result in either over-reporting or under-reporting of duration of a past event. Kenya is not an exception to this problem. For all the ages it is possible that there was under-reporting of duration of breastfeeding attributed to poor memory due partially to low level of education or cultural taboos.

Similarly, durations of postpartum amenorrhea show the same trend as breastfeeding. Mothers aged 15-19 years amenorrheic for 6.94 months whereas those aged 45-49 years experience it for 12.11 months. Therefore, it can be said that the duration of breastfeeding and amenorrhea show the same trend and the two variables may be influenced by similar factors.

On the other hand there is no particular relationship between either breastfeeding or amenorrhea and abstinence as can be seen on the Table 3.2. The duration of abstinence reduces from 6.18 months for mothers aged 15-19 years to 4.78 months for those of age 30-34 years. Thereafter, it increases monotonically with age to 7.4 months for those aged 45-49 years. The results do not conform to the other studies done.elsewhere. For example, Oni (1981) carried out a study in Ilorin, Nigeria, and found an inverse relationship between duration of breastfeeding and abstinence. Our results could have been distorted by the quality of data as explained above or it could be due to lack of free atmosphere especially in discussing sex related issues.

Table 4.1.2 Mean Length of postpartum variables by Mother's Age

Mother's Age	Breast-feeding	Amenorrhea	abstinence
15-19	10.41	6.94	6.18
20-24	12.95	7.57	5.87
25-29	14.14	8.38	5.07
30-34	14.87	9.37	4.78
35-39	15.56	9.79	5.13
40-44	17.74	9.75	6.22
45-49	20.09	12.11	7.4

4.1.3 Mean durations of postpartum variables by parity

It has been suggested that if breastfeeding is used deliberately by many mothers in order to limit their family sizes, its durations should be affected by the number of children already born (Henry, 1961). We have divided the number of children in our study into three groups:- a) those who are first to third born. b) those who are of fourth born to fifth and c) those who are of sixth born and above.

From the results, there is an increase in the duration of breastfeeding with an increase in parity. However, variation between those durations is small, being, less than one month. Mothers of parity one to three breastfeed for an average of 13 months whereas those of parity four to five and six plus have breastfeeding durations of 13.13 and 13.70 months respectively. The findings agree with other studies, like Jellife 1978 who carried out a survey and found that younger mothers breastfeed shortest, and concluded a major reason that some young mothers give for stopping breastfeeding is "insufficient milk".

The results are also plausible because while the possibility may exist that some couples may be using prolonged breastfeeding practice to deliberately limit their family sizes, it is also equally important to consider that some mothers of higher parities may have overcome, through experience, the emotional or psychological and even some physiological barriers that new and young mothers usually go through in respect to breastfeeding and which often make them to breastfeed their babies for shorter durations.

Postpartum amenorrhea also follow the same trend as breastfeeding and since it has been established that the two variables are positively related, the results are convincing. However, amenorrheic durations for mothers of parity one to three is 6.42 months whereas those of parity four to five and six plus amenorrheic for 7.97 and 9.08 months respectively. The variation is wide as compared to the one in breastfeeding duration. This could be due to the quality of data used.

There is an inverse relationship between parity and duration of abstinence. Our results show that mothers of parity 1 to 3 abstain on average for 5.09 months and decreases gradually with an increase in parity to 3.97 months for mothers of parity greater than six children.

Table 4.1.3 Mean duration of postpartum variables by parity

Parity	Breastfeeding	Amenorrhea	Abstinence
1-3	13.00	6.42	5.09
4-5	13.13	7.97	4.09
6+	13.70	9.08	3.97

4.1.4 Mean duration of postpartum variables by sex of the child.

The sex of the child has no significant effect on the duration of postpartum variables. The male children were breastfed on average for 13.05 months, while the females breastfed for about 13.01 months. On the other hand mothers of female children have longer amenorrhea periods than their counterparts with male children. Mothers of female children have amenorrhea duration of 7.52 months while mothers of males amenorrheic for 7.44 months.

The pattern for postpartum sexual abstinence is the same as the one for breastfeeding. Whereas, mothers of males children abstain from sex for 4.5 months, mothers of female children abstain for 4.49 months. Based on the evidences so far, the hypothesis of preferential breastfeeding and sexual abstinence, based on the child's sex cannot be supported.

Table 4.1.4 Mean durations of postpartum variables by sex of the child

Sex	Breastfeeding	Amenorrhea	Abstinence
Male	13.05	7.44	4.5
Female	13.01	7.52	4.49

4.1.5 Mean duration of postpartum variables by place of residence

From the results it is clear that urban women breastfeed on average for a shorter duration than their rural counterparts. Rural women breastfeed their babies for a duration of 15.8 months compared to 12.2 months for their urban women. The same is true for both postpartum amenorrhea and sexual abstinence.

These differences observed in the durations of breastfeeding, postpartum amenorrhea and postpartum sexual abstinence between mothers residing in rural and urban areas can be explained in terms of economic activity and traditional values which apparently are associated with these

areas. Mothers who reside in urban have higher opportunity of generating income as compared to rural women, thus urban women purchase commercialised breastfeeding supplements more oftenly. This helps to reduce both frequency and intensity of breastfeeding among the urban women, thus shortening their breastfeeding duration as compared to the rural women. It is also supported by the fact that most of urban women are engaged in paid wage labour which not only allow them to purchase supplementary foods for their children but also keep them almost day-long before breastfeeding. To the contrast rural women are engaged in agricultural activities such as cultivating and harvesting. During these activities breastfeeding mothers carry along with them their babies. These babies are breastfed at anytime they cry making the frequency and intensity of breastfeeding to be high, hence their breastfeeding duration is longer. This practise is often not possible in the urban areas where women work far away from the residential houses.

The difference in breastfeeding durations help to explain variations in duration of postpartum amenorrhea in rural and urban areas. Since it has been established that there is a positive relationship between durations of breastfeeding and postpartum amenorrhea, the results of this study follow this pattern, where mothers in rural areas amenorrheic for a longer duration than their urban counterparts. Similarly, duration of postpartum sexual abstinence is longer in the rural than in urban areas. This could be due to sleeping arrangements in these places . Whereas in urban areas houses are small to an extent that hardly do people fix two beds in their bedrooms, in the rural areas most people have spacious houses where two beds can easily fit. When a couple sleeps on the same bed, there is always a stronger bond thus sexual relationship resumes faster than in the other case. Secondly, most people in rural areas are in polygamous marriage, thus, when one of the wives delivers the man takes longer time in the other wife's house, while in the urban area people are mostly in monogamous marriage. Alternatively, people in rural areas could be still tied to norms and taboos governing each ethnic group. In most ethnic groups it was an offence to have

sex with a breastfeeding mother before the child attains two years of age for fear that semen would contaminate breastmilk. These taboos can only be effective in the rural ares and not in urban areas.

Table 4.1.5 Mean durations of postpartum variables by place of residence

Place of residence	Breastfeeding	Amenorrhea	Abstinence
Urban	12.2	7.01	5.05
Rural	15.8	8.96	5.61

4.1.6 Mean duration of postpartum variables by mother's level of education

From other studies, mother's educational level had been shown to be one of the factors affecting the durations of breastfeeding,[Mosley et al (1981), Minyacha S.O (1986), Oni O.(1981) and Otieno A.O (1988)]. In this study, the results show that the duration of breastfeeding decreases monotonically with an increase in education. The mean duration of breastfeeding for those children whose mothers had no education is 14.9 months; those whose mothers had primary education were breastfed on average for 13.5 months; and those whose mothers had secondary and above education were breastfed on average for 11.8 months. Education could thus be said to change people's mode of life and attitude towards traditional practices like breastfeeding. Women with higher educational level often stay in urban areas where they are employed in offices. This forces them to breastfeed less frequently as compared to the other women. Since they are employed, they introduce supplementary foods to their children at relatively earlier age thus making their breastfeeding durations to be shorter.

As one attains education, her taste changes and the way one values traditional practices also changes with higher level of education. Most women with secondary education and beyond tend to adopt modern ideas at the expense of continuing with traditional practices. Traditionally,

breastfeeding practice is encouraged as one way of limiting births but educated mothers wean early and start using contraceptive methods to control conception instead.

As in other cases, durations of postpartum amenorrhea is also inversely related to mother's educational attainment. This follows from its relationship with breastfeeding duration. Thus mothers with no education amenorrheic for 10.25 months while those with primary and secondary plus education amenorrheic for 8.59 and 7.08 months respectively.

The relationship between level of education and duration of postpartum sexual abstinence is however different with mothers of no education abstaining from sex for 6.05 months as compared to 5.27 and 5.47 months for primary and secondary plus education respectively. This lack of uniformity could be due to quality of data. It could have been due to under-reporting or over-reporting and as is the case, the issue of sex is very delicate and most people hardly discuss it freely or else they don't talk of it at all.

Table 4.1.6 Mean durations of postpartum variables by level of education

Level of education	Breastfeeding	Amenorrhea	Abstinence
No education	14.9	10.25	6.05
Pri. Education	13.5	8.59	5.27
Sec. Education	11.8	7.08	5.47

4.1.7 Mean durations of postpartum variables by mother's work status

If modernization implies a decrease in the duration of breastfeeding, as indicated by the effects of mothers level of education and place of residence, then one would expect that women who

figures of postpartum variables are presented in the table below.

Table 4.1.7 Mean durations of postpartum variables by work status of the mother

Work status	Breastfeeding	Amenorrhea	Abstinence
Currently Working	14.15	8.37	5.01
Not currently working	15.63	8.66	5.78

4.1.8 Mean durations of postpartum variables by region

The results show that there is much variation in durations of breastfeeding by region. However, the provinces where mothers breastfeed their children longest are Eastern and Coast. People at Coast province are mostly muslims and according to the teachings of Holy Koran, a woman should breastfeed her child for at least two years. The following quotation from the Holy Koran is explicit.

> "The mothers shall give suck to their offspring for two whole years, if the father desires to complete the term." [Sura 2:33 (English language version in Abdullah Yusuf Ali), 1946].

As earlier been established the duration of breastfeeding is inversely related to level of education. In this study most women in Coast who are muslims have lower level of education as compared to their counterparts in the rest of the country. Thus, from the above statement it is true to say that Coast mothers will breastfeed their children for longer durations than other women. Due to the remoteness and aridity of Eastern province, women there are likely to breastfeed their children for longer durations than the rest of Kenya except Coast Province, due to its aridity well nourished infant foods are hardly available prompting women to breastfeed longer.

Women in Nairobi breastfeed their children for an average of 13.23 months, this is the least duration for the regions. The results show what is expected because Nairobi is an urban area

Kiambu, Ruiru, Thika. They adopt living standards of Nairobi in these small towns and even in their homes, so there is an influence of Nairobi in these areas.

There seem to be a uniformity in durations of breastfeeding in Western part of Kenya where Rift Valley, Nyanza, and Western provinces have their average durations for breastfeeding as 14.06, 14.12, and 14.63 months respectively. This pattern is possible since people of Nyanza and Western provinces of Kenya have more-or-less the same culture. In these parts of Kenya, infant and child mortality is higher than anywhere, women breastfeed their children longer with an aim of preventing some common diseases which are transmitted through contaminated food like diarrhoea. It can be generalized that breastfeeding is shortest in Nairobi and the average durations increases as one moves away from Nairobi. It also marked that breastfeeding duration is longest experienced in Coast Province where there is both strong cultural beliefs.

The study shows that there is no wide variation in amenorrhea as experienced in breastfeeding. Women in Nairobi amenorrheic for 7.34 months which is the shortest of all the regions. In other provinces, women resume their fertility after 8 months from the birth of a child. The longest amenorrheic period is observed in Rift Valley which had 8.97 months. The figures for amenorrhea durations don't show the direct relationship between durations of breastfeeding and abstinence. This could have been caused by the quality of data used,it could have come as a result of memory lapse during interviewing or digital preference as demanded by tradition.

Durations of abstinence by region show a wide variation with people of Nairobi, Coast and Western provinces abstaining for the least durations. This could be true for Western province since a district like Bungoma had the highest total fertility rate in Kenya of 8.89 in 1984. Nairobi, could have been compensated for by having higher contraceptive prevalence, thus its TFR is low even when the duration of abstinence is low. Coast province observe shorter durations of abstinence due to the demand of their religious belief, more so most women in Coast Province are not

engaged in both agricultural and office work, not even in business, this make them lazy thus resorting to sexual activities to avoid boredom.

Most people of Coast province are in polygamous marriage, this encourages competition among co-wives to have more children, it leads to women abstaining for a shorter duration to compete with other co-wives.

Table 4.1.8 Mean durations of postpartum variables by region

Region	Breastfeeding	Amenorrhea	Abstinence
Nairobi	13.23	7.34	4.19
Central	13.92	8.43	7.67
Coast	15.67	8.74	3.87
Eastern	15.29	8.53	6.13
Nyanza	14.12	8.73	5.33
Rift Valley	14.06	8.97	6.52
Western	14.63	8.87	4.05

4.1.9 Mean durations of postpartum variables by religion

The study shows that women who do not belong to any religious group breastfeed most with an average duration of 16.35 months. For those who belong to a religious group, it was found that women who are catholics breastfeed longer than those who belong to other religious groups (denominations). The average durations of breastfeeding are as follows: catholics (14.52), protestants (14.4), muslims (14.13) and "other religion" 14.39 months.

The observed difference of 1.9 months between women who are religious and non-religious could be due to varying traditional beliefs, for example, women of no religion still observe traditional beliefs and taboos more often than other women, thus, according to most culture women were

required to breastfeed their children for atleast 2 years. Women who are christians or muslims tend not to follow culture very strictly. Non-religious women are less educated than religious women and as found earlier in this study, women with lower level of education breastfeed their children for longer durations and vice versa. The results agree with KCPS (1984) where non-religious women breastfeed longer than those who belong to any religious group. Also, women in urban areas atleast belong to a religious group and the ones who live in rural areas some or quite a number do not belong to a religious group. So, one can generalise that women of "no religion" mostly live in rural areas, and it had been established in this study that rural women breastfeed longer than women in urban areas.

For women who atleast belong to a religious denomination, catholics lead in durations of breastfeeding with 14.52 months. This differs with earlier studies [KCPS (1984), Mosley (1981), Minyacha (1986)] that found that women who are muslims breastfeed longest. The results of this study could be due to family planning campaign where catholics encourage natural methods such as withdrawal and prolonged duration of breastfeeding to their followers and are opposed to mechanical family planning methods like use of pills, intrauterine devices (IUD) or condoms. This helps encourage catholics to breastfeed their children to longer durations both to give the child best food and to observe longer inter-birth interval.

However, protestants breastfeed their children for shorter durations as compared to Catholics. Protestants preach to their followers the use of mechanical family planning methods which do not influence the duration of breastfeeding, they use pills, intrauterine devices, etc. These methods control the higher risk of conceiving after a woman stops breastfeeding early, i.e when the child is still young.

Religion is somehow related to region, for example, most Catholics live in Nyanza and Western Provinces where durations of breastfeeding are longer. The protestants, however, dominate Central and Rift Valley Provinces where durations of breastfeeding are shorter compared to the other. "Other religion" are mostly concentrated in parts of Nyanza and Rift Valley. They observe longer durations of breastfeeding than the protestants. Muslims are to be found mainly in Coast and North Eastern provinces.

Muslims have the least duration of breastfeeding among all religious groups and as mentioned earlier, it contradicts other studies that were carried out earlier. This deviation could be due to the nature and quality of data used in this study. Never-the-less, this could be true because those studies were done over five years ago, and people's attitude towards formal education is changing. More women are receiving education in Coast Province and as the level of education increases, duration of breastfeeding must decrease as observed earlier. Islam as a religion encourages polygamous type of marriage where co-wives compete in total number of children. This encourages women in polygamous marriage to breastfeed for shorter duration than those in monogamous type of marriages. This could help explain the observed difference since Catholics and Protestants sanction monogamous type of marriage. Furthermore, Muslims do not sanction any use of family planning method.

The study also show that women of no religion amenorrheic longest with a duration of 9.1 months; Catholics for 8.7 months; Protestants for 8.6 months; Muslims for 8.7 months and other religions for 7.6 months. The study show that women of other religions experience shortest amenorrheic period as opposed to breastfeeding where the least is Muslims.In amenorrhea women who are muslims have longer durations, only second to these with "no religion". Since duration of breastfeeding is positively related to the duration of amenorrhea, this lack of uniformity could

be due to the poor quality of data used.

Women who do not belong to any religion, still have the longest postpartum sexual abstinence as in other postpartum variables. This is expected owing to their durations of amenorrhea and breastfeeding. Women who belong to "no religion" abstain from sex for 6.33 months, catholics (5.39), protestants (5.59), muslims (3.94) and "other religion" (5.56) months. The least abstaining religious group is muslims, this could be as a result of competition among co-wives interms of number of children a woman has, thus, making nursing mothers to resume sexual intercourse at relatively early ages of the child. Low levels of education among muslims may lead to early resumption of sexual intercourse, this is because of lack of knowledge on dangers it may subject the woman to.

Table 4.1.9 Mean duration of postpartum variables by religion

Religion	Breastfeeding	Amenorrhea	Abstinence
Catholics	14.5	8.7	5.4
Protestants	14.4	8.6	5.6
Muslims	14.1	8.7	3.9
No Religion	16.4	9.1	6.3
Other	14.4	7.6	5.6

4.1.10 Mean duration of postpartum variables by ethnicity

The sample size was divided into eight major ethnic groups in Kenya and the other smaller tribes were conglomerated under "others". The study shows that average durations of breastfeeding vary among tribes, the variation is 2.4 months of breastfeeding. Mijikenda, "others" and Kisii breastfeed for 16.19, 15.49 and 15.13 months respectively, these are the longest durations . Whereas the Luo, Kamba, and Kikuyu have medium durations of breastfeeding, the Luhya and

Kalenjin experience the least durations of breastfeeding. These difference in durations of breastfeeding is mainly due to varying cultural practices which is beyond the scope of this study.

Kalenjin, Kisii and Mijikenda experience the longest durations of amenorrhea by ethnicity. The remaining ethnic groups have almost similar durations with Kikuyus having the least durations of amenorrhea. The durations of breastfeeding and amenorrhea are related among the Mijikenda, Kikuyu, Luo and Kamba. The other ethnic groups show disparities in patterns. We can only relate this to be a function of breastfeeding. However, as noted earlier ethnic groups who live in regions with longer durations of breastfeeding, breastfed longer too. This is due to levels of education, place of residence and prevalence of family planning methods.

To the contrary Mijikenda who experience the longest durations of both amenorrhea and breastfeeding observe the shortest average duration of postpartum sexual abstinence, that is 3.6 months. Luo and Luhyas also observe shorter duration of postpartum sexual abstinence of 3.8 and 4.0 months respectively. Kalenjin observe the longest duration of sexual abstinence as compared to the entire ethnic groups. From table 3.1.9, the Kalenjin experience longest durations of amenorrhea and abstinence but do not observe long durations of breastfeeding. Kamba, Kikuyu, Kisii, "others" and Meru/Embu experience medium duration of abstinence.

Table 4.1.10 Mean durations of postpartum Variables by Ethnicity

Ethnicity	Breastfeeding	Amenorrhea	Abstinence
Kalenjin	14.3	9.4	7.1
Kamba	14.7	8.3	6.1
Kikuyu	14.7	8.3	6.7
Kisii	15.1	9.9	5.5
Luo	15.0	8.4	3.8
Luhya	13.8	8.6	4.0
Meru/Embu	16.3	8.4	6.6
Mijikenda	16.2	9.5	3.6
Others	15.5	8.8	5.8

4.1.11 Mean durations of postpartum variables by marital status

The study shows that widowed women breastfeed their children for the longest duration by marital status, they observe a duration of 15.7 months. Married and divorced women breastfeed their children for 13.3 and 13.6 months respectively. Never married women observe the least duration of breastfeeding of only 12.8 months.

Widowed women have emotional behaviour towards their children, this being so after the death of their husbands, their only hopes are on their children. This is also accepted by culture where after the death of a husband a woman stays for sometimes after which she is remarried by her brother-in-law to join a polygamous union. The divorced women, however, did not show long durations of breastfeeding since they are engaged in marital life elsewhere from their former husbands' homes. This makes them not experience emotionally feelings but instead look for a second man to remarry them.

Never married women show the least average duration of breastfeeding, the same results was

reflected in KCPS (1984), where never married women breastfeed their children for ** months which is the least. Similar trend were found by Minyacha (1989) and KDHS (1989). These average durations of postpartum practices by marital status are shown below.

Table 4.1.11 Mean durations of postpartum variables by marital status

Marital Status	Breastfeeding	Amenorrhea	Abstinence
Never Married	12.8	7.0	10.9
Married	13.3	7.4	3.5
Widowed	15.7	9.9	8.3
Divorced	13.6	8.7	8.2

The above table shows the same trend in postpartum amenorrhea as in breastfeeding. Women who are widowed amenorrheic longest for 9.9 months and this decreases as does in the case of breastfeeding to 7.0 months for never married women. This follows the relationship between durations of breastfeeding and amenorrhea. The studies which concur with these are Otieno A. (1990) who carried out his study on women in Siaya District and found the same trend, though his durations were slightly higher. Minyacha (1988) used KCPS data of 1984 and established the same trend. Thus we can say that the results of this study agree with the results. There has been no much change of postpartum variables from 1984 to 1989.

The analysis also shows that never married women abstain from sexual practices longest with a duration of 10.9 months. Widowed and divorced women abstain for 8.3 and 8.2 months respectively. Married women abstain the least with an average duration of 3.3 months. This is because married women are more exposed to the risk of resuming sex earlier than the others. On the other hand, never married women tend to be more educated which make them abstain longest

as a measure for having longer child-spacing.

DURATIONS OF POSTPARTUM VARIABLES BY MOSLEY PREVALENCE METHOD

4.2.1 Introduction

This sub-section deals with the estimates of postpartum variables, derived from Mosley Prevalence Method. These estimates are in turn compared with those calculated by life table technique. Mosley prevalence method uses current status data on women and births in the past three years.

4.2.2 Duration of postpartum practices by women's age at child birth

The study shows that breastfeeding duration is positively related to the age of the woman at child's birth. Women who are younger than 25 years breastfeed their children for an average of 17.2 months and this increases with woman's age to 22.4 months for those older than 35 years. The influence of age on duration of breastfeeding could be mainly because of educational differences as younger mothers are likely to be more educated as compared to the ones in older cohorts. As noted earlier, the level of education has an inverse relationship with breastfeeding duration.

The trend of breastfeeding duration is reflected on durations of amenorrhea. However, a different trend is depicted in the case of abstinence. Women who are between 25 and 35 years abstain from sexual practices the least with an average duration of 4.6 months. The majority of these women are in their early marriage life and might have not given birth to their desired number of children. Most women who are less than 25 years are not yet married and thus do not stay with their husbands.

Prevalence method derived estimates which compare favourably well with those derived from life

table technique. But its estimates are high than those from life table techniques.

4.2.3 Duration of postpartum practices by level of education

The results show that women with no education breastfeed their child for four months longer than those women with secondary education and above. Women with primary level of education also breastfeed their children for three more months than those with secondary education, this shows that education effects breastfeeding duration significantly when a woman acquires secondary level of education. It suggests that secondary education brings remarkable changes in the social life of a woman, it exposes women to modern ideas and enable them to take up jobs which are far from the house.

The trend of breastfeeding practice by educational attainment is reflected in the relationship with duration of postpartum amenorrhea. There is a uniform variation in duration of amenorrhea by three educational levels considered. The difference is wide, for example, the durations of amenorrhea are 6.7 and 12.2 months for those with secondary and no education respectively. Educational level of a woman also influences her duration of sexual abstinence, nevertheless, this could be explained by economic status of a woman and traditional values which are associated with those level of education. Women with secondary education and above abstain from sex for shorter durations as compared to those with no or primary education.

On comparison with the durations derived from life table technique, it is notable that the estimates from two methods differ significantly. The trend is the same for all the three postpartum practices. These fluctuation in breastfeeding estimates is most likely due to the quality of data used in both cases,i.e, prevalence method uses current status data whereas life table technique uses retrospective data that is prone to memory lapse.

4.2.4 Duration of postpartum practices by work status

Breastfeeding duration varies according to work status of the woman, women who are currently working breastfeed their children for an average of 17.9 months whereas those who are currently working breastfeed for 14.2 months on average. The trend is similar to the ones found from other studies and even from this study by the other method. The difference of four months observed on work status could be as a result of modernization, for example, better health for babies and mothers in urban areas where working women are residents and earlier age of introducing breastmilk substitute.

4.2.5 Duration of postpartum practices by place of residence

There is a wide variation of breastfeeding duration by place of residence. The analysis revealed that women who reside in urban areas breastfeed the least with a duration of 13.2 months whereas those residing in rural areas observe an average duration of 17.1 months. This variation in duration of breastfeeding may be because of higher educational and employment opportunities for women in urban areas as well as greater use of breastmilk substitutes.

The same trend is seen in the duration of amenorrhea, on average urban women amenorrheic for 6.4 months whereas those in rural areas experience an average of 9.8 months. Since the resumption of monthly period is a biological process, its duration is mainly determined by the duration of breastfeeding. Hence in this case they show strong positive association with breastfeeding duration. Subsequently, such wide variation is not noted in the duration of sexual abstinence. But women stay in rural areas abstain from sex for 1.8 months more than those staying in urban places. The variation could be due to sleeping arrangements where in rural areas people have spacious houses to accommodate more than one beds whereas in urban areas the rents are high prompting people to rent small houses or rooms. This forces residents to use one

bed which rises the resumption of sexual intercourse earlier than in rural areas. Nevertheless, it is worth noting that urbanization does not seem to have as great influence on durations of postpartum practices as education.

4.2.6 Duration of postpartum practices by religion

Women who belong to "no religion" observe the longest average duration of breastfeeding, they observe an average duration of 21.2 months. Women who belong to religious groups like catholics, protestants and muslims show no wide variation in average breastfeeding duration, with catholics having slightly higher breastfeeding duration.

Women who belong to no religion are believed to be strong believers in traditional cultures and as noted earlier. Prolonging breastfeeding duration was one way of limiting births. Religious organizations have been campaigning for the use of contraceptive methods which result in lengthening birth interval even if breastfeeding stops relatively earlier. This has made women of no religious affiliation to observe longer breastfeeding duration than those affiliated to religious groups. The results further revealed that those women of " other" religious breastfeed least with an average breastfeeding duration of 14.6 months.

On comparison with the estimates derived from life table technique, the trend is somewhat the same for the longest and least breastfeeding religious groups. There seem to be a significant difference in breastfeeding durations for women who are catholics, protestants and muslims. However, prevalence method shows that there is no such significant difference.

estimates derived by prevalence method compare favourably well with estimates from other studies thus it is better than life table technique.

4.2.8 Durations of postpartum practices by marital status

Women who are married breastfeed their children for an average of 16.2 months and they are the longest breastfeeding group while divorced women observing the shortest breastfeeding duration of 10.75 months. Separated women observe moderate breastfeeding duration of 13.7 months. The data could not enable estimation of durations of never married. Married women breastfeed longest because of encouragement not only from husbands but also from other family members.

The duration of amenorrhea by marital status of a woman shows that divorced women experience the least duration while separated women experience the longest duration of amenorrhea. In this case the trend of breastfeeding duration is not depicted on duration of amenorrhea, this could be because of poor data quality.

As expected married women abstain from sexual intercourse the shortest duration of 3.2 months. This is so because these women are more exposed to men than the remaining women are. Women who are divorced and separated abstain from sexual intercourse for 8.25 and 10.5 months respectively.

Table 4.2.1 Comparison of durations of postpartum variables derived from life table and Mosley prevalence methods

	Breastfeeding		Amenorrhea		Abstinence	
X-tics	L Table	Mosley	L Table	Mosley	L Table	Mosley
N.level	15.4	19.4	9.8	10.7	5.4	5.5
Age						
15-19	10.4		6.9		6.2	
20-24	13.0		7.6		5.9	
25-29	14.1		8.4		5.1	
30-34	14.9		9.4		4.8	
35-39	15.6		9.8		5.1	
40-44	17.7		9.8		6.2	
45-49	20.1		12.1		7.4	
Residence						
urban	12.2	13.1	7.0	6.4	5.1	3.2
rural	15.8	17.1	9.0	9.8	5.6	5.0
Education						
none	14.9	18.8	10.3	12.2	6.1	5.8
pri.	13.5	17.4	8.6	9.4	5.3	4.7
sec.	11.8	14.3	7.1	6.7	5.5	4.4
W.Status						
Yes	14.2	14.2	8.4	14.2	5.0	
No	15.6	18	8.7	18.0	5.8	
Parity						
1-3	13	*	6.4	*	5.1	*
4-5	13.1	*	8.0	*	4.1	*
6+	13.7	*	9.1	*	4.0	*

	Breastfeeding		Amenorrhea		Abstinence	
X-tics	L Table	Mosley	L Table	Mosley	L Table	Mosley
Sex						
Male	13.1	19.9	7.4	7.7	4.5	4.1
Female	13.0	19.3	7.5	7.5	4.5	4.0
Region						
Nairobi	13.2	13.2	7.3	6.1	4.2	3.7
Central	13.9	13.9	8.4	8.0	7.7	6.0
Coast	15.7	16.3	8.7	7.8	3.9	1.8
Eastern	15.3	18.8	8.5	8.6	6.1	5.7
Nyanza	14.1	17.8	8.7	10.4	5.3	3.4
R/Valley	14.1	17.6	9.0	11.3	6.5	7.1
Western	14.6	20.9	8.9	12.5	4.1	3.7
Religion						
Catholics	14.5	17.1	8.7	9.6	5.4	4.6
Pro.	14.4	17.1	8.6	9.6	5.6	5.1
Muslims	14.1	16.7	8.7	8.7	3.9	3.2
No. rel	16.4	14.6	9.0	9.2	6.3	7.3
Other	14.4	21.2	7.6	9.9	5.6	6.4
Ethnicity						
Kalenjin	14.3	20.3	9.4	13.1	7.1	7.6
Kamba	14.7	17.9	8.3	8.0	6.1	5.2
Kikuyu	14.7	13.6	8.3	7.7	6.7	6.0
Kisii	15.1	15.9	9.9	10.6	5.5	5.5
Luo	15.0	19.3	8.4	11.0	3.8	3.7
Luhya	13.8	18.7	8.6	10.2	4.0	2.5
Meru/Embu	16.3	18.6	8.4	9.4	6.6	6.7
Mijikenda	16.2	14.6	9.5	8.2	3.6	1.5
Others	15.5	15.5	8.8	10.2	5.8	5.9

M. Status						
Nev. Marr	12.8	*	7.0	4.4	10.9	7.2
Married	13.3	16.7	7.4	9.2	3.5	3.1
Widowed	15.7	*	9.9	*	8.3	*
Divorced	13.6	10.8	8.7	6.8	8.2	8.3

* the numbers were not enough for the analysis.

4.3.1 RELATIONSHIP BETWEEN BREASTFEEDING AND POSTPARTUM AMENORRHEA

Bongaarts and Potter (1983) had determined that both breastfeeding and postpartum amenorrhea are related through an exponential function given by:

$$A = 1.753 \exp(0.1396B - 0.001872B^2);$$

where:-

A = mean (or median) duration of amenorrhea, and

B = mean (or median) duration of breastfeeding.

In this section, we shall use the above expression to estimate the durations of amenorrhea from the breastfeeding durations of some subgroups in our data and then compare these estimates with those obtained using the life-table technique on our amenorrhea data and, hence, determine how well the Bongaarts model fits our data.

One way of examining how good the agreement between the life-table estimates of duration of amenorrhea and estimates obtained using Bongaarts' equation is by using a regression approach. If two methods of measurement give identical results, we should be able to fit a straightline passing through the origin to the pairs of measurements given by the two methods. Also, the proportion of the total variation explained by the linear regression (i.e R^2) will indicate how good such a straightline fits the data.

We could estimate the "expected" durations of amenorrhea from breastfeeding durations using Bongaart's equation from the 44 subgroups in Table 4.3.1, and then compare these with the life-table estimates. However, all the 44 subgroups (from the 10 variables) are not independent of one another, and we cannot, therefore, use them for regression analysis without violating a fundamental assumption of independence of observations in regression analysis. To obtain independent estimates, we have used five socio-economic variables namely mother's age, place of residence, level of education, current work status and parity. From all these variables, we are to obtain life-table estimates of durations of amenorrhea and breastfeeding for 17 subgroups. The mean estimates are given in Table 4.3.1. In the last column but one of Table 4.3.1, we have provided the "expected" mean duration of amenorrhea based on the Bongaarts' equation relating breastfeeding with amenorrhea. The differences between the life table estimates and the "expected" estimates (based on Bongaarts' Model) were calculated and given in the last column of Table 4.3.1.

Table 4.3.1 Expected durations of amenorrhea derived from durations of breastfeeding by Bongaarts Model

X-teristics	Breastfeeding	Observed Amenorrhea	Expected Amenorrhea	Difference
Mother's Age				
15-19	10.41	6.94	6.12	0.82
20-24	12.95	7.57	7.81	-0.24
25-29	14.14	8.38	8.68	-0.30
30-34	14.87	9.37	9.24	0.13
35-39	15.56	9.79	9.78	0.01
40-44	17.74	9.75	11.57	-1.82
45-49	20.09	12.11	13.60	1.49

X-teristics	Breastfeeding	Observed Amenorrhea	Expected Amenorrhea	Difference
Place of Residence				
Urban	12.2	7.0	7.3	-0.3
Rural	15.8	9.0	10.0	-1.0
Level of Education				
No education	14.9	10.3	9.3	1.0
Pri. Education	13.5	8.6	8.2	0.4
Sec. +	11.8	7.1	7.0	0.1
Work Status				
Currently working	14.2	8.4	8.7	-0.3
Not working	15.6	8.7	9.8	-1.1

X-teristics	Breastfeeding	Observed Amenorrhea	Expected Amenorrhea	Difference
Parity				
1-3	13.0	6.42	7.84	-1.42
4-5	13.1	7.97	7.94	0.03
6+	13.7	9.08	8.35	0.73

From the results we notice that elderly mothers who breastfed for long durations (17 months and over) tend to report duration of amenorrhea far less than what should be expected based on Bongaarts' equation. Mothers who live in the rural areas also under report their durations of amenorrhea more than their urban counterparts. Also that illiterate mothers who live in low socioeconomic areas and who breastfeed for long durations tend to report duration of amenorrhea far more than what should be expected based on Bongaarts' equation. However, unlike breastfeeding and abstinence terminations, the resumption of menstruation following a child's birth

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35-39	15.56	9.79	9.78	0.01
40-44	17.74	9.75	11.57	-1.82
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Urban	12.2	7.0	7.3	-0.3
Rural	15.8	9.0	10.0	-1.0
Level of Education				
No education	14.9	10.3	9.3	1.0
Pri. Education	13.5	8.6	8.2	0.4
Sec. +	11.8	7.1	7.0	0.1
Work Status				
Currently working	14.2	8.4	8.7	-0.3
Not working	15.6	8.7	9.8	-1.1

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From the results we notice that elderly mothers who breastfed for long durations (17 months and over) tend to report duration of amenorrhea far less than what should be expected based on Bongaarts' equation. Mothers who live in the rural areas also under report their durations of amenorrhea more than their urban counterparts. Also that illiterate mothers who live in low socioeconomic areas and who breastfeed for long durations tend to report duration of amenorrhea far more than what should be expected based on Bongaarts' equation. However, unlike breastfeeding and abstinence terminations, the resumption of menstruation following a child's birth

is not an elective phenomenon and most mothers especially the illiterate ones might not have paid any particular interest to the resumption of menses. The large difference between the expected and observed durations of amenorrhea for the illiterate women mentioned above may be due largely to under-reporting by this group of women.

Figure 4.1 below gives the scatter plots for the 17 pairs of observation. We have, on the X-axis, the "observed" or life-table estimates of mean durations of amenorrhea, and on the Y-axis are corresponding estimates based on Bongaarts' equation. The regression line passing through the origin for this data is given by:

$$Y = 1.04X \,, \quad R^2 = 0.78.$$

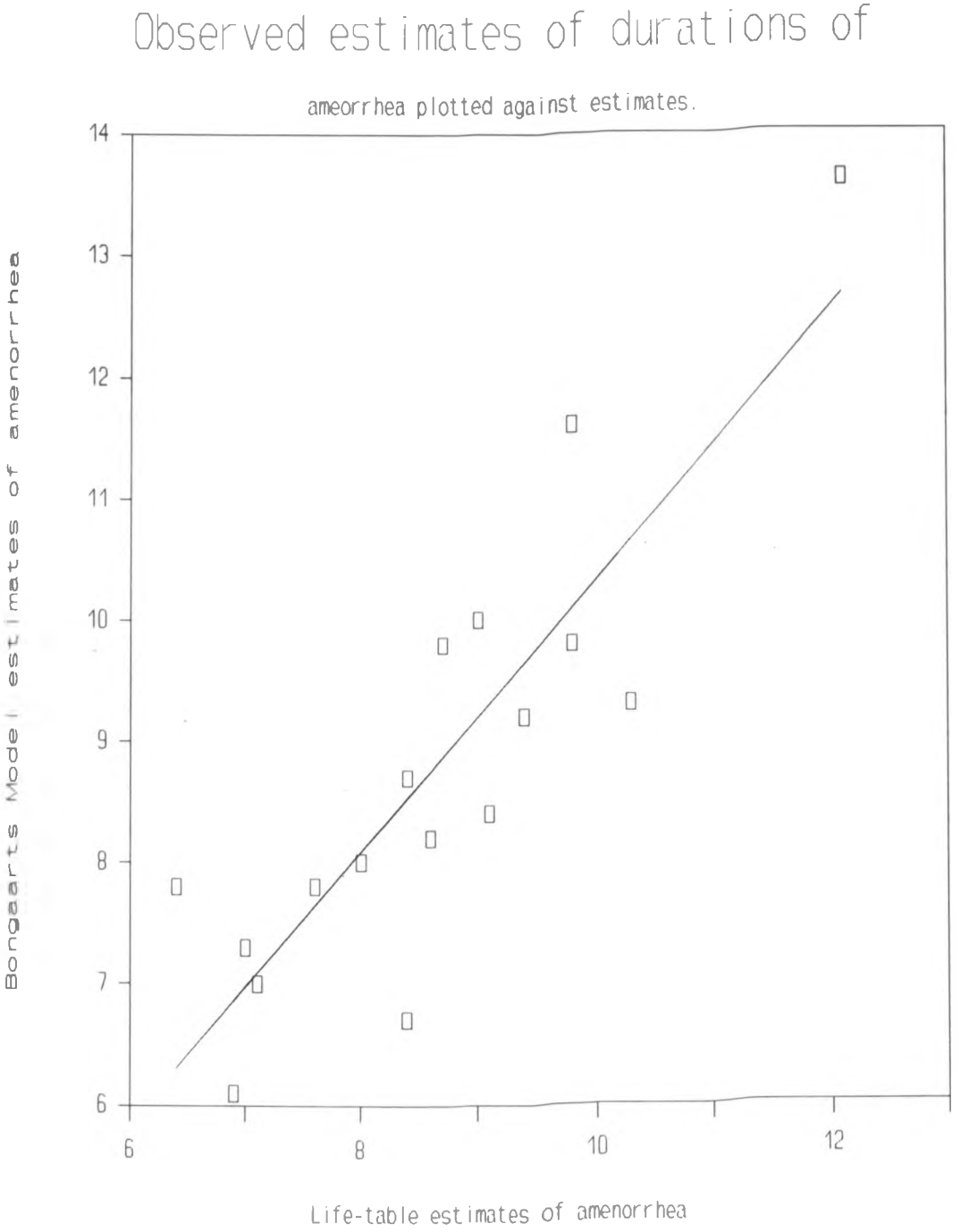
Observed estimates of durations of
ameorrhea plotted against estimates.
Bongaarts Model estimates of amenorrhea
Life-table estimates of amenorrhea
14
13
12
11
10
9
8
7
6
6
8
10
12

Figure 1

The analysis of variance (ANOVA) table for this regression is given by table 4.3.2, by applying Bongaarts equation based on breastfeeding for variables, we have been able to explain about 78 percent of the total variation in our life table estimated mean durations of amenorrhea. Since 78 percent of the total variation can be explained by Bongaarts model, we can use breastfeeding durations and Bongaarts model to estimate amenorrhea durations without using data for amenorrhea, also our data fits Bongaarts model well.

Table 4.3.2 The ANOVA table for the regression of Bongaarts' estimates of duration of amenorrhea (Y) on the corresponding Life table estimates (X)

Source of Variation	Sum of Square	Degree of freedom	Mean Square	F	Signif of F
Due to Regression	28.112	6	4.685	13.313	0.01
About Regression (i.e residual)	3.168	9	.362		
Total	31.279	15	2.085		

CHAPTER FIVE
MULTIPLE LINEAR REGRESSION ANALYSIS OF DURATIONS OF POSTPARTUM VARIABLES

5.1 Introduction

There are several factors which are assumed to play major role in determining the durations of postpartum variables. As outlined earlier in chapter four, these include socio-economic, socio-cultural and demographic factors. In this chapter the main aim is to look at multiple regression analysis of the factors which significantly affect postpartum practices of mothers who are at their reproductive ages. The analysis uses SPSS (statistical package for social scientists) package and the selection of variables is determined by using stepwise method.

5.2 BREASTFEEDING

5.2.1 Definition of variables in the regression analysis

When dummy regression was applied, the following categories of different variables considered were found to significantly affect the duration of breastfeeding when considered with their reference categories.

Socio-economic:

i) CONTMOD:-

Mothers' contraceptive use considered as "modern". The category "not using" was considered as the reference category with dummy variable 0.

ii) EDSEC:- Mothers' level of education considered as "secondary". The category "no education" was considered as the reference category with dummy variable 0.

Demographic:

i) MAGE6:- Mothers' age at the child's birth, considered as "40-44" years. The category "15-19 years" was used as the reference category with dummy variable 0.

ii) MAGE7:- Mothers' age considered as "45-49 years", reference category as in the above case.

iii) MAGE4;- Mothers' age considered as "30-34 years", reference category as in the above case.

Socio-cultural:

i) TLUHY: Mothers' tribe in this case "Luhya". The category "Kalenjin" was considered as the reference category with dummy variable 0.

ii) TMIJI:- Mothers' tribe in this case " Mijikenda". The reference category is the same as in (i).

iii) TKAMB: Mothers' tribe in this case "Kamba". The reference category is the same as in (i).

iv) TMERU: Mothers' tribe considered as "Meru/Embu". The reference category is the same as in (i).

v) DBRF: Duration of breastfeeding(breastfeeding index).

Table 5.1 Mean and standard deviations of significant variables

Variable	Mean	Std dev
CONTMOD	.286	.452
MAGE6	.076	.265
MAGE7	.024	.152
TLUHY	.175	.380
MAGE4	.147	.354
TMIJI	.042	.201
TKAMB	.138	.345
EDSEC	.188	391
TMERU	.061	.239

The above table shows the mean and standard deviation of significant variables when regression

analysis was applied. All these statistics were calculated and printed by computer.

5.2 Discussion of the results

We will only consider the variables that were significant in the regression analysis. Regression analysis results are reported in Table 5.2 below whereas means and standard deviations have been reported in Table 5.1 above. Dummy stepwise regression was used to analyze the data and every variable that was brought into the equation at every stage was determined by the computer according to its contribution on the amount of unexplained variation on duration of breastfeeding it accounted for. Moreover, at every stage, after selecting a significant variable the computer printed an analysis of variance (ANOVA) table giving the regression coefficient, residual sum of squares together with the degrees of freedom, mean sum of squares and t- and F-value statistics.

Table 5.2 Coefficients of Regression Equations

	EQUATIONS								
Variables	1	2	3	4	5	6	7	8	9
CONTMOD	2.507	-2.527	-2.501	-2.523	-2.480	-2.577	-2.692	-2.959	-2.830
MAGE6		3.944	4.117	4.151	4.524	4.531	4.468	4.103	4.132
MAGE7			6.763	6.695	7.070	7.015	7.093	6.689	6.599
TLUHY				-2.463	-2.460	-2.286	-1.929	-1.903	-1.678
MAGE4					2.296	2.252	2.214	1.963	1.984
TMIJI						3.413	3.787	3.578	3.789
TKAMB							2.027	2.078	2.290
EDSEC								-1.739	-1.707
TMERU									2.416
CONST	15.978	15.213	15.047	15.472	15.111	14.916	14.533	14.853	14.658
ADJR2	.19	.21	.24	.29	.32	.34	.36	.39	.42
S.E	16.27	16.23	16.21	16.18	16.16	16.15	16.14	16.12	16.12
F-V	17.93	16.64	16.08	15.20	14.01	12.79	11.92	11.20	10.47

Note: All the figures are significant at 0.05 level of significance.

The table above shows the results of multiple regression. There are nine major equations in this analysis, that is, nine variables were found to affect breastfeeding duration significantly. In the first equation only one variable was included and that is women who use modern contraceptive

methods(CONTMOD). The second and subsequent equations contains variable in equation one and some additional variable as shown in Table 5.2.

The final equation can be summarized as follows:

DBRF = 14.658 -2.830(CONTMOD) +4.132(MAGE6) +6.599(MAGE7) -1.678(TLUHY) +1.984(MAGE4) + 3.789(TMIJI) +2.290(TKAMB) - 1.707(EDSEC) +2.416(TMERU).

It is evident from the above equation that socio-economic factors[mothers who use modern contraceptive methods (CONTMOD) and mothers with secondary level of education (EDSEC)] affect the duration of breastfeeding. Regression coefficients for these two variables are negative showing that they have a negative effect on breastfeeding duration as compared to their reference categories. The explanation for this is that mothers who use modern contraceptive methods breastfeed shorter because most of them reside in urban places where these services are readily available; they are mostly employed in outdoor jobs thus making their frequency and intensity of breastfeeding duration to reduce. This is in contrast to mothers "not using" any contraceptive method, as they use prolonged breastfeeding to reduce the risk of earlier conception after the birth of a child. Similarly, mothers with secondary level of education have a shorter duration of breastfeeding as compared to those with no education. The explanation for this is that mothers with secondary level of education have better knowledge of contraceptive use and their consequences thus making them breastfeed shorter as they use contraceptives more often than those with no education. Mothers with secondary education have higher purchasing power as compared to those with no education, this enables them to purchase commercialized breastmilk substitute and introduce them at relatively early ages of infancy than their uneducated counterparts. Their children grow up faster which results in them stopping breastfeeding after shorter duration than those with no education . Lastly, mothers with secondary education work

in offices far away from their residential houses and their children can not breastfeed at anytime they wish to, on the other hand those with no education are mainly engaged in farm activities where they carry their children along with them. These tendencies make mothers with no education to observe longer durations than the ones with secondary education.

The variables that had positive effects on the duration of breastfeeding when compared with their reference categories were age of the mother at the child's birth(MAGE7, MAGE6, MAGE4) and tribe of the mother (TMIJI, TKAMB, TMERU). Relatively mothers who are 35 years old and above breastfeed their children for longer durations than those mothers who are less than 20 years old. This finding could be explained by the fact that mothers who are over 35 years old have breastfed their previous children and hence have some experience on how to overcome such simple problems related to breastfeeding such as caring for their breasts to maintain beauty than the young ones. Most mothers who are less than 20 years old are still in either school or college and this forces them to breastfeed for shorter duration to enable them resume their studies.

Mothers who reported that they belong to Luhya tribe had a lower duration of breastfeeding than those mothers who are Kalenjin. This finding could be explained by the fact that Luhya women are more educated as compared to Kalenjin (KFS 1978) and as noted earlier in chapter four, maternal level of education is negatively related to the duration of breastfeeding. Though, there could be some cultural factors involved in this relationship; such a relationship is beyond the scope of this study. Women reporting that they are Mijikenda, Kamba and Meru/Embu show a positive effect on duration of breastfeeding as compared to the reference category which is Kalenjin. Of these tribes Mijikenda is more significant than the other two tribes.

After the above analysis we wanted to find out what would happen to the first equation if the contraceptive use variable was left out. When contraceptive use variable was left out very

interesting results were found. These mothers aged 40 - 44 years showed significant positive effect on the duration of breastfeeding when compared with those who are 15 -19 years old. This results indicates that when the variation in duration of breastfeeding explained by contraceptive use is left out then variation in breastfeeding duration explained by age increases. This finding could be explained be the fact that those women who are over 40 years old breastfeed for longer periods than those aged less than 20 years.

The other variable which are included to the equation is rural residence (RERUR) which showed a positive effect on duration of breastfeeding as compared to the reference category which is urban (REURBA). This finding could be explained by the fact that mothers who reside in rural areas stay with their children all the times hence breastfeeding them more frequently than those in urban areas. Mothers with primary education has also been included in the equation and it has a negative effect as compared to the reference category which is women with no education.

The equation that was obtained was as follows:

DBRES = 15.699 + 4854(MAGE6) + 7.468(MAGE7) - 1.710(TLUHY) + 2.580(MAGE4) + 3.897(TMIJI) + 3.182(TMERU) + 2.117(TKAMB) + 1.601(RERUR) - 1.127(EDPRI).

5.3 AMENORRHEA

5.3.1 Definition of variable in the regression analysis

i) DBREST:- Duration of breastfeeding in months.

ii) EDSEC:- Mothers educational level considered as secondary. The reference category was "no education" and assigned a dummy variable 0.

iii) MAGE2:- Mothers' age at the birth of the child considered as age 20 - 24 years. The

category "15 -19 years" was considered as the reference category with dummy variable 0.

iv) EDPRI:- Mothers level of education considered as primary, reference is the same as (ii) above.

v) MPAR2:- Mothers parity at the child's birth considered as 3. The reference category was parity 1 with dummy variable 0.

vi) MAGED6:- Mothers age at the birth of the child considered as age 40-44 years. Reference category is the same as in the above case.

vii)REPROT:- Mothers religion affiliation considered as protestant. The reference category was catholic with dummy variable 0.

DAMEA:- Duration of postpartum amenorrhea.

Table 5.3 Mean and standard deviation of the significant variables

Variable	Mean	Std. Dev.
DBREST	16.36	345.2
EDSEC	.188	.391
MAGE2	.237	.425
EDPRI	.543	.498
MPAR2	.128	.335
MAGE6	.076	.265
REPROT	.574	.495

acquires secondary level of education she would hope to work in office and to keep pace with the demands of work, she would use contraceptives to avoid unwanted pregnancies. This helps in reducing the duration of amenorrhea as women using contraceptives breastfeed for shorter durations on average. However, women with primary education amenorrheic for shorter duration than those with no education but longer than for women with secondary education.

Age of the mother at the child's birth has a varying effect on amenorrhea. The results show that mothers who are aged 20 -24 years at birth amenorrheic for less duration than the reference category which is those aged 15 -19 years. This could be due to maturity of the person at the time of birth. Whereas women of age 15 -19 years are not fully developed for reproductive purposes, the ones who are age 20 -24 years are old enough. The aspect of maturity makes mothers who are 20 -24 years to experience less amenorrhea duration than the reference category. On the other hand mothers aged 40 -44 years at the child's birth experience longer durations of amenorrhea than the reference category. These women breastfeed longer than the younger group thus their expected amenorrhea duration is bound to be higher. At the same time these people have lived with their husbands for a long time. Frequency of sexual intercourse is inversely related to the duration of amenorrhea, it follows that elderly women, i.e of age beyond 40 years, will experience longer durations of amenorrhea.

Mothers of parity 3 experience a longer duration of amenorrhea than those of parity 1. This finding could be attributed to the fact that mothers of parity 3 are more than 30 years old and as noted earlier they are expected to amenorrheic for longer durations than the younger women. Normally, when a woman gives birth to three children, she tends to breastfeed longer as a way of limiting births, the observed breastfeeding period is certainly longer than the former case. This will make the duration of amenorrhea to be longer being a biological process. Women who reported that they

were protestant indicated a relatively higher duration of postpartum amenorrhea when compared with those who are catholics.

5.4 ABSTINENCE

Table 5.5 Mean and standard deviation of significant variables

Variable	Mean	Std. Dev.
MSMAR	.769	.403
MSLIVI	.460	.210
MSDIV	.026	.167
WSYES	.110	.313
RERUR	.843	.364
SEFEM	.507	.500
CONTIUD	.035	.184
MAGE7	.024	.152

Table 5.6 Coefficients of regression variable

	EQUATIONS.							
Variables	1	2	3	4	5	6	7	8
MSMAR	-6.023	-7.467	-8.483	-8.351	-8.402	-8.390	-8.340	-8.399
MSLIV		-6.390	-7.1407	-7.208	-7.253	-7.269	-7.310	-7.269
MSDIV			-5.579	-5.642	-5.718	-5.760	-5.692	-5.630
WSYES				1.533	1.896	1.905	1.772	1.792
RERUR					1.535	1.546	1.657	1.607
SEXFEM						0.842	0.863	0.896
CONTIUD							2.342	2.359
MAGE7								2.575
CONST	11.126	12.570	13.586	13.505	12.016	11.571	11.407	11.365
ADJR2	.39	.49	.54	.55	.57	.58	.59	.59
S.E	11.95	11.89	11.86	11.85	11.81	11.83	11.83	11.83
F-V	152.75	96.22	70.90	54.73	45.45	38.69	33.88	30.18

Note: All the figures are significant at 0.05 level significance.

5.4.2 Discussion of the results

The table above shows the results of multiple regression.There are eight major equations in this analysis, that is, eight variables were found to affect postpartum abstinence duration significantly. In the first equation only one variable was included, that is, women who were married (MSMAR). The second and subsequent equations contains variable in equation one and some additional variable as shown in Table 5.6.

The final equation can be generalized as follows:

DABS = 11.365 - 8.398(MSMAR) - 7.269(MSLIV) - 5.631(MSDIV) + 1.792(WSYES) + 1.607(RERUR) + 0.896(SEXFEM) + 2.359(CONTIUD) + 2.575(MAGE7).

It is evident from the equation that socio-economic factors (marital status) affect the durations of postpartum abstinence. Regression coefficients for these variables are negative showing that they have a negative effect on duration of abstinence as compared to their reference category (never married). The explanation for this is that mothers who are married stay together with their husbands and they are more likely to resume sexual activity sooner after the birth of the child than those never married. Those who are married observe shorter duration of abstinence than the ones living together. Women who are living together are not in stable marriage hence they are not as exposed sexual relationship as the married ones, duration spent with a man will very much determine abstinence duration. Women who are divorced also abstain for shorter duration as compared to the reference category, this can be attributed to fact that divorced women engage in sexual intercourse more frequently than those who are never married and whenever they go they often find their partners. Women who are currently working observe longer durations of abstinence than those not currently working. The explanation for this could be that currently working women would want to limit their families and as a result they abstain longer than those not working who have very little knowledge the advantages of having a small family. Working

women have higher educational level as compared to their counterparts, and as noted in chapter four they abstain from sex least so regression results confirm the relationship, similar results were obtained by Mosley et al 1981 and KFS 1978.

Mothers staying the rural areas abstain from sexual intercourse for longer durations as compared to reference category. People in the rural area observe traditional beliefs more strictly than those in urban areas, some people believe that semen can contaminate breastmilk when sex is practised during breastfeeding period. However, such beliefs are fast eroding in urban areas where most people hardly listen to traditional beliefs. With the introduction of cosmetics mostly in urban areas, women are neat prompting most people to resume sexual intercourse within a very short time after the birth of the child. The analysis shows that mothers of female children abstain from sex for longer durations as compared to mothers of male children.

Age of the mother at the child's birth has a positive effect on duration of postpartum abstinence duration. The study shows that mothers aged 44-49 years observe far longer period as compared to those who are aged 15 - 19 years. The explanation for this is mainly physical as women who are 20 years are still younger and are highly sexually motivated as compared to those who are 45 years, the urge for younger people to engage in sexual intercourse more frequently is what causes the variations.

CHAPTER SIX
SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This study had three objectives. The first was to estimate mean durations of breastfeeding, postpartum amenorrhea and sexual abstinence both at national and provincial levels. The tool of analysis used in estimating mean durations of postpartum practices was life table technique and the more recent Mosley prevalence method. Life table technique estimates the mean durations of censored events such as postpartum practices. The estimates show the duration of postpartum variables for a given factor after all the other factors are controlled.

Second was to establish whether there exists a relationship between durations of postpartum amenorrhea and breastfeeding. The analytical tool was Bongaarts Model which uses durations of breastfeeding to estimate length of postpartum amenorrhea. The estimated results were compared with the computed duration of amenorrhea to find out how well our data fits Bongaarts Model.

The third objective was to examine how socio-economic, socio-cultural and demographic characteristics of the mother affect durations of her postpartum practices and in order of preference. The tool of analysis was multiple linear regression analysis which shows the variables that affect postpartum variables significantly and in order of importance. Life table technique and Mosley Prevalence method was also used in this case in estimating postpartum durations by mothers varying characteristics.

By the use of the information from the Kenya Demographic and Health Survey (1989) the study was able to generate the data required to accomplish these objectives.

6.2 Summary and conclusions

Chapter three shows the results of life table technique and Mosley prevalence method both at national and by mother's characteristics. The durations were estimated in months. At the national level, the duration of breastfeeding was estimated at 15.5 months by life table technique and 19.6 months by Mosley prevalence. Estimates derived by life table technique showed a remarkable reduction compared to earlier studies (KFS 1978, Mosley et al, etc). The durations of postpartum amenorrhea and sexual abstinence also showed a decline as compared to the earlier studies (Minyacha, Mosley).

When we consider the effect of mother's level of education on postpartum variables. The results show that mother's educational level is negatively related to breastfeeding. Mothers with no education breastfeed longest followed by those with primary education. Other postpartum variables show the same association with maternal level of education. Regression analysis results show that secondary education of the mother significantly affect mothers' breastfeeding duration, it had a negative effect. It also affects the durations of postpartum amenorrhea and sexual abstinence. Thus the null hypothesis that mother's level of education is negatively related to the duration of breastfeeding can be accepted.

The variable, mother's work status also considered in this study give some interesting results. Women who are currently working breastfeed for shorter duration as compared to those not currently working. There is however, more than one month difference in breastfeeding duration, the same trend is seen on durations of amenorrhea and abstinence as breastfeeding, but have much smaller differences. Regression analysis results show that work status is only significant on determining the duration of postpartum sexual abstinence. It showed that it has a positive effect on abstinence as compared to those not currently working. The results leads to accepting the null

hypothesis that mother's work status is negatively related to the duration of postpartum variables. The variable, mothers place of residence also considered in the study gave some interesting results. From the results, mothers who live in rural areas breastfeed for longer durations than their urban counterparts, the difference is remarkably large. The same pattern was observed in postpartum amenorrhea and sexual abstinence. Place of residence was found to significantly affect mothers postpartum sexual abstinence from regression analysis results. Thus the null hypothesis can be accepted.

The study showed that religious affiliation has varying effects on duration of postpartum variables. Women with no religious affiliation have the longest durations of all postpartum practices. Women who are catholics observe longer durations of breastfeeding as compared to other religious affiliations with muslims observing the least durations. Mothers who are in "Other religion" observe the least duration of amenorrhea. Mothers who are muslims amenorrheic for longer durations than catholics and protestants but observe the least duration of sexual abstinence. In regression analysis, only protestant showed significant effect on duration of amenorrhea. The null hypothesis that catholics observe the longest duration of postpartum practices is rejected and we conclude that women with no religious affiliation have the longest durations of postpartum variables.

Region was considered as provinces of Kenya. The study showed that Nairobi region and Central Province had the least durations of breastfeeding and amenorrhea. Breastfeeding is prolonged in Coast and Eastern Provinces and moderately practised in Western Kenya. So we can conclude that breastfeeding practice is least observed in Nairobi and increases with an increase in distance from Nairobi. Apart from Nairobi region, the other regions experience more-or-less the same duration of postpartum amenorrhea. Coast, Nairobi and Western Provinces observed the least

durations of abstinence as compared to the rest. Rift Valley, Nyanza and Eastern provinces observed moderate durations, while Central Province had the longest duration of sexual abstinence. Interestingly, none of these regions was significant in regression analysis. The null hypothesis is rejected, hence we conclude that there is some difference in postpartum practices by region.

Marital status of the mother plays a great role especially in determining the duration of sexual abstinence. Mothers who are widowed breastfeed longest with those who are never married observing the least duration. The trend for amenorrhea is more or less the same as for breastfeeding. However, duration of postpartum sexual abstinence by marital status showed that married women observe the least duration with never married women experiencing almost three times the duration experienced by married women. Marital status of the mother is not significant according to regression analysis on durations of breastfeeding and amenorrhea, but is the main determinant of duration of abstinence. We reject the null hypothesis that there is no significant difference in durations of postpartum variables by mothers' marital status.

The findings show that there is a significant relationship between mother's age and durations of postpartum practices. The relationship is pronounced in all the seven age groups. There is a positive relationship between mothers age and her duration of breastfeeding, that is, elderly mothers breastfeed for longer durations than the younger ones. The same trend is depicted by durations of amenorrhea. However, for mothers who are less than 35 years old, there is a negative association between mother's age and durations of sexual abstinence. Regression analysis result shows that mothers who are older than age 40 years significantly affect the duration of breastfeeding, they are second to those using modern contraceptives. Mothers who are 20-24 and 40-44 years show significant effect on amenorrhea. Nevertheless, mothers' age was the least

6.4 Recommendations of the study

From this study, it is worthwhile to make the following recommendations not only to policy makers but also for further research.

6.4.1 Recommendations for policy formulation

1) The practice of breastfeeding should be encouraged to mothers because of its nutritious value and protective nature to the babies. The practice has been on the decrease since the introduction of commercialized breastfeeding substitutes.

2) Breastfeeding education should be incorporated in secondary school syllabus so that students can know the effects of prolonging or shortening durations of breastfeeding. This will help the government and Non-governmental organization to spend a lot of money on educating the public on pro-breastfeeding compaigns.

3) Contraceptive use and campaign is mainly concentrated in urban areas, this can be seen in rural-urban difference on durations of postpartum variables. Family Planning Association in conjunction with the government of Kenya should mobilise and intensify their campaign in the rural areas where 75 per cent of the population live.

4) Mother's age at the child's birth plays a very important role in determining her durations of postpartum variables. The government should increase the gazetted marriage age from 18 years to 22 years, it also should spell out strict measures on adolescent pregnancy. This would lead women into getting married when they are mature hence breastfeed longer. It will help the government in reducing total fertility rate (TFR).

6.4.2 Recommendations for further research

Due to lack of time, nature of data used and resources, this study was not able to exhaust all the determinants of postpartum variables. The following topics are recommended for further research.

1) A study should be carried out to determine the effect of infant and child mortality and age of the child at introduction of supplementary foods on postpartum variables.

2) The study was carried out at macro-level owing to the secondary data used, therefore, similar studies should be carried out at the micro-level to enable policy makers implement their policies at the micro-level.

3) A study on determinants of postpartum variables should be carried out but changing methodology of regression analysis by Proportional Hazards Model to determine the relative risk of each dummy variable on postpartum practices.

SELECTED REFERENCE

Akin,J.S., Bilsborrow,R.E., Guilkey,D.E., Popkin, B.M., Benoit,D., Centrelle,P., Garenne,M. & Levi, P. (1981). "The determinants of breastfeeding in Sri Lanka. *Demography*, 18, 287.

Akin,J.S., Bilsborrow,R.E., Guilkey,D.E & Popkin, B.M (1986). "Breastfeeding patterns and determinants in Jordan." *Population Bulletin ESCWA*, 28,5.

Akinrinole, B. and Olakye (1990). "The effects of breastfeeding on infant and child mortality in Kenya."

Bongaarts, J. (1981). " The fertility-inhabiting effects of the intermediate fertility variables" *Studies in Family Planning*, Vol. 13, NO. 617.

Bongaarts, J. and Potter, R.G. (1983). Fertility, biology and behaviour: An analysis of the proximate determinants." Academic Press, New York, pp 25.

Bongaarts, J. (1976). "Intermediate fertility variables and marital fertility rates." *Population studies*, 30(2): 227-241.

Bongaarts, J.,(1978)."A framework for analyzing the proximate determinants of fertility."

Caldwell, J.C. (1976). "Towards a restatement of demographic transition theory." *Population and development Review 2*:358.

Caldwell, J.C. and Caldwell, P. (1981). "Cause and sequence in the reduction of postnatal abstinence in Ibadan city, Nigeria." In: Child-spacing in Tropical Africa. Page, H.J. and Lestheaghe, R. (eds). Academic Press, London, New York.

Centrelle, P.; Ferry, B. and Mondot, J.C. (1978). "Relationship between fertility and mortality in tropical Africa". In: The effects of infant and child mortality on fertility. S. Preston (ed.). New York, Academic Press.

Chen,L.S., Ahmed,S., Geschu,M., and Mosley, W. (1974). A prospective study of birth interval dynamics in rural Bangladesh." *Population Studies 28(2)*: 277-297.

Dow, T.E., Jr (1977). Breastfeeding and abstinence among the Yoruba." *Studies in Family Planning 8(8)*: 208-214.

Ferry, B. and Smith, P.P. (1983). " Breastfeeding differentials." W.F.S., Comparative Studies, Cross National Summaries. International Statistical Institute, Netherlands.

Ferry,B. (1981). "Breastfeeding." World Fertility Survey: Comparative Studies. International Statistical Institute, Netherlands.

Gaisie, S.K. (1981). "Child-spacing patterns and fertility differentials in Ghana." In: Child-spacing in Tropical Africa: Tradition and Change. H.J. Page and R. Lesthaeghe (eds). New York, Academic Press.

Gray, R. (1983). "The impact of health and nutrition on natural fertility ." In : Determinants of fertility in developing countries, Vol. 1, The supply and demand for children. R.A. Bulatoo and R.D.Lee (eds). New York, Academic Press.

Huffman, S.L. Chowdhury, A.K.M.A., Charraborty,V.J. and Mosley, W.H. (1978). "Nutrition and postpartum amenorrhea in rural Bangladesh." *Population studies 32*:251 -260.

Huffman, S.L. (1984). "Determinants of breastfeeding in developing countries, Overviews and policy implications." *Studies in Family Planning 15(4)*: 170 -184.

Huffman, S.L., Ford, K.,Allen, H.A & Streble, P. (1987). "Nutrition and fertility in Bangladesh: breastfeeding and postpartum amenorrhea." *Popul.Stud.* 41,447.

Jain, A.K and Bongaarts, J. (1981)." Breastfeeding patterns, correlates and fertility effects." *Studies in Family Planing 12*:79 -99.

Jain A.K., Hsu,T.O and Chang M.C. (1970). " Demographic aspects of lactation and postpartum amenorrhea." *Demography*, 7, 255.

Ginneken,J. van (1974). "Prolonged breastfeeding as a birth spacing method." *Studies in Family Planning*. 5, 201.

Jelliffe, P.B and Jelliffe, E.F.P (1978). "Human milk in the modern world: Psychological, nutrition and economic significance." Oxford University Press, Oxford.

Knodel, J. and Debalvaya, N. (1980). "Breastfeeding in Thailand: Trends and differentials, 1969 - 79." *Studies in Family Planning 11*:355-377.

Smith, D.P. (1980). "Life table analysis." *W.F.S - Technical Bulletins*, No.6/ Tech. 1365.

Laukaran, V.H., Kellner, E.K, Winikoff,B., Solimano,L.M., Van Esterik,P. & Post, J. (1981). "Research on determinants of infant feeding; A conceptual framework." *Working Paper No. 15. Population council*, New York.

Lesthaghe,R,J & Page, H. (1980). "The postpartum non-susceptible period: development and application of model schedules." *Population Studies*, 34, 143.

MacDonald, J.(1981). "A new methodological approach for the analysis of WFS current status breastfeeding data." *World Fertility Survey Technical Bulletin* No.1732. International Statistical Institute, Voorburg, Netherlands.

Mburugu,E. et.al.,(1987). "Women's status, breastfeeding patterns and contraceptive use in Rural Kenya. Cultural roots of African Fertility Regimes." Proceedings of the Ife conference.

Minyacha, O.S. (1989). "Birth interval analysis." Msc. thesis, PSRI, University of Nairobi.

Mosley, H. at. el. (1981). "Modernization, birth spacing and marital fertility in Kenya." Interfaculty Seminar Paper, PSRI, University of Nairobi.

Ngogu, W. and Martin, T.C. (1972). " Fertility decline in Kenya. The role of timing and spacing of births."

Oni, A.G. (1985). "The effects of women's education on postpartum nonsusceptible period in Ilorin, an urban community in Nigeria.

Otieno, A.A. "Determinants of breastfeeding in Siaya District." On-going Msc. thesis, PSRI, University of Nairobi.

Potter,R.G & Kobrin,F.E (1981). "Distributions of amenorrhea and anovulation." *Population Studies,* 35, 85.

Raphael, P (1979). "Breastfeeding and food policy in hungry world." New York, Academic Press.

Republic of Kenya, Central Bureau of Statistics (1978). "The Kenya Fertility Survey report Vol. 1."

Republic of Kenya, National Council for Population and Development (1989). "Kenya Demographic and Health Survey."

Sempebwa, E.K. (1981). "Breastfeeding and family planning in an urban population, Nairobi." Msc. thesis, PSRI, University of Nairobi.

Sexana, P.C & Pathak, K.B. (1977). "On the distribution of postpartum amenorrhea period following a live birth." *Demography*, 6, 174.

Srinivasa, K. & Muthiah,A.C. (1987). "Fertility estimation from retrospective surveys; biases attributable to pregnancy related movement of mothers." *Demography*, 24, 271.

Van Esterik, P and Greener, T. (1981) "Breastfeeding and women's work; constraints and opportunities." *Studies in Family Planning 12*:186 - 197.

Akin J.S., Bilsborrow R.E., Guilkey D.E., Popkin B.M., Benoit D., Centrelle P., Garenne M. & Levi P. (1981). "The determinants of breastfeeding in Sri Lanka. *Demography*, 18, 287.

Akin J.S., Bilsborrow R.E., Guilkey D.E & Popkin B.M (1986). "Breastfeeding patterns and determinants in Jordan." *Population Bulletins ESCWA*, 28,5.

Akinrinole B. and Olakye (1990). "The effects of breastfeeding on infant and child mortality in Kenya."

Bongaarts J. (1981). " The fertility-inhabiting effects of the intermediate fertility variables" *Studies in Family Planning*, Vol. 13, NO. 617.

Bongaarts J. and Potter R.G. (1983). Fertility, biology and behaviour: An analysis of the proximate determinants." Academic Press, New York, pp 25.

Bongaarts J. (1976). "Intermediate fertility variables and marital fertility rates." *Population studies*, 30(2): 227-241.

Bongaarts J. (1978)."A framework for analyzing the proximate determinants of fertility."

Caldwell J.C. (1976). "Towards a restatement of demographic transition theory." *Population and development Review 2*:358.

Caldwell J.C. and Caldwell P. (1981). "Cause and sequence in the reduction of postnatal abstinence in Ibadan city, Nigeria." In: Child-spacing in Tropical Africa. Page, H.J. and Lestheaghe, R. (eds). Academic Press, London, New York.

Centrelle P.; Ferry B. and Mondot J.C. (1978). "Relationship between fertility and mortality in tropical Africa". In: The effects of infant and child mortality on fertility. S. Preston (ed.). New York, Academic Press.

Chen L.S., Ahmed S., Geschu M. and Mosley W. (1974). A prospective study of birth interval dynamics in rural Bangladesh." *Population Studies 28(2)*: 277-297.

Dow T.E., Jr (1977). Breastfeeding and abstinence among the Yoruba." *Studies in Family Planning 8(8)*: 208-214.

Ferry B. and Smith P.P. (1983). " Breastfeeding differentials." W.F.S., Comparative Studies, Cross National Summaries. International Statistical Institute, Netherlands.

Ferry B. (1981). "Breastfeeding." World Fertility Survey: Comparative Studies. International Statistical Institute, Netherlands.

Gaisie S.K. (1981). "Child-spacing patterns and fertility differentials in Ghana." In: Child-spacing in Tropical Africa: Tradition and Change. H.J. Page and R. Lesthaeghe (eds). New York, Academic Press.

Gray R. (1983). "The impact of health and nutrition on natural fertility ." In : Determinants of fertility in developing countries, Vol. 1, The supply and demand for children. R.A. Bulatoo and R.D.Lee (eds). New York, Academic Press.

Huffman S.L. Chowdhury A.K.M.A., Charraborty,V.J. and Mosley, W.H. (1978). "Nutrition and postpartum amenorrhea in rural Bangladesh." *Population studies 32*:251 -260.

Huffman S.L. (1984). "Determinants of breastfeeding in developing countries, Overviews and policy implications." *Studies in Family Planning 15(4)*: 170 -184.

Huffman S.L., Ford, K.,Allen, H.A & Streble, P. (1987). "Nutrition and fertility in Bangladesh: breastfeeding and postpartum amenorrhea." *Population Studies* 41,447.

Jain A.K and Bongaarts J. (1981)." Breastfeeding patterns, correlates and fertility effects." *Studies in Family Planing 12*:79 -99.

Jain A.K., Hsu T.O and Chang M.C. (1970). " Demographic aspects of lactation and postpartum amenorrhea." *Demography*, 7, 255.

Ginneken J. van (1974). "Prolonged breastfeeding as a birth spacing method." *Studies in Family*

Sempebwa E.K. (1981). "Breastfeeding and family planning in an urban population, Nairobi." Msc. thesis, PSRI, University of Nairobi.

Sexana P.C. & Pathak K.B. (1977). "On the distribution of postpartum amenorrhea period following a live birth." *Demography*, 6, 174.

Srinivasa K. & Muthiah A.C. (1987). "Fertility estimation from retrospective surveys; biases attributable to pregnancy related movement of mothers." *Demography*, 24, 271.

Van Esterik P and Greener T. (1981) "Breastfeeding and women's work; constraints and opportunities." *Studies in Family Planning 12*: 186 - 197.