HIV/AIDS AND FERTILITY PATTERNS IN KENYA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE REQUIREMENT FOR THE DEGREE OF MASTER OF ARTS IN POPULATION STUDIES AT POPULATION STUDIES AND RESEARCH INSTITUTE

UNIVERSITY OF NAIROBI

MARCH, 2001

DECLARATION

This thesis is my original work and has not been presented in any other institution of higher learning.

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DEDICATION

I dedicate this piece of work, with a lot of sincerity, to my parents: Jaduong' Peterson Ong'anyi Licha for his loving discipline and Mama Mary Ong'anyi for her loving humility.

ACKNOWLEDGEMENT

First and foremost I thank GOD for His grace and love which have been abundant for me throughout the course. He has been fondly on my side.

I'm profoundly indebted to the University of Nairobi for granting me a scholarship that enabled me pursue this course. My deepest gratitude to my supervisors, Professor A.B.C. Ocholla Ayayo and Doctor B.O. K'Ovugi for their irreducible intellectual guidence in this new field of research. It was through your critique rather than criticism that this piece of work was perfected. In the same vein I should like to extend similar appreciation to the direct and or indirect contributions of the rest of the PSRI academic and technical staff, librarians and 98 colleagues. It's too long a list to even start to mention one by one.

Finally, I wish to acknowledge the support of the immediate Licha "Mituka" and the larger K'Omollo families for being a source of inspiration. To all my close friends especially, Peter, Justus and "Alpha" all of USA, and Conie, George, Ruth, Juma, Liliane and Kennedy, I say "Ahsante Sana!" and May the Spirit of the Lord be upon You Always.

ABSTRACT

The main objective of this study was to investigate the effect of HIV AIDS on fertility patterns among women of reproductive age (15–49) years. The study considered the effect of HIV AIDS perceived risk of infection and its prevalence rate on fertility patterns as measured in terms of the number of children ever born, ideal number of children and desire for more children. The study also considered the effect of selected key fertility determinants on HIV AIDS perceived risk of infection

The study utilized the 1998 Kenya Demographic and Health Survey (KDHS) data, which was a national survey. Of great importance here was the women s questionnaire that the survey used to collect information on women. Also the study used the 1999 HIV-sentinel surveillance data on prevalence rates as compiled by National AIDS and STIs Control Programme (NASCOP) basing on HIV test results of women clinic attendants from various sites in selected districts in Kenya. The two data sets were merged for the 16 selected districts considered in both cases.

To analyse the data, multiple linear and logistic regression were used for an in-depth analysis of the impact of key fertility determinants, contraceptive use and HIV AIDS perceived risk of infection on fertility patterns. In the case of prevalence rate, simple cross-tabulations were used to establish possible differences in fertility patterns by zonal prevalence categories. Cross-tabulations were also employed to gauge the effect of key fertility determinants on HIV/AIDS perceived risk of infection. In analysing the effect of the key fertility determinants

on perceived risk of HIV AIDS-infection and the effect of HIV AIDS perceived risk of infection on fertility patterns, the unit of analysis in this study was individual woman However, when considering the effect of HIV AIDS prevalence, selected districts that were grouped into prevalence zones based on the prevalence rates were used as the unit of analysis

The main findings of this study revealed that HIV AIDS perceived risk of infection has an insignificant positive effect on the number of children ever born and desire for more children. Though insignificant, this effect could be attributed to the impact of the scourge on morbidity and mortality, especially on infant and child mortality, which is known to affect fertility positively Such deaths often (other factors being constant) shorten post partum amenorrhoea due to curtailed breastfeeding period hence high fertility. However, the study established that HIV AIDS risk perception has a significant negative effect on ideal number of children. Even though this measure of fertility is known to be a poor one especially with regard to estimation of individual fertility intentions levels from which patterns are gauged, it portrays the general negative attitude of the society towards large families Generally, the study shows that HIV AIDS both in terms of perceived risk of infection and prevalence rate has not played a major role in altering fertility patterns among Kenyan women in the reproductive age group15-49 years

It is the recommendation of the study that school enrolments be improved at all levels as educational level was found to be negatively related to HIV AIDS risk perception. Expansion of Family Planning services and awareness should be enhanced and rural-urban gap in terms of provision of infrastructural facilities and services reduced. These would help reduce risk of

HIV AIDS infection especially in the rural areas where risk was found to be highest. On the other hand, future researchers should consider re-examining the various research methodologies especially the application of "fertility models" to determine and recommend suitable model(s) for HIV AIDS and fertility relationship. There is also need for methodologies that would enhance the conversion of Sentinel Surveillance data into reliable community level estimates of HIV AIDS prevalence rates.

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CHAPTER ONE

INTRODUCTION

1.1 GENERAL INTRODUCTION

Kenya's population has been increasing rapidly since the colonial days. In 1948, Kenya's population was 5.4 million with an estimated annual growth rate of 3.0 per cent. In 1969, Kenya's population had reached 10.9 million with a growth rate of 3.3 per cent per annum. The 1979 population census recorded a total population of 16.1 million with an estimated growth rate of 3.85 per cent per annum. The 1989 population census results revealed the total population of Kenya to be 21.4 million with an annual growth rate of 3.4 per cent. The 1999 population and housing census provisional results have indicated that the population of Kenya has reached 28.7 million. This has fallen short of the projections that put the population of Kenya at about 32 million by the year 2000. The short fall has been attributed to, among other things: rapid fall in fertility; rising mortality especially through HIV/AIDS scourge and enumeration coverage errors. The estimated 1989-99 inter-censal annual growth rate of 2.9 per cent confirms this.

As an explanation for this trend of population growth, Kenya's Total Fertility Rate (TFR) rose from 5.3 in 1962 to 6.6 in 1969, 8.0 in 1977, 7.9 in 1979; 7.7 in 1984; 6.7 in 1989; 5.3 in 1993 and to 4.7 in 1998 (Censuses: 1962, 1969, 1979, 1989; NDS 1977, KCPS 1984; KDHS 1989, 1993, 1998).

Studies that have been done in Kenya and other parts of the world reveal that fertility is affected by a multiplicity of factors. Bongaarts' (1978) Fertility Model indicates that fertility is influenced directly by biological and behavioural factors. These include starting, spacing and stopping of child bearing. It's at this point that an investigation on the possible role of HIV AIDS scourge in fertility behaviour becomes necessary, as the scourge is known to be pegged to both behaviour and biology.

In Kenya like in many parts of the world, HIV AIDS has gone beyond epidemic proportions and is now a worrisome social, economic, demographic and health scourge. According to Forsythe and Rau (1996), AIDS has become a tragedy of devastating proportions. United Nations (UN, 1991) correctly noted that projections of the impact of the demographic pandemic had assumed that there would be no significant difference in the 'with and without AIDS' fertility in sub-Saharan Africa in the immediate future. However, theoretical evidence (Anderson *et al.*, 1988; United Nations, 1991; Gregson *et al*., 1994) and a growing body of empirical evidence (De Cook *et al*., 1990; Mulder *et al.*, 1994; Sewankambo *et al*. 1994; Gerenne *et al*. 1995; Gregson et al., 1997) demonstrate that HIV epidemic has profound effect on the demography of many sub-Sahara African population where prevalence rates are soaring day by day. It is imperative that HIV AIDS pandemic has perhaps played a major role in fertility decline in the region, particularly in Kenya where sero-positivity prevalence is estimated at a high figure of 13.9 per cent. In this context of high prevalence of HIV AIDS, the Total Fertility Rate (TFR) in Kenyan has fallen tremendously from over 8.0 children per

woman in mid-1980s to a current figure of 4.7 children per woman on average (NCPD *et al.*, 1998).

Gregson *et al* (1997) considered the possibility of a direct physical effect of the virus on the probability of conception. They also posit that changes in behaviour that result from a growing awareness of HIV/AIDS pandemic and a desire to avoid infection or vertical transmission might change childbearing patterns. Behaviour change might work in both directions. Where post-partum abstinence and long periods of breastfeeding are common, women may feel these practices can push their husbands into multiple sexual partners and therefore increase their risk of infection. Curtailing abstinence and breastfeeding may increase fertility. Deliberately seeking to increase fertility in response to high mortality environment created by HIV/AIDS pandemic would also increase the average number of children per woman.

On the other hand, where the most common response to the fear of infection is decreased sexual activity and or increased condom use, behaviour change is likely to limit childbearing. In high HIV/AIDS-prevalence situation like in most parts of Kenya, death and disabling illness will also cut down the time spent in sexual unions and coital frequency. In fact, in the poor sub-Saharan African countries, HIV/AIDS incubation period is too short for any meaningful child replacement effect. Generally, Gregson *et al* (1997) consider that the forces reducing fertility are likely to outweigh those promoting it.

It is hypothesized in this study therefore, that HIV/AIDS has played a major role in reversing fertility trends and patterns in Kenya through its effects on proximate fertility determinants

especially contraceptive use. Nevertheless, HIV AIDS pandemic raises concerns that go beyond intended and actual reproductive performance. However, this study shall focus on its effect on selected fertility determinants and childbearing limitations through contraception.

1.2. PROBLEM STATEMENT

Kenya has experienced a rapid fertility decline since late 1980s. Not many years ago, the Total Fertility Rate (TFR) of Kenya was more than 8.0 children per woman. This was among the highest the world has ever recorded. Although the Kenya Demographic and Health Survey (KDHS) estimates of 1998 put TFR at 4.7 children, which is still high compared to the rates achieved by developed countries, this current rate indicates a remarkable decline in recent years. Nevertheless, this is a clear indication that fertility transition seems to have established a foothold in Kenya.

It is interesting to note that over this period of fertility decline, Kenya has gone on record as one of the sub-Sahara African countries hardest hit by the HIV AIDS pandemic. The National AIDS STIs Control Programme (NASCOP, 1999) estimates that adult HIV AIDS prevalence has hit 13.9 per cent. This puts Kenya as one of the countries with the highest HIV AIDS prevalence in the world. It is hypothesized that fertility transition and HIV AIDS pandemic are currently running parallel in Kenya with the suspicion of the later causing the former especially through increased contraceptive use. However, variations do occur and according to Serwadda *et al* (1997), the effect is more pronounced in high HIV AIDS prevalence areas. Uninfected, through fear of infection, as well as the infected people can be affected and many

of the changes thereof, could have unintended consequences for fertility (Gregson *et al.*, 1997).

There is a consensus that HIV AIDS pandemic induces both biological and or behavioural responses that have tremendous effect on birth rates (Carpenter *et al.*, 1997). Interaction between HIV AIDS pandemic and fertility both at individual and population levels could explain the dramatic and substantial shifts in the demographic profile of the Kenyan population in the recent past. The impacts of HIV AIDS include major changes in population growth and structure especially due to declining fertility, orphanhood, widowhood and household composition. Thus, there is need to understand and measure these effects in Kenya especially how they relate to various selected socio-economic, socio-cultural and demographic factors. So far, there is no adequate information to help explain the effect of HIV AIDS pandemic on fertility patterns in Kenya.

1.3. STUDY OBJECTIVES

1.3.1. General Objective

To establish the extent to which the impact of HIV AIDS prevalence and its perceived risk of infection have influenced fertility patterns among women of reproductive ages (15-49) years in Kenya. The study also seeks to establish the effect of selected fertility determinants on HIV AIDS risk perception.

1.3.2. Specific Objectives

(i) To investigate how the selected fertility determinants affect HIV AIDS perceived risk of infection

(ii) To examine the extent to which HIV AIDS prevalence rate affects fertility patterns.

(iii) To find out how HIV AIDS perceived risk of infection affects fertility patterns.

1.4. STUDY JUSTIFICATION

Population estimates in the context of HIV/AIDS pandemic have so far been confined to the rise in mortality, but should now incorporate its effects on fertility. Understanding the relationship between HIV/AIDS infection pandemic and fertility determinants and its effect on fertility patterns in a young population like that of Kenya is vital. There is need to predict the current and/or future socio-economic burden on surviving family members and communities of increased numbers of children infected by vertical transmission of HIV AIDS or subsequently orphaned by the death of their HIV AIDS infected parents

Lower fertility among HIV AIDS infected women has been observed in women in Zaire, Rwanda and Zimbabwe (Ryder *et al.*, 1991; Allen *et al.* 1993; Sewankombo *et al.*, 1994) although these studies have generally been too small to yield significant results. But, cross-sectional studies carried out by Serwadda *et al* (1997) and Gregson *et al* (1997) in rural

Uganda and Zimbabwe respectively, observed significantly reduced rates of pregnancy among HIV AIDS infected women.

Nevertheless, the precise relationship between HIV AIDS pandemic and childbearing is important, not least because much of what we know about levels and trends of infection in different areas comes only from testing pregnant women at antenatal clinics. It's also important to examine how the various selected background factors like level of education, type of place of residence, current employment status, religious affiliation, ethnic background, region of residence, age and current marital status relate to the proximate ones to influence fertility patterns. Moreover, the more we know about how HIV AIDS risk of infection relates to key fertility determinants and especially to pregnancy, the better idea we have of how our Sentinel Surveillance data relate to women in the general Kenyan population. In addition, estimates of fertility among HIV AIDS infected women have a profound effect on projection of the numbers of orphans, and infant and child mortality rates.

1.5. SCOPE AND LIMITATION

The study focused on Kenya in general. The study targeted adult women aged between 15 and 49 years. This age group was considered because it's the conventional reproductive period. Also, this is the most severely affected age category manifesting the highest HIV AIDS prevalence. Prevalence rates data as reported by the Kenya National AIDS STIs Control Programme (NASCOP) from the 1999 Sentinel Surveillance system were used. HIV AIDS perceived risk of infection status and the selected fertility pattern indicators/measures (i.e.,

number of children ever born, desire for more children and ideal number of children) data as detailed in the KDHS of 1998 were also used in this study. The relationship between HIV/AIDS perceived risk of infection and selected fertility determinants was also considered. However, the nature and extent to which HIV/AIDS perceived risk of infection affects fertility patterns in Kenya was the main area of concern in this study.

The limitations of this study were mainly focused on the data used. The researcher used two sets of data. First, the use of Sentinel Surveillance system data for HIV/AIDS prevalence rates as estimated by NASCOP. It's based on collection of HIV/AIDS prevalence data from attendants of antenatal clinics, mainly women, in selected surveillance sites in various parts of the country.

The data had some limitations. Due to lack of data on prevalence rate in the main Kenya Demographic and Health Survey (KDHS) data set of 1998, the Sentinel Surveillance system data was used. These data were on only selected sentinel clinic sites hence may not give actual picture of community district rates in Kenya. The results of each of the Surveillance site were not exact estimates since the number of women tested varied by year and by site. For instance, when the number tested was small, the uncertainty associated with the estimates would obviously be high. Moreover, a lot of cases were left out as only data on relevant districts also considered in the KDHS survey were merged for study. This kind of complication could not enable regional comparison of the effect of HIV/AIDS-prevalence rate on fertility patterns.

But since there was no other data on HIV/AIDS prevalence by districts, the sentinel results were used as the only way of categorizing the districts into HIV AIDS prevalence zones. Second, data on the HIV-perceived risk of infection as well as those on key fertility determinants and patterns as measured by the number of children ever born, the preferred ideal number of children, and desire for more children were obtained from the KDHS of 1998.

Data on fertility and key fertility determinants were sufficiently exhaustive, however, those on HIV AIDS perceived risk of infection were insufficient since this survey was the first of its kind to include issues related to HIV AIDS perceived risk of infection. For instance, it's difficult to attain high level of accuracy on perceived risk of infection status. For this reason, the researcher adopted only two categories of risk perception that is; those who reported to be at risk of infection that included negligible (only four) reported cases of those who were HIV-positive and those who reported to be at no risk of HIV -infection.

Since not all the districts were included in both KDHS and Sentinel Surveillance system, it is a fact that some important information from other areas was left out. Moreover, harmonising the two data sets was yet another drawback that might have compromised the results of this study as it was not possible to trace the KDHS respondents in the sentinel surveillance prevalence results.

CHAPTER TWO

LITERATURE REVIEW AND STUDY DESIGN

2.1. GENERAL INTRODUCTION

An attempt was made in this section to review relevant socio-economic, socio-cultural, demographic and contraceptive use variables and how they relate to fertility. An effort was equally made to review literature on possible effects of HIV/AIDS on reproduction.

Studies carried in Kenya like others all over the world indicate that fertility is affected singly or by a combination of many factors. In Kenya, fertility rates were quite high in 1970s and early 1980s; however, there has been a remarkable decline in fertility in the recent past. It has been established that this drop is not uniformly distributed among the populace. There exist distinct variations with respect to socio-economic, socio-cultural and demographic variables within different population categories in Kenya. Moreover, it is hypothesized that HIV/AIDS could have contributed to fertility decline through its effect on contraceptive use.

Many studies have been carried out to explain why these variations occur. However, it would be interesting to examine these with respect to the current HIV/AIDS prevalence rates and its perceived risk of infection in Kenya.

2.2. SOCIO-ECONOMIC FACTORS AND FERTILITY

Several socio-economic factors have been associated with reproductive performance. Education appears to be the most important single variable commonly cited in association with variations in fertility. Higher levels of educational achievement commonly relate negatively to fertility (Ohadike, 1968; Dow, 1971; Ejiogu, 1972; Caldwell, 1980).

Education and especially that of females has been shown to exert a powerful effect on fertility (Caldwell, 1980). Studies that have been conducted have revealed negative or positive and sometimes an insignificant change in fertility depending on levels of formal education. Education, nevertheless, influences fertility in a number of ways.

Quoting an ILO/UN study of 1974, Anker and Knowles (1978) point out that Ideal Family Size is negatively correlated to wife's education. They proceed to explain that parents' educational level may affect fertility in a number of different ways. One, by increasing parents' relative preference for consumption items not related to children and thus reducing preference for more traditional lifestyles that include large family size. Another way is that education should increase an individual's willingness to accept new products and to use new procedures more effectively. When this reasoning is applied to modern contraceptive methods, it implies that increases in education may reduce fertility by increasing the acceptability and effective use of contraceptives, thereby reducing the number of unwanted births. Yet a third way is that education enhances the woman's income earning potential and

thereby increasing the opportunity cost of her withdrawing from the labour force in order to care for children. These arguments, thus, indicate that female educational attainment and fertility should be negatively correlated. However, the duo note that the relationship between parents' education and fertility may not be clear as there may be thresholds below which formal education has little or no effect on fertility

Education acts as a fertility depressant in part because it tends to increase knowledge of, favourable attitude toward and practice of family planning. It influences the willingness of spouses to accept new methods of and the ability to use contraception appropriately. For this reason, formal education is said to play an important role in accelerating the pace of fertility decline (Gupta, 1994). Studies have shown that there is a strong relationship between women's educational achievement and fertility reduction in many societies (Nag, 1982). Women with formal education frequent family planning clinics more than those with no education. An earlier similar study by Morgan (1972) found the same with Lagos (Nigeria) women. Education influences fertility through the acquisition of family planning information and by making women to be more aware of their rights. An increase in education produces an increase in the use-efficiency of family planning methods by increasing the usage levels of contraceptives and by giving a large preponderance to the more efficient methods (Festhaeghe *et al.*, 1983). In most cases women with formal education start to use contraceptives at earlier stages in childbearing period. Efficient users of contraceptives are also normally more educated than inefficient users of contraceptives (Dow and Werner, 1981). Mburugu and Ouchu (1985) considered illiteracy in private sector institutions as an obstacle to family

planning. They observed that 23 per cent of women were illiterate while 17 per cent of men were illiterate. Respondents who were less educated were found to desire larger families.

In consideration of education as a prerequisite to adoption of family planning, Gachuhi (1971) looked into the education of the spouses to be a facilitating factor in adoption of family planning. In some cases, the income of educated women is high, making fertility high because women with high incomes can afford to support more children. Education may also indirectly affect the fecundity of women. This is because educated women may be more knowledgeable about their health, diets and hygiene. Educated women may also reduce the length of breast-feeding period allowing for earlier conception. This reduces the length of post-partum amenorrhoea, miscarriages and intrauterine mortality thus increasing fertility. The educated women may also afford nutritious food. This improves the health of the people and increases their fecundability.

Egero and Mburugu (1994) argue that in Kenya, women with a few years of education in 1970s had a higher fertility than other categories of women. This high fertility is said to be highly linked to a tendency among educated women to reduce the breast-feeding period. In the 1970s most of the Kenyan women who had formal education were young and this caused a tremendous increase in marital fertility with an increase in education. The trend reversed in 1980s. Although the mean desired family size is usually said to decrease steadily with increasing level of education, in sub-Sahara Africa, even relatively highly educated women are said to want to have higher number of children (UN, 1987).

Ong'uti (1987) using data collected by Kenya Contraceptive Prevalence of 1984 found no great fertility difference between women with no education and women who had 1-4 years of education. However, Henin and Mbwobobia (1981) point out that with primary level schooling women break away from tradition yet do not adopt modern contraception, thus increasing fertility. Those with secondary plus education are more often than not found in urban areas probably in formal employment where practice of contraception becomes a norm

Population researchers, basing on variables associated with the demographic transition in developed countries, have focused their earlier studies in developing countries on investigating a presumed inverse relationship between female labour force participation and fertility behaviour. It has been established that the manner in which female employment status and fertility are related varies across and within countries (Standing and Sheehan, 1978) A sociological explanation from the economic theories of fertility, which has dominated many studies is that as a woman's potential wages increase, the higher the cost of raising children. This is so because women forgo more socio-economically when time is devoted to childbearing and rearing. The maternal role incompatibility hypothesis highlighted the critical interrelationship between women's productive (labour force participation) and reproductive roles in life.

According to an empirical research guided by Women In Development (WID), Lloyd (1991) cited in Mikeso (1996) demonstrated that the relationship between women's work outside the home and fertility is much more complex than originally anticipated That a plethora of

variables mediate the relationship, alter the hypotheses and modify the outcomes. Key intervening factors according to WID are the structure of economic opportunities for women and households as well as poor women's lack of access to family planning. This empirical research has clearly touched on the importance of a poverty-oriented when studying women's productive and reproductive lives in developing countries.

It is well known in developed countries that women's engagement in employment is positively related to lower birth rates, particularly when women in low-income groups are excluded. In developing countries, however, many studies have come up with rather ambiguous and often contradictory results. This could, in part, be due to less conflict between women's roles as workers and mothers (Youssef, 1982).

A recent review of the World Fertility Survey (WFS) data, that included information on women's work before and after marriage, points out that the variability in findings among countries and within countries is a function of the opportunity structure variable to women within and without households. A minority of the women are in the modern sector employment and for the majority of women in mixed, transitional and traditional occupations, the work-fertility relationship varies over the life cycle and with the type of occupation and earnings (Lloyd and Blanc, 1993).

The Maternal Role Incompatibility and the Rising Costs of Children models both provide explanations based on the assumptions that mothers always take care of children, and that parents live together over the life cycle of the family. It has been established through research

in developing countries that instead, the socio-economic arrangements of families in these countries are highly variable and in most cases running parallel to these assumptions. Lloyd and Blanc further argue that parents often live separately and even when they live together, child fostering can occur. Father's support of children, particularly in developing countries of sub-Saharan Africa is variable. The burden of child rearing outside marriage may be shared by siblings, family members, co-residential members, and or hired help (Desai, 1991).

The importance of a focus that touches both on the structure of opportunities for women and on the family and residential arrangements in explaining the work fertility relationship has been highlighted by empirical findings. Such findings also show that under certain conditions, the cause effect relationship hypothesized by the early population studies can be reversed; i.e., women may need to work to support their children rather than wanting to stop work in order to have children (Anker and Knowles, 1982). However, these cross-sectional surveys are ill equipped with the necessary tools to gather information on population variables tracing the direction of causation.

Longitudinal studies have been used for further contribution in determining the cause effect relationship. This has been done to provide the narrative for events in women's lives. Tracking causality is, therefore, important since there are so many intervening individual, family and community institutional factors in the work-fertility relationship. Even though scholars (Cleland and Rodriguez, 1987) have questioned the utility of pursuing further research in this area, it should be noted that studies in this area would yield valuable information about how women balance responsibilities in their lives.

Miheso (1996), using the 1993 KDHS data to establish the relationship between fertility differentials and occupation type among married Kenyan women came up with the finding that socio-economic and socio-cultural factors play a significant role in the type of work a woman does. Ethnicity and availability of jobs in the respective settings were shown to influence choice of occupation. Education was also found to play a major role in the type of work a woman does. Consequently, it was found that the effect of occupation on fertility was seen to be quite significant with women in the more time demanding jobs such as transitional and more modern sector having lower fertility than women in the more flexible jobs represented by the mixed and traditional sector. The age at first marriage and type of occupation confirmed that occupation influences the age at first birth as women in modern sector jobs had late first births while women in the traditional sector had early first births. That although desired family size was predominantly small for all women in these categories, the analysis indicated that most women preferred to have between three to four children. Women in the more time demanding jobs such as modern sector and transitional sector preferred small family norm. The analysis also showed that women in the modern sector used contraceptives more than in the other sectors.

Some studies have shown that urbanization makes people drop or loose contact with their cultural beliefs and practices. However, this is generally a gradual process as other researchers have found. Rural-urban migrants have relatively traditional values that change slowly over time. These migrants are known to retain some of their fertility behaviours of their original environment until they make considerable adjustments at their new environment. According to

Goldberg (1957) cited in Mileso (1990) in a study based on a number of American cities, hypothesized that urban fertility differentials by social class/status were only caused by farm in-migrants who had moved into the cities and these were a majority among the lower social strata.

2.3. SOCIO-CULTURAL FACTORS AND FERTILITY

It is well documented that cultural norms, beliefs, attitudes and practices have an influence on behaviour that eventually affects fertility trends, levels, patterns and differentials in almost every society. In Kenya, a number of studies have shown that fertility variations do occur by religious affiliation among the populace. An explanation of fertility variations based on socio-cultural ideologies has been attempted by Ocholla-Ayayo and Ottieno (1988). They noted that Protestantism and Catholicism do not allow polygyny unlike the Moslems who allow it. This obviously, as other studies have shown, has fertility implications. Ang'awa (1990) found that the Total Fertility Rate (TFR) of both Catholics and Protestants do not differ very much. There was, however, a substantial difference between the total fertility rate of Christians and the Moslems. The TFR of Christians also differed greatly from that of those people who still keep traditional African faith.

Ang'awa (1990), using the Kenya Fertility Survey (KFS) data found that the TFR for Catholics was 8.46, for Moslems it was 6.67, for Protestants 8.76 and Traditionalists 7.01. The findings of Ang'awa concur with those of Ong'uti (1987) who, using the Kenya Contraceptive

Prevalence Survey (KCPS) data of 1984 found Moslems to have a TFR of 6.49, Protestants 8.69 and Catholics 8.95 and traditionalists 7.76.

The above findings are similar to those of Henin (1979) for Tanzania. According to Henin, the low fertility for the Moslems in Tanzania was due to a high proportion of childless women. Moslems are also reported to be associated with less secular education and high level of polygyny. However, Ocholla-Ayayo (1986) reported that fertility levels among Christians could be high because they ignore most traditional norms, beliefs and practices as well as the use of modern contraceptives.

According to Anker and Knowles (1982), the general contention is that religious group differences in fertility are due to differences in contraceptive practice, religiousness, type of education (secular versus religious), socio-economic status, ethnicity and marital status. Although research reports elsewhere seem to confirm this general hypothesis, the multiplicity of religious groups with different religious philosophies sets a limit on the extent to which findings from one religion can be extrapolated to another with similar religious orientation (Arowolo and Mabogunje, 1978).

A specific hypothesis that has been tested in some parts of Africa relates to the insinuations of religion on contraceptives use. Given the pronatalist positions of certain religious groups like Catholics and Moslems and the varying degrees of permissiveness of the issue of family planning among others as Protestants, the explanation of different fertility rates lies mainly, other factors being constant, on religious group differentials in knowledge of, attitude toward

and practice of family planning. The Catholic Church was reported to give active encouragement to "approved methods" of family planning in countries like Mauritius. Even in the predominantly Muslim countries of Africa, it has been shown that the adoption of family planning has little to do with religion. The real obstacle to family planning programmes in sub-Saharan Africa as indicated in Caldwell's work are socio-economic in nature i.e., lack of finance, shortage of trained personnel, insufficient publicity, uncertainty of government support, the difficulty of supplying remote rural areas, rural illiteracy, and suspicion on the part of those holding more traditional attitudes.

Commenting on religion, Omran (1984) argued that the Catholic arguments regarding procreation strongly influence attitudes against family planning. He notes that Catholics have an inflexible attitude against modern contraception which has evolved over period and which does not seem to have softened in modern ways. This, according to Omran, is therefore likely to make Catholics have comparatively higher fertility. The non-Catholic churches have, on the other hand, been more positive towards family planning.

Anker and Knowles (1982) rightly underscored that analysis of fertility differentials in Kenya would be incomplete if ethnic groups were not considered. This is because in African society, children belong to the lineage. Mosley *et al* (1982) reported that the highest levels of fertility were observed among the Kalenjin and the Kisii, while the Mijikenda had the lowest fertility because they had the longest intervals of birth and breast-feeding periods. They also found that polygyny was prevalent among the Luhya, Kisii, Luo and Mijikenda while it was lowest among the Kikuyu. Ocholla-Ayayo and Ottieno (1987) reported that the Kikuyu married

much later than the Luo, but there was no much difference in the fertility of the two ethnic groups as would have been expected. They argued that this was because the Luo married early and stopped giving birth early whereas the Kikuyu married late and stopped child bearing late.

Ocholla-Ayayo and Osiemo (1989), in their other studies, have argued that this could also be so because Luos are more polygynous than the Kikuyu who, on the contrary, have high single fertility. They also reported that the Luhya and the Kisii manifested almost similar fertility levels and the same proportions of women currently married between ages 15-19. They were also the groups with the highest fertility levels. The Kamba, with almost the same proportion of women not married between ages 15-19 as the Kisii and the Luhya and with low proportion of women in polygynous unions, had a lower fertility than the two other groups. This phenomenon could be due to ecological conditions these people stay in. The Luhya and the Kisii come from the fertile western Kenya region, while the Kamba are in the semi-arid eastern part of the country.

The Luo and the Mijikenda, according to the duo, have the highest proportion of women currently married in polygynous unions. Their total fertility rates were, however, different with the Mijikenda having the lowest fertility of all the ethnic communities considered. This has been attributed partly to relatively low educational level, high divorce rate, long breast-feeding duration and possibly the same religious norms. The fertility of the Kalenjin was also among the highest along with that of the Kisii and Luhya. This could have been due to improved nutrition conditions, low age at marriage, negative attitude toward family planning and small family size, and low under five mortality rate among other factors. The Kalenjin,

like the Mijikenda, observed a longer period of breast-feeding than most Kenyan ethnic communities today. Such differences bring out regional variations in fertility in Kenya.

2.4 DEMOGRAPHIC FACTORS AND FERTILITY

Various studies have shown that demographic factors like age is of primary importance in fertility determination. Miheso (1996) cites a study of 1988 done by Barakrishnan and others that reported that the negative consequences of early child bearing, especially if followed by high consequent fertility, have been well documented. They noted that the inherent effect of age on child bearing is to raise completed fertility. This is because early child bearing interrupts schooling and probably terminates it altogether. Thus, early child bearing is closely correlated with early marriage and therefore a long potential exposure is ensured.

Besides, where contraceptive use and/or practice are not very efficient, the chance of unwanted births is higher. Those who marry early are also exposed to pregnancy during the high fecundity years of the late teens and early twenties in contrast to those who marry late Moreover, women who marry early and start a family soon after may also have the characteristic usually found to be correlated with higher family size such as low education, low income and strong religious background. Using data from the Canadian Fertility Survey of 1984, Barakrishnan, and others confirmed the relationship between age at first birth and subsequent fertility. They found that those who had a first birth before the age of 18 years had a total lifetime fertility of 4.7 births while those who had their first birth after the age of 25 years had a total lifetime fertility of 2.01 births.

In a study of adolescent fertility in European countries, Deschamps and Velentin (1978) found that fertility rates of teenage women in Bulgaria varied from 0.75 per cent for younger teenagers aged (10-14) years, to 72.4 per cent for older teenagers aged (15-19) years. While in Switzerland, the rates varied form 0.02 per cent to 17.4 per cent for younger and older teenagers respectively. Finland and France were, however, noted for their low teenage fertility.

Gaisie (1984) carried out a study on Ghana using data drawn from World Fertility Survey. He noted that 75 per cent of Ghanian women have their first birth before their 23rd birthday, with nearly all those who do bear children experiencing their first birth before they are 26 years old. He estimated the average age at first birth as 19.7 years with a spread of five years, while the median age at first birth was 20 years for all ethnic groups. He also found that women in the urban centres have their first birth about a year later than those in the rural areas, and also women with secondary education and above experience their first birth at a median age of 25 years, while those with middle and primary education have their first birth at a median age of 20 and 19 years respectively.

In the Kenyan scene, Nyarango (1985) from a study of estimation of nuptiality using census data for Kenya found that marriage is still a universal phenomenon. That females tend to marry at earlier ages than males. The marriage timing for females was found to be increasing (i.e., it increased from 0.74 to 1.1 years) while that of males reduced from 1.22 to 0.26 years over the period 1962-69 and 1969-79. Khasiani (1985), in her study of adolescent fertility in

Kenya, reported that more adolescents were engaging in premarital sex at younger ages, yet very few of them practiced contraception to prevent conception despite knowing about them. This reluctance among the youth to practice contraception partly reflects the reluctance on the general population to provide contraceptive information and services to the youth. However, the level of contraceptive use has been increasing of late with KDHS of 1998 reporting a 39 per cent prevalence rate. This could be attributed to among other things, a measure to prevent HIV infection and unwanted pregnancy.

It has been established through research that the type of family structure can also affect fertility. For instance, in extended family structures, fertility is usually high compared to nuclear or single parenthood types. In extended families, early marriages are predominant and the community cherishes children. As such, childcare has been known to be a collective responsibility and the spouses are encouraged to have as many children as possible. Children are also viewed as economically useful in extended families (Ware, 1977a; Ocholla-Ayayo, 1988). This tends to raise fertility.

In certain circumstances, cultural values may help to control fertility. An example is given of some cultures where the spouse may be separated when the woman is pregnant. The woman continues to stay away from the husband even after she has delivered until the time that the child stops breast-feeding. This may help to reduce coital frequency that may eventually lead to a decline in fertility. Polygamy, as already stated elsewhere, is another cultural practice that influences fertility negatively (Mosley, 1981). He also asserts that breast-feeding is a cultural practice that affects fertility through its effect on the length of infecundity.

Mortality and particularly infant and child mortality is likely to affect fertility behaviour. In places where infant and child mortality is high, the use of contraception is normally low. This can be attributed to the tendency of the couples to replace actual loss of children (replacement effect) or even have more than they would actually desire if there were an eminent anticipation of loss in high infant and child mortality environment (hoarding effect). Mortality, and especially infant and child mortality, can also affect fertility through their effect on lactation period. For instance, a reduction in infant and child mortality lengthens the average period of lactation which implies a longer period of post partum amenorrhoea. These views have been shared by many researchers including (Kimani, 1982; Gupta, 1994)

2.5. CONTRACEPTIVE USE AND FERTILITY

It has been argued that no population is ignorant of birth control methods even where there is absence of modern methods of contraception. Therefore, each population tries to limit its fertility in one way or another and this affects its level of fertility. Women who practice birth control techniques tend to have fewer births.

Anker and Knowles (1982) observe that use of modern contraceptives allows couples to have fewer unwanted births, thus, causing family planning acceptance and fertility to be negatively related. They further observe that contraceptive use is likely to increase with better education of women and point out that this has been confirmed by various studies. Also, the more educated women were found to be least likely to discontinue contraceptive use.

Celade (1972) has argued that contraceptive use is influenced by education. That education affects knowledge, attitude and motivation and perhaps to a lesser extent, access to family planning through higher income. The Kenya Contraceptive Prevalence Survey of 1984 showed that the use of contraception had a depressing effect on fertility. One of the most important factors explaining fertility decline in Kenya is the intensive Family Planning programmes adopted by the Kenya government (NCPD, 1993). Kizito *et al.* (1991) in explaining fertility decline in Kenya between 1977/78 and 1989 found that contraceptive use was the most important determinant of fertility in fertility decline explaining 62 per cent of the aggregate fertility decline. It was also noted that the changing proportion of women who were exposed to the risk of childbearing through marriage was also an important determinant of fertility decline. Approximately 26 per cent of the fertility decline was attributed to a change in marital patterns. Studies have indicated that the use of modern contraceptives is particularly prevalent in urban areas than in the rural areas (NCPD, 1993). However, it has been noted that contraceptive prevalence is rising and fertility is falling in Kenya and the speed at which these changes are occurring suggest that Kenya has passed a turning point and entered a transition (Robinson, 1991).

In his 1983 study, Ayiemba looked at nuptial determinants of fertility in western Kenya and found out that socio-economic and situational factors that had significant effect on fertility were education, proportion of female Catholics and the proportion using modern contraceptives. He concluded that in the context of socio-economic development of western Kenya, socio-economic and situational variables would continue to be relatively more

important determinants of lifetime total fertility rate. In his study, he found that only childhood mortality and contraceptive use exerted direct impact on total fertility rate while other variables influenced fertility strongly but indirectly through impact on age at first marriage, marital stability and frequency of re-marriage.

According to Ocholla-Ayayo and Osiemo (1989), most users of contraceptives only did so to terminate childbearing rather than birth spacing. However, the duo observed that the termination of pregnancy takes place when fertility is already too high. The average number of children normally expressed is a desire not actually achieved. They found a Total Fertility Rate (TFR) of about 6.4; 7.4 and 8.1 in 1962; 1969 and 1979 respectively, while in 1984 it stood at 8.6 births per woman.

The KDHS of 1993 found out that knowledge of some family planning methods is virtually universal among both males and females in Kenya. Among the currently married people, it was found that about 97 per cent knew at least one modern contraceptive method. In Kenya at least one third of married women are said to be using contraception method. Thus, for significant decline in fertility to occur and for small fertility size to emerge, it seems that those who are motivated to have few children have to contracept to achieve that goal. In the absence of significant use of contraceptives, large family size may be the rule even among couples who express attitudes that favour small family size.

2.0 HIV/AIDS BEHAVIOURAL RESPONSE AND BIOLOGICAL/PATHOGENIC EFFECT AND FERTILITY

2.6.1. Introduction

There is mounting evidence for association between HIV infection and reduced fertility in sub-Saharan populations (Ratter *et al* 1994; Sewankombo *et al.*, 1994; Serwadda *et al* 1997). Infertility may be a risk factor for HIV infection (Boerma *et al.*, 1996). But it also seems likely that HIV prevalence itself can result in lower fertility among infected and uninfected individuals.

In a recent analysis of a large population-based study in Uganda, Serwadda *et al.* (1997) found a 53 per cent lower adjusted risk of pregnancy among women with HIV infection compared to women without HIV. As was the case in an earlier small-scale study in Zaire, women with more advanced disease had the lowest pregnancy rates but there was also evidence for sub-fecund among those with asymptomatic infections (Ryder *et al.*, 1991). The authors suggested that higher levels of spontaneous abortions and stillbirths could be important in explaining their findings. Other possibilities include increased amenorrhoea (Widy-Wirski *et al.*, 1988), and reduced spermatozoa among male partners and reductions in coital frequency during periods of sickness (Martin *et al.*, 1991).

At the population level, low fertility among women with HIV infection can, in some circumstances, result in an overall decrease in birth rates over time (Zaba and Gallumbien,

1990). For instance, this could occur where lower fertility due to other sexually transmitted infections are more likely to acquire HIV infection and thus suffer high morbidity and mortality. It is also important to recognize that biomedical and behavioural responses to HIV pandemic that affect birth rates can also extend to persons not infected. This happens through fear of the risk of infection. The substantial reduction in fertility experienced by HIV-infected women not withstanding, behaviour changes could emerge as being more important than biological changes at the population level; more people being involved and the effects being long term. Relatively few people infected with HIV in sub-Saharan Africa are unlikely to be aware of their condition until the later stages, which are typically very short.

At the individual level, it is helpful to differentiate between deliberate and unintended fertility effects. It is sometimes suggested that couples will seek to accelerate their childbearing for fear that they might not live long throughout the normal reproductive lifespan (Setel, 1999). This seems especially plausible in societies that emphasize the importance of childbearing like Kenya. However, other concerns such as the reduced chances of child survival, the adverse effects of orphanhood on the child, and the broader health consequences be paramount, particularly where the woman or the couple already has children.

However, in Kenya according to KDHS of 1998, about 15 per cent reported having gone for HIV/AIDS test with an encouraging figure of 65 per cent of those who had not been tested reporting that they would like to be tested. This gives the indication that it seems likely that behaviour change will be more extremely significant among people infected with HIV and those who are at risk of HIV/AIDS infection.

most cultures emphasize succession by living children and in Kenya at least, while most people have heard that HIV can be transmitted from mother to a child at birth, relatively few realize that there is a more than 50-50 chance that this will not occur. In Kenyan population, conscious control of fertility has picked-up in the recent past and the possibilities for deliberate acceleration of childbearing are clearly limited. Irrespective of whether individuals alter behaviour with the intention to influence their rate of childbearing, broader changes instituted primarily to reduce the perceived risks of HIV transmission may have this consequence (Gregson *et al.*, 1997). Increases in abstinence and condom use would tend to reduce fertility, particularly where effective contraceptives have not been widely used in the past. According to (NCPD *et al.*, 1998), use of modern contraception has risen sharply since the early 1980s to a current prevalence rate of 39 per cent as far as modern methods is concerned and is probably one of the principal causes of the fertility decline in the country.

Conversely, earlier and more effective treatment for other sexually transmitted diseases or early termination of breast-feeding would tend to increase fertility. It seems quite plausible that it would be the changes of this nature which will involve currently uninfected, but perceive themselves to be at a risk of infection as well as infected individuals which will be most significant in determining the extent of the effect of the HIV-pandemic on actual and intended fertility at the population level.

2.6.2. HIV/AIDS Biological/pathogenic Effect and Fertility

The clinical consequences of HIV infection form a spectrum ranging from a totally asymptomatic stage to a severe disease. However, the stage of HIV infection that has defied precise clinical classification is that of non-specific signs or symptoms. This has generally been referred to empirically as AIDS-Related Complex (ARC) if individuals manifest one or two signs or symptoms such as fatigue, fever, weight loss, persistent skin rash, oral hairy leukoplakia, herps complex, oral thrush among others: and advanced (ARC) if more than two of the manifestations are present. Thus, AIDS, according to Obel (1995), is defined as consisting of either fever persisting for more than one month, involuntary weight loss exceeding 10 per cent of baseline, and diarrhoea persisting for more than one month in the absence of another cause to explain the finding, or a combination of two or more of these conditions.

HIV/AIDS infection normally has many devastating effects including nutrient absorption in the body, a condition that often leads to muscle tissue wasting (Fleming, V. I. *et al.*, 1988). Other core areas affected that can interfere with the body normal function are the brain, liver, bone marrow among others. This condition according to Obel can lead to high HIV-induced sterility, increased spontaneous abortions, still births among other defects in females and decreased spermatozoa among males, all of which have tremendous effect on fertility performance especially in high HIV AIDS prevalence areas.

Williams G. *et al* (1997) view the effect of HIV/AIDS to be more on women in reproductive life for they are at a higher risk of contracting HIV and other STIs than their male counterparts. In Tanzania, for instance, researchers found that 17 per cent of young women aged between 15 and 24 in the town of Mwanza were HIV positive compared with only 5 per cent of their male counterparts. Thus, they say, is not because more young women are involved in high-risk sexual behaviour than young men. The higher level of HIV infection among young women, they argue, is due to a combination of factors that, to a large extent, are beyond their own control. For biological reasons, women are much more likely than men to become infected with HIV through unprotected sexual intercourse. That women have a much larger genital surface area than men and the female genital tract retains semen for a considerable period of time. Young women in their reproductive age are at a particular risk because of the fragility of their vaginal membrane. This makes the interaction between HIV/AIDS pandemic and fertility performance an interesting area of concern.

Baver, M. and Ray S. (1993) considered the effect of HIV/AIDS on menstruation and fertility and found out that many women with HIV reported changes in menstrual patterns, most commonly irregularity of periods. In a study carried out in USA compared 17 HIV positive and 20 HIV negative women with similar histories of infectious drug use. Here, 24 per cent of the HIV-positive women and 13 per cent of the HIV-negative women reported loss of periods. 18 per cent of the HIV positive women and 6.0 percent of the negative ones reported bleeding between periods. They concluded that drug use was probably not the primary cause of these differences but HIV/AIDS infection. Sexually transmitted diseases, weight loss, the effects of immune deficiency on hormone production or damaging effects of HIV itself on ova or

reproductive organs they argued, could cause loss of periods, menstrual changes and effect on [illegible]

Serwadda *et al* (1997) carried out a controlled study in Uganda relating HIV, STIs and fertility and found that loss of periods and possible lower fertility were common in several hundred women with HIV. Five per cent of HIV-positive women had no menstrual period compared to two per cent of the HIV-negative ones. The HIV-positive women, they found to have an average of four living children compared to five in the HIV-negative women, though their ages and other factors were comparable. A similar study carried out earlier by Allen *et al* (1993) in Rwanda reported that the fewer children women had, the more likely they were to be HIV-positive. However, they did not examine this as a fertility issue.

Ryder *et al* (1991) examined fertility rates in 238 HIV sero-positive women in Zaire followed for 3 years post-partum. This was a large controlled three-year study of women who had just given birth in Zaire. The study found a reduced fertility in each year in HIV-positive women compared to HIV-negative women. The biggest difference, they asserted, was among the women with AIDS. In this study, figures were adjusted to take account of use of birth control. The writers postulate that if women with HIV stop having unprotected intercourse, which is not uncommon, fertility as measured by the number of pregnancies will be reduced. This is different from possible adverse effects of HIV on the reproductive organs, which may affect the ability to become pregnant. This is an area these researchers argue, has not been given enough attention as a possible channel through which HIV/AIDS pandemic impacts on fertility performance.

Berer and Ray further argued that there might also be an association between HIV AIDS itself and specific AIDS-related diseases. For instance, in their other studies ovarian cysts associated with cytomegalo-virus were found in a woman who had died of AIDS, and this had previously been reported in two other women with other causes of immune deficiency. As HIV-disease advances, they argue, the number of mature sperms and sperm cells in the male tastes declines. In a small group of men who died from AIDS, no sperms at all were found. Other anecdotal reports of reduced fertility exist. For example, a man and a woman, they report, who both tested HIV-positive and had previously had children with former partners, unsuccessfully tried for a pregnancy for several years. Investigation indicated that the woman had ovarian cysts and the man had abnormal sperms. Her immune function was found to be at the lowest and abnormal, while his was somewhat lower

In trying to establish whether HIV AIDS in pregnant women increases the risk of maternal morbidity and mortality, and whether pregnancy has an adverse effect on immune function and progression of illness in HIV-positive women, Barer and Ray (1993) found that generally, if a woman with HIV is weak or has only minor symptoms of infection, has not been infected for a long period, and has a low risk of other pregnancy-related morbidity, few if any adverse effects up to two years after pregnancy have been found in studies in USA, Scotland and Sweden. Effects do begin to appear with longer periods of follow-up and infection, but these may have occurred in the absence of pregnancy. Of the 54 pregnant HIV-positive women and 53 pregnant HIV-negative women in Uganda, all of whom were healthy, Serwadda *et al.*

found, after five years, that 41 of the HIV positive women were still healthy, 8 were ill and 6 had died. Among the HIV-negative, on the other hand, there were no deaths

Berer and Ray also report of a Swedish study that followed pregnant HIV-positive women who were similar in age, clinical status and immune status at delivery. HIV-related diseases progression and increased immune deficiency occurred after pregnancy in 46 per cent of the women. The affected women had generally had HIV infection for a longer period of time, and were also more likely to have an infected child than the women whose health was unaffected. In this study, follow-up was for a mean of just under 3 years.

Mann *et al* (1992) argue that adverse effects of HIV AIDS on maternal morbidity and mortality seem to be worse in women of low socio-economic status, especially in developing countries of sub-Saharan Africa. At Harlem Hospital Centre in New York, women with HIV are reported to have poor outcome with sexually transmitted diseases, pelvic inflammatory diseases, ectopic pregnancy, low birth weight, maternal complications and infant mortality. These researchers assert that where woman's health is already compromised or poor, HIV in pregnancy may exacerbate their condition, and this is more likely if previous pregnancies have affected her health, if she has had HIV for a longer time, or is at more advanced stages of HIV-related illness. They argue that few effects on the rate of maternal complications in HIV-positive, which may have tremendous effect on live birth rates, have been investigated in developing countries where these are most likely to occur. In a large study carried out in Malawi recently, Mann *et al* reported that the risk of miscarriage in HIV-positive women was

that of HIV-negative women. The risk for stillbirth was higher for HIV-positive in one Kenyan study, but lower in the Malawian study.

Specific AIDS related illness might lead to complications during pregnancy or birth. The rate of emergency caesarean section deliveries to HIV-positive women in a Swedish study was however not significantly higher than in the general population. But of the seven emergency caesareans, one was because the woman had pneumocystis pneumonia, shingles, herps and cytomegalo-virus, conditions all of which are associated with HIV-infection, and she died.

2.6.3. HIV/AIDS Behavioural Response and Fertility

Most writers concede that HIV/AIDS is a major global health and socio-demographic problem. In poor countries like Kenya, the socio-demographic effects of HIV/AIDS are greater for it affects the productive and reproductive population groups that these countries really need.

According to Tuju (1996), this disease is a major challenge to human nature and that the human race must be ready to face its challenges as the epidemic unfolds. The writer argues that churches and other religious organizations have already seen many members die of HIV/AIDS, even as they continue to preach the key moral message of abstinence before marriage as the only solution to AIDS pandemic. That there will be varying options and controversies on issues like condoms not only as contraceptive method but also as a method of

preventing HIV infection. Iuju asserts that such debate, controversy and confrontation is the stuff that life is made of.

Anyonza-Nyamongo *et al.* (1991) in their study of HIV/AIDS response and its effects in third world countries, argue that most sexually transmitted diseases particularly HIV/AIDS occur among the youth, more so, in the age group 16-29 years. That promotion of condom use has been increased to enable those who cannot abstain from sex to have access to a protective measure. This would help combat not only the spread of HIV and other STDs but also curtail unwanted pregnancies which are on the increase in the region especially among the youths. This concurs with the KDHS of 1998 report that puts contraceptive prevalence rate at 39 per cent up from 27 per cent in 1989. This shoot-up is expected to have similar effects on fertility patterns and trends in Kenya.

Ayiga *et al* (1999) carried out research in a number of sub-Saharan African countries particularly in Uganda to establish the people's attitude about death, HIV-testing and sexual behaviour change. In the northern Ugandan study, also referred to as the Northern Uganda Survey, research was done in the districts of Soroti, Lira, Lango and Lugbara respectively. These ethnic groups were chosen because they are the largest of the three major language groups of Nilo-Hamites, Luo and Sudanic populations in Uganda where HIV/AIDS infection rates increased rapidly because of socio-political disruption in the areas. It was established that changes in attitude and behaviour are beginning to emerge in Northern Uganda including use of condoms, reduced number of sexual partners, reduction in extramarital sex and reduced cases of widow inheritance and late start of sexual activity among the youth. That some other

changes are beginning to emerge especially those related to attitude to death, desired family size and HIV testing mainly because of AIDS. The increasing AIDS morbidity and mortality in the region has made change in sexual behaviour desired. What needs to be done, according to the writers is to increase monitoring and preventive programmes to sustain the emerging patterns of attitudes and behaviour.

In Population Reference Bureau of the, Peter Way and Karen Stannezki (1991) attempted an overall effect of HIV AIDS pandemic on population growth in sub-Saharan Africa. The duo used the United States (U S) Department of State's Inter-agency Working Group Model of the HIV AIDS pandemic to make 25-year projection for the sub-Saharan Africa region. As infection levels soar urban life expectancy is reduced by 19 years. This gives the implication that life expectancy will go down to as low as 30 years in many sub-Saharan countries, a fact which coupled with increasing age at first marriage as induced by the desire to attain higher levels of education in most sub-Sahara African countries, is set to further limit reproductive lifespan. This has a direct impact on fertility performance. However, these researchers argue that the effect of AIDS on the total population is moderate with annual population growth rate declining from 2.2 to 1.8 per cent.

Malungo (1999) in his study entitled "Behaviour Change in the Context of HIV AIDS in Zambia" talks of "sexual cleansing" locally known as *kusalazya* and levirate marriage as being the cultural practices that have been implicated in the spread of HIV. Using both qualitative and quantitative data obtained from a survey conducted in the second half of 1998, mostly in the southern Zambia, with additional information on all the other eight provinces in

the country, it was revealed that *kusalazva* is culturally expected to "chase away" the spirits of the deceased from the clan and especially the spouse, and that the widows had to have some form of sexual intercourse with someone preferably a man from the clan to be cleansed. At the same time most people, as most respondents indicated, have come to realise that this practice is not only a risk factor in the spread of HIV and in turn AIDS, but also an additional burden to the surviving family members, as children born of such women often become orphans as their mothers soon die. This has resulted in the use of alternative practices to *kusalazva* that do not involve sexual intercourse.

The lower fertility of the sero-positive women compared with sero-negative ones had been reported for a cohort of women in Kinshasa, Zaire (Ryder *et al* 1991, Batter *et al* 1994) with fertility being about 25 per cent lower among sero-positive women and with the gap increasing with age. But these women were told their sero-status. Those HIV-infected were encouraged not to become pregnant again and were assisted to practice family planning. Their level of contraceptive use was significantly above that of the sero-negative, although this is probably not enough to explain the full fertility differential. Nevertheless, it appears that it (high fertility) had been curbed by increased contraception.

Similarly, Gregson *et al* (1996) reported that fertility had declined by one child per woman in Zimbabwe's Honde Valley which they ascribed at least partly to greater use of contraception, especially condoms, employed increasingly in an attempt to prevent HIV-infection. Nevertheless, they appear to have suspected that HIV itself (biologically) might be part of the explanation for fertility decline. By 1997, Gregson *et al*, concluded that it was likely in

Zimbabwe that HIV was causing fertility decline beyond that which could be ascribed to condom use and behavioural attitudinal change.

2.7 THEORETICAL FRAMEWORK

Quite a number of theories have been developed by various scholars to explain the changes in fertility levels, trends and or patterns in different parts of the world. The theories that are relevant to and included in this study are: Demographic Transition Theory; Natural Biological Theory; Socio-economic Theory, Socio-psychological Theory and Wealth Flows Theory.

(a). Demographic Transition Theory:

This theory refers to the fertility and mortality transitions as experienced in some developed countries. As argued by Notestein between 1915 and 1953, it started from a situation of high death and birth rates to a condition of falling death rate and constant or even higher birth rate; and finally to that of low death and birth rates being experienced currently in more developed countries. The theory argues that in societies of industrialization, the process of demographic change and or modernization was spread over a few western European countries. That prior to industrialization, these countries were characterized by high death and birth rates, but as a result of improved living conditions such as better nutrition, health personal hygiene and other aspects, death rates in these countries began to go down. By the end of the 19th century, these countries had moved to a situation of low fertility and mortality.

in less developed countries, however, population growth was about 0.3 per cent per annum at the beginning of the 20th century. In a number of such countries, mortality began to decline gathering momentum after World War II. By contrast, fertility remained relatively high. Since then, the mortality rates have declined rapidly. In a few cases though, death rates are not comparable to those experienced by more developed countries then. However, recent developments like dismal economic performance in these developing countries and the impact of HIV AIDS scourge have negated the already made achievements and mortality rates have risen leading to suspicion that fertility would follow suit

The Demographic Transition Theory is to some extent relevant to the study of fertility. The theory argues that there are three stages of demographic change namely; the first stage of high death and birth rates; the second stage of relatively high birth rate and low death rate, and lastly, the third stage of low death and birth rates.

Kenya could be said to be moving toward the third stage of demographic transition with relatively low death rate and high but falling fertility as has been witnessed from late 1980s to date However, the situation remains unpredictable as mortality rates have reversed and there is every suspicion that fertility is likely to respond by rising once more.

(b). The Natural/biological Theory:

The classical school of environmental determinism developed the concept of "Natural Fertility" as explained in the theory of fertility behaviour. Proponents of this theory explain that inherent biological levels of fecundity primarily determine human fertility. The biological

processes are regarded as the most important determinants of age pattern of reproductive risk. Biological forces are known to influence the age of entry into and exit from the reproductive life. This Theory of natural fertility sees reproductive potentiality of human population and that of other animals to be determined solely by natural forces, which also potentially determine the nature of environmental health and nutrition.

The natural theory explains further that there is no conscious or unconscious application of socio-economic and cultural forces, which could affect exposure to intercourse, conception and gestation. These forces are conceptualised as determinants of the degree of reproductive risk regardless of the mother's age. These exogenous forces are significant intermediary variables, rendering the concept of natural fertility as embodied in the natural theory of fertility behaviour too idealistic.

This theoretical model is inadequate in the sense that it disregards the conscious and unconscious application of fertility control methods or measures. Man is known to be naturally rational and this rationality affects his reproductive behaviour. He is capable of deciding when to have a child and the means to achieve it. In Kenya, the data collected in KDHS 1998 indicate contraceptive prevalence rate of about 39 per cent as far as use of modern methods is concerned. This shows an increasing desire by Kenyans to both space and limit childbearing. However, man's decision is affected indirectly by the socio-economic, socio-cultural and demographic factors and proximately by the biological and or behavioural variables.

Though idealistic, the model has some relevance to this study in the sense that biological processes like age remain core demographic determinant of fertility

(c). The Socio-economic Theories:

These Theoretical Models are primarily based on what has been termed as "cost-benefit analysis" Unlike the Natural Fertility Model, these models assume rationality in human behaviour towards achieving fertility intentions as argued by Easterlin (1969) among others.

Proponents of these theories argue that maximization of household welfare or potential earnings of the household members accrue from direct or indirect labour efforts This cost-benefit approach subjects the household welfare to some financial constraints or costs generated from investment on children's welfare The implication is that family size is presumed to increase to the point at which marginal benefits of an additional child is equal to or approximately zero

The socio-economic theories are quite relevant to this study as economically independent women are not only likely to marry late, but, also likely to contracept to limit child bearing.

(d). The Socio-psychological Theory:

This theory, as put forward by scholars like Burr and Bagozzi (1975) stipulates that fertility is a function of income, and social status of the family household and normative pressures impinging upon the family. The theory underscores taste, family decision making processes and socio-economic variables as important factors in reproduction analysis. The theory asserts

that the above noted factors affect fertility only through their impact on the attitude of family members and the specific social exchanges that occur within the family.

This theory has major shortcomings concerning its application to single adolescent fertility analysis. It stresses the family decision-making, especially the communication between husband and wife, as a major determinant of fertility. In Kenya, the issue of adolescent fertility is of great concern. Adolescent fertility or pregnancy, however, usually occurs accidentally with neither of the two parties involved having discussed. Moreover, in most developing countries especially those of sub-Saharan Africa, fertility decisions are largely controlled unilaterally by men and not a product of mutual decision making process in most families.

The theory asserts further that individual decision-making in fertility behaviour and knowledge of environmental factors could influence fertility control. This argument could be relevant to this study since an individual can decide when to have first intercourse, marriage, birth and more importantly to this study, when to use contraceptives and with whom to discuss reproductive health issues.

(c). The Wealth Flows Theory:

The theory was developed by a scholar called Caldwell in an attempt to explain fertility transition in third world countries, especially those of Africa. Caldwell (1980) singles out the promotion of western culture and, more importantly, the role of mass formal education in restructuring the family relationships and the direction of flow of wealth and hence affecting

fertility. He argues that where the children are not provided with formal education, wealth flows from children to parents and that in such situations parents have everything to gain from large families. That mass formal education has the impact of reversing the intergenerational wealth flows, as parents would spend more resources on children than they receive from them. The families can therefore benefit by limiting the number of children.

This argument could be said to fit well in the Kenyan context in the sense that fertility has been declining under socio-economic odds. The value of education has been appreciated and expanded nationally in Kenya, and the fertility decline being witnessed could be due to its high cost.

Generally, the behavioural and biological factors through which background factors like socio-economic, socio-cultural and demographic variables affect fertility are called intermediate fertility variables. These intermediate or proximate variables have direct influence on fertility. For example, as the prevalence of contraceptive use changes, the fertility necessarily changes (if other proximate fertility variables remain unaltered); however, this is not necessarily the same with indirect determinants such as education.

(f). Davis and Blake's Model:

Davis and Blake (1956) have, however, put forward a list of such proximate variables that are important in the reproduction process, especially those governing the occurrence of conception and birth. They classified these variables as follows:

- Those governing the formation and dissolution of marital unions in the reproductive period

(i). age of entry into sexual unions

(ii) permanent celibacy

(iii) amount of reproductive period spent after or between unions broken by death of husband.

- Those governing the exposure to intercourse within unions

(i) voluntary abstinence

(ii). involuntary abstinence (from illness or impotence)

- Factors affecting exposure to contraception

(i). fecundity or desertion

(ii). use or non-use of contraception.

As the duo has expressed, different combination of values for these intermediate variables may produce identical fertility levels. Other factors can affect fertility only through one or more of these intermediate variables; for instance, education of women might have some influence on the age at marriage, use of contraceptives among others. These factors include programme factors such as contraceptive use and non-programme factors such as sterility

(g). **Bongaart's Model:**

The proposal by Davis and Blake (1956) to classify these factors as above was later revised by Bongaarts in 1978. He re-classified them as follows:

- Exposure factors

(i) proportion of women who are married

- Deliberate marital fertility control factors

(ii). contraception

(iii) induced abortion

- Natural fertility control factors

(iv) lactation infecundity

(v). frequency of intercourse

(vi). spontaneous intra-uterine mortality

(vii). duration of fertility period

Bongaarts argued that variations in fertility result from variations in one or more of the above factors. The degree of influence of these factors on fertility, however, varies from one society to another and also differs with time within societies. The influence of these factors on fertility is discussed below

Marriage has, for a very long time, been recognized by demographers as one of the principal intermediate determinants of fertility. Bongaarts argues that marriage affects fertility through the number who marries, the proportions of those who stay in stable unions and the age at which they marry. Women who marry late have a shorter reproductive span; hence their fertility is lower. Prolonged lactation is associated with longer period of post partum amenorrhoea, which is a period of infertility following birth. In developing countries, prolonged lactation is common and hence birth intervals are longer. Therefore, one can conclude that, in developing countries natural fertility is lower than in developed countries where prolonged lactation is not common.

Proportion of couples who are sterile is an important determinant of fertility. Despite the scarcity of data on sterility, it is, however, known to have significant depressing effect on fertility in some developing countries. Fertility is also influenced directly by coital frequency. Fecundity, the power to reproduce, has been observed to increase with an increase in coital frequency.

Within marriage, contraceptive use is currently responsible for the wide range in the level of fertility. In developing countries like Kenya, contraceptive use has been low though currently picking up with the KDHS of 1998 reporting a national prevalence rate of 10 per cent. This could help explain the falling marital fertility in Kenya today. In developed countries, on the other hand, about half of married women in the reproductive ages are users of contraceptives (Bongaarts, 1978)

Bongaarts (1982) noted that it is not necessary to devote the same effort to analysing and measuring each of these variables because they are not of equal interest in studies of fertility levels, patterns and differentials. He found the four principal intermediate variables to be the proportion of married women, breast-feeding duration, induced abortion and contraception (programmed and non-programmed). The traditional Davis and Blake Model of 1956 and the modification by Bongaarts in 1978 has been adopted in this study to display the relationships between the independent, intervening especially contraceptive use or non-use and the dependent variables.

2.8. CONCEPTUAL FRAMEWORK

In order to have a clear and precise understanding of the relationship between HIV/AIDS disease pandemic and fertility, it is important to consider the mechanisms/channels through which this infection pandemic influences fertility intentions and actual reproductive performance. Conceptually, the impact of HIV/AIDS pandemic on fertility has both intermediate biological/pathogenic and behavioural implications. The background factors, however, remain key driving force behind fertility determination.

(a). Biological/pathogenic Effects Operate Though:

Biological changes including HIV related infertility, reduced coital frequency and spermatozoa, increased spontaneous abortions and stillbirths. Changes in morbidity and mortality including HIV related morbidity and adult and early childhood mortality

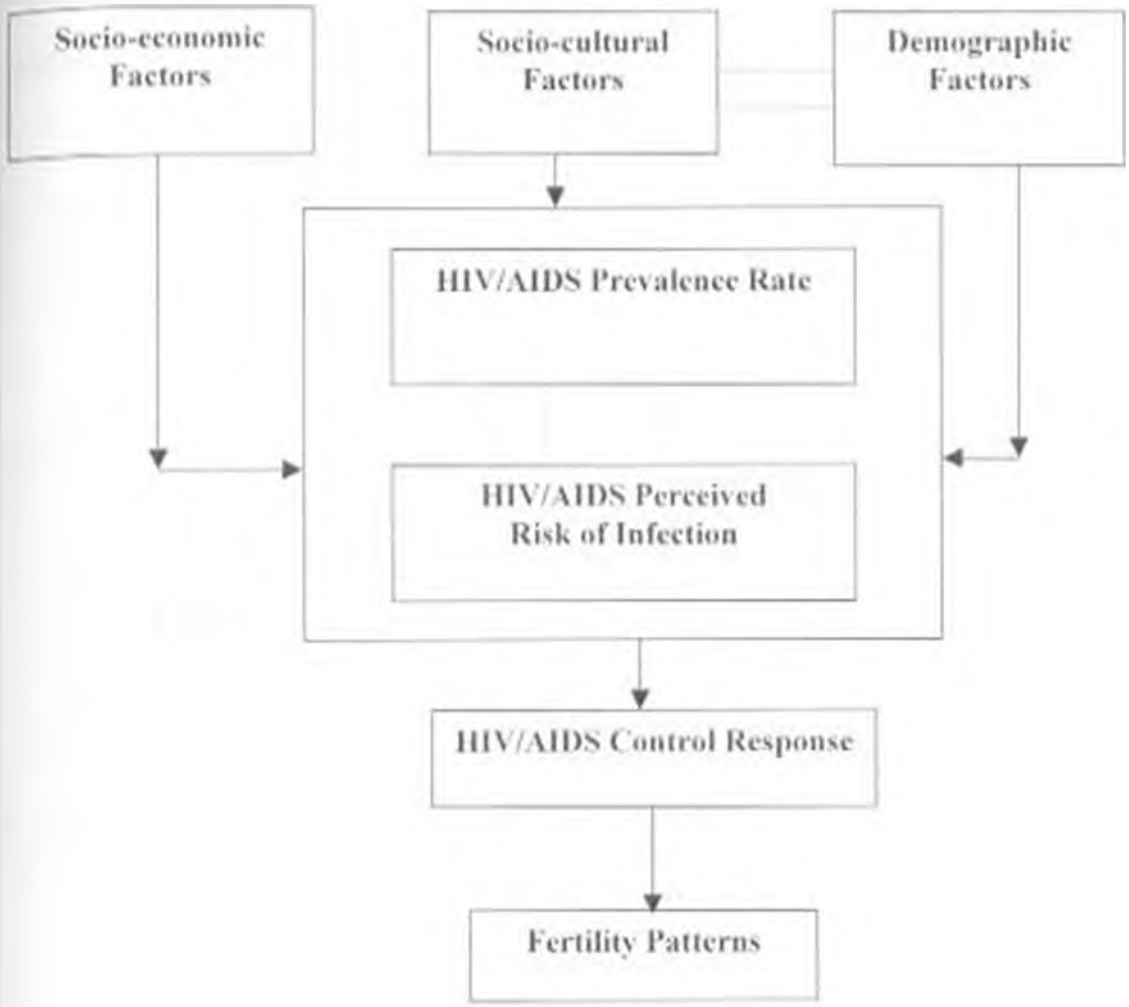
(b) **Behavioural Effect Operates Through:**

HIV/AIDS control responses (both at individual and community levels) including contraception e.g., condom and pill use, abstinence and reduced partner change. Changes in social attitudes including attitude to family planning, desired family size, attitude to gender roles and female autonomy, access to education, health care, legal rights, childbearing role, wealth obligations and dependence on marriage.

However, in this study, the focus was on change in behaviour and more specifically, contraceptive use and its effect on fertility intentions and actual reproductive performance among women aged 15-49 years.

2.9. CONCEPTUAL MODEL

Fig. 1.



Source: Adapted from Gregson et al., (1997)

2.9.1. Conceptual Hypotheses

(i) HIV/AIDS prevalence rate and its perceived risk of infection are likely to affect preferred ideal number of children and hence the number of children ever born

(ii) Perceived risk of HIV/AIDS infection is likely to affect the desire for more children

(iii) The selected fertility determinants are likely to affect HIV/AIDS perceived risk of infection

affect

2.10. OUTLINE OF VARIABLES

2.10.1. Independent Variables

Socio-economic Factors

- Education Level
- Type of Place of Residence
- Current Employment Status

Socio-cultural Factors

- Religious Affiliation
- Ethnic Background
- Region province of Residence

Demographic Factors

- Age
- Current Marital Status

2.10.2. Proximate Determinants

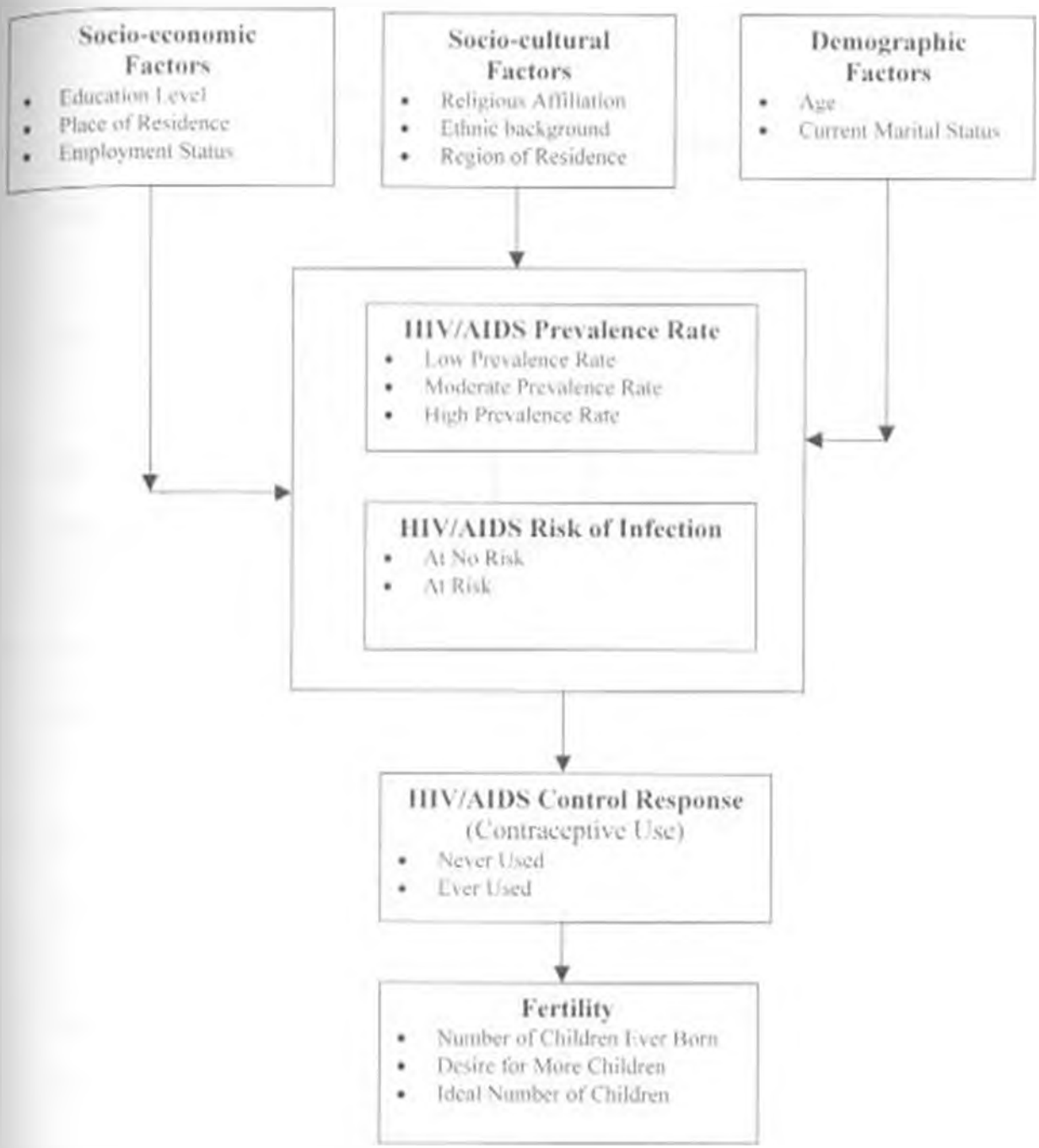
- HIV AIDS Prevalence Rate
- HIV AIDS Perceived Risk of Infection
- Contraceptive Use

2.10.3. Dependent Variables

- Number of Children Ever Born
- Ideal Number of Children
- Desired for More Children

2.11. OPERATIONAL MODEL

Fig. 2.



Source: Adapted from Gregson et al. (1997)

2.11. Operational Hypotheses

(i) HIV AIDS perceived risk of infection is likely to have negative effect on ideal number of children

(ii) The lower the level of HIV AIDS prevalence rate, the lower the number of children ever born

(iii). Women who perceive themselves to be at risk are not likely to desire for more children.

(iv). Women of no education are likely to be at risk of HIV AIDS infection than those of secondary and above level of education.

(v). HIV/AIDS risk of infection varies differentially by the respondent's type of place of residence.

(vi). Being widowed or divorced separated or never married, increases the chance of HIV AIDS risk of infection.

(vii). Women in the age group 45-49 are less likely to be at risk of HIV AIDS infection than those in the 20-24 age group.

(viii) Ever use of contraceptive is likely to be negatively related to risk of HIV/AIDS infection.

2.12. DEFINITION OF KEY CONCEPTS

Total Fertility Rate – This is defined as the number of births a woman would have if she were to live through her reproductive years (ages 15-49) and bear children at each age at the rate observed in a particular year or period.

This is a hypothetical measure as no real group of women experienced or will necessarily experience these particular rates.

HIV – Human Immuno-deficiency Virus, the virus that causes AIDS.

AIDS = Acquired Immune Deficiency Syndrome, the syndrome or "disease" caused by the HIV. This term is normally used to refer to the physical condition resulting from infection by the HIV.

HIV/AIDS Prevalence Rate – Refers to the estimated number of adult population infected with the disease per cent in some defined area at a given point in time (i.e., in a given year in this case 1998).

Contraception – Refers to ever or never use and/or practice of any method to prevent or delay conception

Fertility = Refers to actual reproductive birth performance (or bearing a live child) by a woman

Desire for More Children – This variable refers to a woman's future reproduction intentions. It indicates whether a woman wants more children in addition to the one(s) she already has or not.

Ideal Number of children – This refers to the number of children a woman would want to have in her reproductive life.

Determinant = A determinant is a variable that would change a population fertility patterns if its own value is affected.

HIV/AIDS Perceived Risk of Infection – This refers to the general feeling of a sense of danger due to respondent's own personal circumstances in the context of HIV/AIDS infection pandemic. It's assumed in this study that there is no change in HIV/AIDS risk perception over time.

CHAPTER THREE

DATA AND METHODOLOGY

3.1. INTRODUCTION

In this chapter we examine the source of data that was used in this analysis and also assess its quality. In addition, we discuss the various methods used during the analysis. These included cross-tabulations, multiple linear and logistic regression methods.

3.2. DATA SOURCE

The KDHS of 1998 was tailored to provide population and health data for use by policy makers and the research community in the country. In 1998, the National Council for Population and Development (NCPD) in collaboration with the Central Bureau of Statistics (CBS) carried out the survey with significant technical and logistical support provided by the Ministry of Health and various other governmental and non-governmental organizations in and out of Kenya. The survey was conducted between February and July 1998. The survey was nationally representative covering women aged 15-49 and some sub-samples of their husbands. On the other hand, data on HIV/AIDS prevalence rate was obtained from the HIV/AIDS Sentinel Surveillance system data as compiled by National AIDS/STDs Control Programme (NASCOP).

In this study, we considered HIV/AIDS adult prevalence rates produced by NASCOP for the sixteen districts sampled and surveyed in the 1998 KDHS. Eighteen out of the thirty-four districts were, therefore, left out as they were not part of the sentinel surveillance sites selected by NASCOP. The selected districts (with a KDHS sample of 3,985 respondents) were later categorized into three zones basing on the level of HIV/AIDS prevalence rates. The low prevalence zone consisted of Kericho (6%), Lasin Gishu (9%), Kitui (10%) and Murang'a (11%). The moderate zone composed Kakamega, Kisii and Nairobi each at (16%), Nyeri and Mombasa each at (17%), Trans-Nzoia (18%), Meru (20%) and Nakuru (26%). The high prevalence rate zone included Embu and Kisumu at (27%) each, Busia (29%) and Kiambu (34%). The national prevalence rate figure, however, stands at 13.9 per cent as per the 1999-sentinel surveillance report.

These HIV-prevalence figures based on sentinel surveillance results, however, do not give actual community district rates since they are based on sentinel clinic sites. But since there was no other data on HIV/AIDS prevalence by districts, the sentinel results were aggregately used as the only way of categorizing the districts into the mentioned zones to facilitate the analysis.

3.3. METHODS OF DATA COLLECTION

KDHS used a number of questionnaires e.g. Household Schedule Questionnaire, Women's Questionnaire and Men's Questionnaire. The most important questionnaire for this study, however, was the Women's Questionnaire. The questionnaire was divided into eleven (11)

sections. The information from section One, Two, Three, Five, Six and Eight were utilized. These sections provided information on the Respondents' Background, Reproduction, Contraception, Marriage, Fertility Preference and AIDS other STIs respectively. Since 1975 the CBS created a sample-frame from which samples needed for government and other users and researchers have, when need arises, been drawn. This master sample since its inception has provided reliable and integrated data needed for the design, control, implementation and evaluation of development policies and programmes. The KDHS sample was based on the National Sample Survey Programme (NASSIP) frame, which is a two-stage sample design, stratified by urban-rural within the rural stratum by individual districts

The KDHS excluded three districts in North Eastern province and four other northern districts (Samburu and Turkana in the Rift-Valley province, and Isiolo and Marsabit in Eastern province). These form about half of Kenya's land surface but accounts for less than 4 per cent of Kenya's population. Nomads who cannot be sampled out easily using a sample design involving a fixed geographical area are still predominant inhabitants of most of these areas.

KDHS was designed to produce completed interviews with about 7,881 women aged 15-49 years with a sub-sample of 3,407 husbands aged 15-54 years. A total of 9,400 households were selected of which 8,661 were identified as occupied households during fieldwork, and thus eligible for interview. 8,380 were successfully interviewed giving a response rate of 97 per cent for households. In interviewed households, 8,233 eligible women (aged 15-49 years) were identified and 7,881 were successfully interviewed yielding a response rate of 96 per cent

On the other hand, estimates of the level and trends in HIV prevalence and incidence among women in many African countries increasingly rely on Sentinel Surveillance system data collected from antenatal clinics. The HIV Sentinel Surveillance system in Kenya is co-ordinated by NASCOP. It became operational in 1990 and has been conducted annually. This involves the selection of specific sites at which a pre-determined number of persons from specific population groups are routinely tested in a regular and consistent procedure according to a pre-determined protocol. The data is collected from both antenatal clinics' (ANC) clients and for STD patients. The STDs data is primarily designed to represent the general health of the population. In estimating the general HIV/AIDS prevalence rate, ANC data is applied.

The 1999 Sentinel Surveillance system, which this study utilized, was operational in 13 urban sites and 11 peri-rural/rural sites around the country. In these sites of antenatal clinics where women went for care during pregnancy, an average of 200-300 pregnant were tested for HIV in that year in each site. The results were reported to NASCOP, which synthesized the data assuming it to be representative adult prevalence rate for the total population in the selected districts. However, these site test results may not give a clear picture of actual community/district prevalence rates. Moreover, a limited number of districts were involved as only sixteen (out of the thirty four) districts surveyed in the KDHS that also hosted the sentinel clinics were considered in this study.

Nonetheless, the Kenya Sentinel Surveillance system data remain the only source and potentially help in estimating HIV-prevalence and distribution of HIV infection in specific

geographical areas. The sentinel surveillance system also provides information necessary for monitoring trends and evaluation of HIV infection

1.4 DATA QUALITY

The 1998 KDHS was designed to provide high quality and reliable data. The questionnaires after being reliably designed were translated into the languages of the various ethnic communities covered by the survey. The quality test for the translations was conducted by pre-testing them on the respective communities. Use of highly trained personnel also aimed at enhancing the quality of data. However, such sample surveys suffer from non-sampling and sampling errors. Non-sampling errors could have been 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 were asked, misunderstanding of the questions on the part of either the interviewer or the respondent or data entry errors among others.

Moreover, despite the need for obtaining district level data for planning and research purposes, reliable estimates could not be produced from the KDHS for all the districts in the country which have increased from 48 to 70 since 1993 without expanding the sample to an unmanageable size. Non-sampling errors can only be minimized in a survey but cannot be totally avoided and are usually difficult to evaluate analytically.

Sampling errors are generally defined as a measure of variability between all possible samples. The advantage here is that the error can be estimated from the survey results. Sample

errors 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 enough for any statistical threat.

On the other hand, information on HIV/AIDS prevalence rates were obtained from the 1999 Sentinel Surveillance system data which estimated HIV prevalence rate among women who attended antenatal care clinics in selected sites and this was adjusted to represent the general population in the respective areas. The blood used for testing HIV was obtained in anonymous procedure after testing for syphilis, which was the original purpose for which the blood was drawn. All the personal identities were removed. The remaining serum was then later tested for HIV. The key advantage in the unlinked procedure is the reduction of self-selection bias with a resultant increase in accuracy. But, it should be noted that the result of these Sentinel Surveillance system were not exact estimates since the number of women tested varied by site. That is, for instance, when the number tested was small, the uncertainty associated with the estimates could be high. However, there was no alternative data for prevalence rate identification. Moreover, it was difficult to trace the respondents interviewed in the KDHS to match with the ones whose test results were used to produce the prevalence rates for the various regions.

To overcome this, the prevalence rates were used to create prevalence zones with the assumption that the prevalence rates developed for particular sites were unchanging over the period and were representative of the entire districts in which such sites were located. The prevalence zones created were low, moderate and high. However, taken as a whole, results of

1990 Sentinel Surveillance system data described the trends and patterns of HIV infection in the selected parts of rural and urban Kenya.

3.5. METHODS OF DATA ANALYSIS

3.5.1. Introduction

The various methods of data analysis used in this study are discussed in this section. Two descriptive methods were applied in this study. These were: multiple linear and logistic regressions. However, other intermediary data presentation techniques like cross-tabulations and percentage frequencies were also used. It was assumed in this study that HIV/AIDS risk perception did not change over time especially with regard to children ever born.

3.5.2. Cross-tabulation

This is the simplest and most vividly used non-parametric test statistic. This method was used to determine the distribution and relationship between among variables, that is, to determine the association between selected key fertility determinants (i.e., socio-economic, socio-cultural, demographic and contraceptive use) and; HIV/AIDS perceived risk of infection and fertility patterns as measured by the number of children ever born, ideal number of children and desire for more children. It was also employed to gauge the relationship between prevalence rate and the above fertility measures.

Cross-tabulation does not make assumption about the population being sampled. It describes the magnitude of statistical discrepancy between theory (expected values) and observation i.e., with the aid of chi-square test, one can know whether a given discrepancy between theory and observation can be attributed to chance or whether it results from the inadequacy of the theory to fit the observed facts.

The researcher, however, did not consider chi-square test statistic to test to confirm or disapprove the statistical significance of H_0 at α= 0.5 level of significance. The study, focusing on fertility patterns as measured in terms of the fore mentioned indicators, did not consider testing the statistical significance of the variables at this stage. Moreover, some conditions of applying the chi-square test statistic were not met, e.g., some cells contained less than five observations and further re-categorization of variables was not possible.

3.8.3. Multiple Linear Regression

The Multiple Regression (MR) was used in the analysis. Regression analysis shows the strength and direction of the effect of selected explanatory variable(s) on the dependent variable(s). To be able to establish the direct effect of HIV/AIDS perceived risk of infection on numeric fertility pattern indicators like children ever born and ideal number of children, multiple regression analysis was used. This was done while controlling for the selected socio-economic, socio-cultural and demographic factors and the intermediate variable i.e. contraceptive use and perceived risk of HIV-infection.

The multiple regression model postulates a casual relationship between the dependent and the independent (explanatory) variables. The model is in the form:

$Y_i = \beta_0 + \beta_1 X_1 - \beta_2 X_2 + \ldots + \beta_i X_i - e_i$ where:

β_0 = is a constant

β = are the regression coefficients of the independent variables, i.

e = error term which is assumed to be normally distributed with a mean of zero.

The expected value of the dependent variable (Y_i) can be obtained and its relation to the actual value calculated through Coefficient of Determination, R^2, given as:

$R^2 = 1 - \Sigma(Y_i - \hat{Y})^2 / \Sigma(Y_i - \bar{Y})^2$

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

The F -test statistic was used to test the statistical significance of the overall model, while t-test was employed to test the statistical significance of individual independent variables in the model.

(a). Assumptions of MR

1. The dependent variable and the independent variable should be normally and randomly distributed.
2. The independent variables have to be linearly related to the dependent variable.

i. The dependent variable must not be dichotomous But can be in interval scale or ratio form

(b). **Problems of MR**

The basic problem with MR is test of multi-colinearity, defined as the inter-correlation of the independent variables. This problem arises when independent variables overlap. The greater the overlap of the independent variable, the lower the reliability of the regression coefficients. This means that some of the independent variables are linearly dependent

Enter Method was preferred in this study as opposed to Step-wise Regression Method. In using stepwise method, there arises a problem in that it decides for the researcher variables to be included. This means that one does not have absolute control over what one is doing. The advantage with the enter method is that it keeps all variables entered in the model irrespective of their contribution substance to the explanation of the dependent variable.

3.5.4. Logistic Regression.

Logistic regression analysis was used in this study to measure the effect of the independent variables on the dependent variable This method of analysis is important in determining the extent to which each of the independent variables affect the dependent variable. It is applied in this study for the following reasons:

(i). The dependent variable is dichotomous, thus, whether the respondent desired more children or not. This variable takes a value of 1 if a respondent desired more children never had sex and 0 if the respondent expressed undesire for more children could not have more children.

(ii) Variables used in this study are either categorical or continuous. The logit regression is therefore ideal for analysis in such situations.

(iii). Logistic regression lends itself to a biologically meaningful interpretation.

(a). Interpretation of the Results

The odds exp(β) was used to measure the effect of the explanatory variables on the dependent variable. The value changes from negative to positive infinity. One (1) normally represents the reference category. An odds of value less than one (1), represents a negative effect of the variable on desire for more children. Any value greater than one (1) represents a positive effect of the variable or variable category on the dependent variable. The Standard Error helped to determine the accuracy of the regression equation. It indicates the standard deviation of the residuals thus indicating how much the actual values of the dependent variable can be expected to deviate from the expected predicted scores. The t-significant showed the level at which the statistic computed using the student t-test was found to be statistically significant at $\alpha = 0.05$.

(b). **Limitations of Logistic Regression**

When too many variables are fitted into the model, it may produce numerically unstable estimates. Over fitting is typically characterized by unrealistically large estimated coefficients and/or estimated standard errors. This may be especially troublesome in problems where the number of variables is very large relative to the number of subjects and/or when the overall proportion responding (y = 1) is either close to either 0 or 1 (Hosmer and Lameshaw, 1989). The study shall undertake to collapse the necessary categories should such a situation arise.

Compared to the linear regression model, the parameters have a limited interpretation and range of validity due to the restriction that $0 < P_x < 1$. Although a linear function may provide a satisfactory approximation of P_x over a restricted range of x, extrapolation would be suspect, since it is certain that the linear relation would be outside some range of values of x.

Since variables are often always correlated, so that a change in one is accompanied by a corresponding change in the others, multicollinearity may result. Therefore, the change in the logit of risk estimate to result from a postulated change in any particular variable may be misleading. However, it has flexibility in the analysis of dichotomous variable and p-value would give the effect of the model.

CHAPTER FOUR

HIV/AIDS AND FERTILITY PATTERNS

4.1. INTRODUCTION

In the Kenya Demographic and Health Survey (KDHS) of 1998, 7,881 female respondents aged between 15 and 49 years were interviewed. Out of this figure, 516 missing and non-numerical response cases were left out. A total of 7,365 valid cases were therefore analysed in this study. Frequencies of the selected background and proximate factors, and fertility indicators by HIV/AIDS perceived risk of infection were tabulated.

In the analysis of fertility patterns based on district HIV/AIDS adult prevalence rates produced by NASCOP, a total of sixteen out of the thirty-four districts surveyed in KDHS were considered in the study. Eighteen districts were left out, as they were not part of the sentinel surveillance sites selected by NASCOP. The selected districts (with a KDHS sample of 3,985 respondents) were later categorized into three zones basing on the level of HIV/AIDS prevalence rates. The low prevalence zone consisted of Kericho (6%), Lasin Gishu (9%), Kitui (10%) and Muranga (11%). The moderate zone composed Kakamega, Kisii and Nairobi each at (16%), Nyeri and Mombasa each at (17%), Trans-Nzoia (18%), Meru (23%) and Nakuru (26%). The high prevalence rate zone included Embu and Kisumu at (27%) each, Busia (29%) and Kiambu (34%). The national

prevalence rate figure, however, stands at 13.9 per cent as per the 1999-sentinel surveillance report.

These HIV-prevalence figures based on sentinel surveillance results, however, do not give actual community district rates since they are based on sentinel clinic sites. But since there was no other data on HIV AIDS prevalence by districts, the sentinel results were used as the only way of categorizing the districts into the mentioned zones.

4.2. BACKGROUND CHARACTERISTICS AND FERTILITY INDICATORS BY HIV/AIDS PERCEIVED RISK OF INFECTION

4.2.1. Background Characteristics

From Table 4.1, it is evident that most of the respondents (81.1%) were drawn from the rural areas where most of the Kenyan women reside. While only 65.4 per cent of the urban women reported to be at risk, 67.7 per cent of the rural women indicated the same. This could be attributed to among other things, low contraceptive use, and high-risk practices still being upheld by many rural societies.

Rift Valley, being the largest province, had the highest proportion (24.5%) of respondents. Respondents from Nyanza province had the highest proportion of those at risk. Nairobi, Western, Central, Rift Valley and Eastern followed it in descending order as shown in the Table 4.1. The above picture is clearly painted when dominant

communities that inhabit these regions were considered. The Luo who dominate Nyanza region led the other ethnic communities reporting about 76.1 per cent of the respondents being at risk. The Kamba who dominate the Eastern region had the least proportion (51.6%) of those at risk.

Table 4.1 also indicates that most Kenyan women had at least some level of education as about 60.6 per cent of the respondents reported to have had at least primary education. Those with no education had the least representation. However, this was the category with the highest proportion of those who reported to be at risk. Despite having attained good levels of education, most of the Kenyan women were not employed. However, those who reported to be employed had higher proportion of those at risk than their unemployed colleagues.

Differences in HIV/AIDS risk status did not vary very much with religious affiliation. Those who reported to belong to other faiths, however, had the lowest proportion of those who reported to be at risk. The Catholic however, reported the highest.

Table 4.1. Selected Background Characteristics by HIV/AIDS Perceived Risk of Infection

Background Characteristic	Respondents		Perceived Risk of Infection					
			No Risk		At Risk		Total	
	No.	%	No.	%	No.	%	%	
Education								
No Education	834	11.3	251	30.1	583	69.9	100.0	
Primary Education	4,661	60.6	1,518	34.0	2,945	66.0	100.0	
Secondary+ Education	2,068	28.1	610	30.9	1,477	69.1	100.0	
Place of Residence								
Urban	1,389	18.9	481	34.6	908	65.4	100.0	
Rural	5,976	81.1	1,928	32.3	4,048	67.7	100.0	
Employment Status								
Not Employed	3,734	50.7	1,375	36.8	2,359	63.2	100.0	
Employed	3,631	49.3	1,034	28.5	2,597	71.5	100.0	
Religion								
Catholic	2,001	27.2	621	31.0	1,380	69.0	100.0	
Protestant other Christians	4,518	61.5	1,558	32.8	3,190	67.2	100.0	
Muslim	394	5.3	155	39.3	239	60.7	100.0	
Other	222	3.0	75	33.8	147	66.2	100.0	
Ethnicity								
Kalenjin	1,213	16.5	367	30.3	846	69.7	100.0	
Kamba	831	11.3	401	48.3	430	51.7	100.0	
Kikuyu	1,194	16.2	385	32.2	809	67.8	100.0	
Luhya	1,037	14.0	296	28.5	741	71.5	100.0	
Luo	876	11.9	192	21.9	684	78.1	100.0	
Other	2,211	30.0	768	34.7	1,446	65.3	100.0	

Table 4.1. **Selected Background Characteristics by HIV/AIDS perceived Risk of Infection (continued)**

Region of residence						
Central	759	10.3	223	29.4	536	70.6	100.0
Coast	1,111	15.1	473	42.9	637	57.3	100.0
Eastern	1,160	15.8	521	44.9	639	55.1	100.0
Nyanza	1,301	17.7	263	20.2	1,038	79.8	100.0
Rift valley	1,808	24.5	581	32.3	1,224	67.7	100.0
Western	825	11.2	237	28.7	588	71.3	100.0
Age Group							
15-19	1,761	23.9	817	46.1	911	53.6	100.0
20-24	1,475	20.0	468	31.7	1,007	68.3	100.0
25-29	1,280	17.4	329	25.7	951	74.3	100.0
30-34	914	12.4	264	28.9	650	71.1	100.0
35-39	931	12.6	232	24.9	699	75.1	100.0
40-44	561	7.6	147	26.2	414	73.8	100.0
45-49	443	6.0	152	34.3	291	65.7	100.0
Marital Status							
Never married	2,251	30.5	976	43.4	1,275	56.6	100.0
Married	4,506	61.2	1,234	27.4	3,272	72.6	100.0
Widowed	271	3.7	100	36.9	171	63.1	100.0
Divorced separated	337	4.6	99	29.4	238	70.6	100.0
Contraceptive use							
Never Used	3,699	50.2	1,392	37.6	2,307	62.4	100.0
Ever Used	3,666	49.8	1,017	27.7	2,649	72.3	100.0

Marriage seems to be still universal in Kenya as the highest proportion (61.2%) of women reported to be in marital unions. A good proportion, 2,251(30.5%), reported to have never married while a few reported to be widowed or divorced separated. Most of the married and divorced separated reported higher proportions of those who perceived themselves to be at risk compared to the widowed. However, the never married women reported the lowest proportion of those at risk.

It was also evident that the number of respondents consistently decreased with increase in age. Most of the women reported to be at risk irrespective of age, however, the extreme age groups of 15-19 and 45–49 reported the lowest proportion of those at risk of HIV infection. Slightly higher number of women in Kenya reported to have never used any

method of contraception compared to those who had ever contracepted. Those who reported to have ever contracepted had higher proportion of those who perceived themselves to be at risk as shown in Table 4.1.

4.2.2. Fertility Indicators

The number of respondents decreased steadily with increase in parity as shown in Table 4.2. The majority of the respondents who reported to be at no risk of contracting HIV/AIDS were childless. Except for these childless women, about seventy per cent of respondents in other children ever born categories reported to be at risk of HIV infection.

Higher proportion of the respondents expressed desire for more children including the never had sex. The respondents who reported to desire more children never had sex had relatively lower proportion of those at risk than those who did not desire to have or could not have more for whatever reasons.

Table 4.2. Selected Fertility Indicators by HIV/AIDS Perceived Risk of Infection

Fertility Indicator	Respondents		Perceived Risk of Infection				
			No Risk		At Risk		Total
	No.	%	No.	%	No.	%	%
Children Ever Born							
0	2,037	27.6	922	45.3	1,115	54.7	100.0
1-2	2,011	27.3	605	30.1	1,406	69.9	100.0
3-4	1,382	18.8	371	26.8	1,011	73.2	100.0	
5-6	[illegible]	13.2	240	24.8	729	75.2	100.0
7+	966	13.1	271	28.1	786	71.9	100.0
Reason for More Children							
Wants more never had sex	4,146	56.3	1,185	35.8	2,661	64.2	100.0
Doesn't want can't have more	3,219	43.7	924	28.7	2,295	71.9	100.0
Ideal Number of Children							
0-1	190	2.6	50	26.3	140	73.7	100.0
2-3	2,834	38.5	980	34.6	1,854	65.4	100.0
4-5	3,385	45.4	1,069	32.0	2,276	68.0	100.0
6+	996	13.5	310	31.1	686	68.9	100.0

It's evident from Tabe 4.2 that most of the Kenyan women were against childlessness or one child culture. Most of the respondents considered children between 4-5 as ideal Except for the first (0-1) ideal number of children category, the proportion of those at risk and those at no risk did not show significant differences.

4.3. FERTILITY PATTERNS BY PERCEIVED RISK OF INFECTION

4.3.1. Education

From Table 4.3, those with no education reported higher number of children ever born As would be expected, the proportion of those who reported to have had no education increased with increase in parity. The trend reversed for the other education level categories where proportions of respondents steadily decreased with increase in the

number of children ever born. This was true irrespective of perceived HIV AIDS risk of infection. The impression created, therefore, is that risk perception did not alter the number of children ever born among the respondents.

Table 4.3. Fertility Patterns by Level of Education

Fertility Indicator	Percentage Distribution by Education Level					
	None		Primary		Secondary +	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born						
0	10.8	7.2	40.6	22.5	41.4	29.1
1-2	11.6	15.3	25.1	27.5	29.7	35.6
3-4	16.7	18.2	14.8	20.9	16.4	20.2
5-6	19.9	21.5	9.6	15.1	6.9	10.7
7+	41.0	38.1	9.6	14.1	3.6	4.1
Total (Number)	**251**	**583**	**1,518**	**2,945**	**640**	**1,428**
Desire for More Children						
Want More Never Had Sex	30.3	32.1	64.4	54.2	67.5	61.5
Don't Want Can't Have More	69.7	67.9	35.6	14.8	32.5	38.5
Total (Number)	**251**	**583**	**1,518**	**2,945**	**640**	**1,428**
Ideal Number of Children						
0-1	1.6	2.1	1.6	0.2	3.3	4.5
2-3	17.9	19.7	36.8	33.6	58.8	52.5
4-5	41.8	46.3	49.2	50.4	31.9	36.6
6+	38.6	31.9	12.3	13.8	1.1	6.5
Total (Number)	**251**	**583**	**1,518**	**2,945**	**640**	**1,428**

The proportions of those who reported to want more children including the never had sex increased with level of education irrespective of risk perception. The pattern was however reversed among those who did not want more or could not have more children.

It is also evident that most of the respondents were against childlessness or one child culture. The proportion of respondents with none and primary level of education increased steadily with increase in the number of children considered ideal except for the two extreme (first and last) ideal number of children categories. While those with none and primary education considered between 4-5 as the ideal number of children, most of

their colleagues who had had secondary education and above preferred children between 2-3 as ideal for families as Table 4.5 indicates.

4.3.2. Place of Residence

Respondents from urban areas were reported to have had lower children ever born than their rural counterparts. For both type of place of residence categories, if those who reported to have had zero and seven and above children were ignored, it's clear that the number of respondents decreased with increase in parity irrespective of place of residence. It's therefore evident that HIV/AIDS perceived risk of infection did not have noticeable effect on the number of children ever born in both type place of residence as shown in Table 4.4

Table 4.4. Fertility Patterns by Type of Place of Residence

Fertility Indicator	Percentage Distribution by place of residence			
	Urban		Rural	
	No Risk	At Risk	No Risk	At Risk
Children Ever Born				
0	49.5	28.2	38.0	21.2
1-2	32.6	17.3	23.2	26.1
3-4	18.1	22.1	11.7	20.0
5-6	6.2	8.1	10.9	16.2
7+	3.4	4.2	11.2	16.2
Total (Number)	481	900	1,920	4,048
Desire for More Children				
Want More/Never Had Sex	61.1	57.6	61.8	52.8
Don't Want Can't Have More	38.9	42.4	38.2	47.2
Total (Number)	481	900	1,920	4,048
Ideal Number of Children				
0-1	2.7	5.5	1.9	2.1
2-3	56.5	54.4	36.7	33.6
4-5	33.9	33.3	47.0	48.8
6+	6.9	6.8	14.4	15.4
Total (Number)	481	900	1,920	4,048

Majority of respondents especially those at no risk expressed desire to have more children including the never had sex. However, higher proportions of the respondents of rural residence desired more children than their urban counterparts

Consistency in opposition to childlessness or one child culture is evident here as well. Most of urban women considered 2-3 while their rural counterparts were for 4-5 children as ideal for families. Ignoring those who reported to have considered between 0-1 and 7+ as extreme, the proportion of respondents decreased with increase in the number of children considered ideal among the urban dwellers especially those at no risk. The situation was, as expected reversed among the rural dwellers. It's also evident from Table 4.4 that risk perception did not seem to alter the number of children considered ideal for Kenyan families.

4.3.3. Current Employment Status

Table 4.5 indicates that most of the respondents especially those unemployed reported not to have had a child unlike their employed colleagues most of whom reported having had between 1-2 children. The proportion of respondents, however, generally decreased with increase in parity for both employment statuses. Higher proportion of unemployed respondents especially those who reported to be at no risk expressed desire for more children never had sex compared to their employed counterparts.

Table 4.5. Fertility Patterns by Current Employment Status

Fertility Indicator	Percentage Distribution by Employment Status			
	Not Employed		Employed	
	No Risk	At Risk	No Risk	At Risk
Children Ever Born				
0	51.0	34.8	71.4	11.3
1-2	22.5	26.6	28.6	30.0
3-4	12.8	16.6	18.9	23.9
5-6	7.6	10.8	13.1	18.3
7+	6.1	11.2	18.1	16.6
Total (Number)	1,378	2,359	1,034	2,597
Desire for More Children				
Want More Never Had Sex	72.3	63.0	47.5	45.2
Don't Want Or Can't Have More	27.7	37.0	52.5	54.8
Total (Number)	1,378	2,359	1,034	2,597
Ideal Number of Children				
0-1	3.2	2.8	1.9	2.8
2-3	41.5	38.9	39.7	36.0
4-5	44.2	45.1	44.6	46.7
6+	13.1	13.2	13.8	14.4
Total (Number)	1,378	2,359	1,034	2,597

Opposition to childlessness or one child culture was evident in both categories. The majority of respondents in both categories generally considered children between 4-5 as

ideal for families. This was true irrespective of HIV AIDS perceived risk of infection, a clear indication that risk perception did not affect the number of children considered as ideal for families.

4.3.4. Religion

From Table 4.6. the majority of the respondents who reported to have had no children were not at risk of infection. For other children ever born categories except that of 7+, the proportion of the respondents decreased continuously with increase in parity for all the religious groups. But, those of other religious group were likely to have had a higher parity of between 5-6 children compared to the Catholic, Protestant other Christians and Muslim groups. Those at risk of HIV infection reported higher number of children ever born compared to their counterparts who reported to be at no risk.

Table 4.6. Fertility Patterns by Religious Affiliation

Fertility Indicator	Percentage Distribution by Religion							
	Catholic		Protestant/other Christian		Muslim		Other	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born								
0	38.6	23.2	38.5	23.2	37.1	15.5	32.0	12.2
1-2	23.5	29.8	25.1	27.2	29.0	34.3	25.3	31.3
3-4	16.7	18.3	14.4	20.8	18.1	28.5	18.7	17.7
5-6	9.5	14.1	10.1	15.0	9.0	11.3	12.0	17.7
7+	11.6	14.4	11.6	13.8	6.5	10.5	12.0	21.1
Total (Number)	**621**	**1,380**	**1,558**	**3,190**	**155**	**239**	**75**	**147**
Desire for More Children								
Want More Never Had Sex	60.7	53.3	61.9	53.7	65.8	56.1	54.7	53.7
Don't Want Can't Have More	39.3	46.7	38.1	46.3	34.1	43.9	45.3	46.3
Total (Number)	**621**	**1,380**	**1,558**	**3,190**	**155**	**239**	**75**	**147**
Ideal Number of Children								
0-1	1.1	2.8	2.3	2.9	1.9	2.5	2.7	2.7
2-3	37.8	39.7	41.2	37.1	17.6	37.2	38.7	7.0
4-5	49.0	35.1	43.9	36.9	35.5	36.1	31.7	44.9
6+	11.8	12.5	12.6	12.9	44.8	23.4	24.0	35.1
Total (Number)	**621**	**1,380**	**1,558**	**3,190**	**155**	**239**	**75**	**147**

Most of the respondents especially those at no risk of HIV infection desired to have more children never had sex irrespective of their religious affiliations. Higher proportion of women of other faiths reported not to desire more children or could not have more children for whatever reasons compared to their other colleagues. Muslim women, however, led the other religious communities in the proportion that wanted to have more children.

Lower proportions of the Catholics and Muslims considered 1-2 as the ideal number of children compared to women of other religious affiliation categories. Women who considered six children and above to be the most ideal for families were likely to be those of Muslim and Other faiths. This was particularly so among those who reported to be at risk. While most of the Catholics and Protestants/other Christians considered children

between 4-5, Muslims considered 2-3 as the most ideal number. This was true irrespective of HIV AIDS risk perception.

4.3.5. Region of Residence

Generally, Table 4.7 on fertility patterns by region of residence indicates that most of the respondents irrespective of region of residence reported to be at risk. The proportion of women decreased with increase in the number of children ever born for all the regions. This was especially so having ignored those who reported 0 and 7+ parities. Women, especially those at risk from Central and Nairobi provinces had lesser number of children ever born compared to those of other regions

Central province was leading with the proportion of those who did not desire could not have more children for whatever reasons. This was followed closely by Eastern region while Western region reported the least. Apart from Central region, most of those who reported not to desire more children/could not have more children in other regions were at risk.

Table 4.7. Fertility Patterns by Region/Province of Residence

Fertility Indicator	Percentage Distribution by Region of Residence							
	Nairobi		Central		Coast		Eastern	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born								
0	50.5	33.1	26.9	22.6	38.0	21.5	41.1	18.6
1-2	27.1	37.1	34.1	36.9	21.7	32.0	21.3	25.0
3-4	17.8	20.4	21.5	21.6	11.8	22.9	11.8	25.2
5-6	3.7	6.8	10.3	12.1	10.8	12.1	8.6	17.1
7+	0.9	2.4	7.2	6.7	11.8	11.5	11.1	14.1
Total (Number)	107	294	223	536	474	637	521	639
Desire for More Children								
Want More Never Had Sex	62.6	57.8	48.9	50.7	62.6	58.1	62.0	42.9
Don't Want Can't Have More	37.4	42.2	51.1	49.3	37.3	41.9	38.0	57.1
Total (Number)	107	294	223	536	474	637	521	639
Ideal Number of Children								
0-1	7.5	5.4	1.1	5.2	1.1	2.8	2.1	4.1
2-3	66.1	61.2	61.0	55.4	41.1	34.9	46.3	49.3
4-5	24.3	29.6	31.4	36.2	38.6	42.2	41.3	39.0
6+	1.9	3.7	1.5	3.2	19.2	20.1	7.3	7.6
Total (Number)	107	294	223	536	474	637	521	639

Table 4.7. Region/Province of Residence by Perceived Risk of Infection (continued)

Fertility Indicator	Percentage Distribution by Region of Residence					
	Nyanza		Rift Valley		Western	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born						
0	14.5	21.6	31.8	21.2	46.4	21.3
1-2	27.4	24.2	25.1	27.4	21.2	25.3
3-4	6.8	17.1	19.0	19.5	11.8	18.9
5-6	8.7	16.7	13.0	15.4	7.6	16.5
7+	12.5	15.1	13.9	16.5	11.0	18.0
Total (Number)	263	1,038	584	1,224	237	588
Desire for More Children						
Want More Never Had Sex	71.1	55.9	56.7	54.5	72.2	55.8
Don't Want Can't Have More	28.9	44.1	43.3	45.5	27.8	44.2
Total (Number)	263	1,038	584	1,224	237	588
Ideal Number of Children						
0-1	1.1	1.2	2.1	2.4	1.3	1.9
2-3	29.7	29.7	29.6	30.1	46.3	27.9
4-5	57.0	50.8	50.9	52.3	47.3	52.3
6+	11.8	14.4	17.5	15.1	15.2	17.5
Total (Number)	263	1,038	584	1,224	237	588

while respondents from Nairobi, Central and Eastern regions considered children between 2-3 as ideal, their counterparts in Coast, Nyanza, Western and Rift Valley preferred 4-5 children as the ideal number for families. Also, Coast, Nyanza, Western, and Rift Valley provinces had the highest proportions of women who had considered six children and above to be the most ideal for families irrespective of risk status as shown in Table 4.7. This was an indication that risk perception had not altered the respondents fertility preference in terms of number of children considered ideal for families.

4.3.6. Ethnicity

From Table 4.8, among the children ever born categories, majority of the Kalenjin, Kamba, Luhya and other especially those at no risk had never had a child while Kikuyu and Luo had had between 1-2 children. The proportion of respondents decreased with increase in children ever born except for those of parity 0 and 7+. This was true among all ethnic groups irrespective of HIV/AIDS risk perception. This gives the indication that HIV/AIDS risk perception did not have considerable alteration on the number of children ever born. However, those who were at risk particularly reported higher number of children ever born.

A majority of women in all the ethnic categories reported that they would desire for more children never had sex. Those of Kikuyu origin, however, had the least representation of those who desired more children. The highest proportions of women especially those at risk who reported not to desire for more children or could not have more children were

those of Kamba, Kikuyu, Luhya, Other, Luo and Kalenjin communities in descending order.

Table 4.8. Fertility Patterns by Ethnicity

Fertility Indicator	Percentage Distribution by Ethnic Group											
	Kalenjin		Kamba		Kikuyu		Luhya		Luo		Other	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born												
0	39.1	21.9	40.4	18.1	27.8	13.9	44.9	20.4	30.1	20.3	40.8	25.9
1-2	18.5	26.0	23.2	30.9	13.8	25.5	22.1	26.6	31.3	28.5	24.2	23.9
3-4	18.9	18.9	15.2	24.2	21.6	23.0	12.5	19.6	12.0	15.9	12.6	21.2
5-6	13.1	15.2	9.0	12.3	9.6	11.7	8.1	16.2	4.2	15.4	10.9	15.4
7+	11.7	17.5	11.2	14.1	7.1	5.9	10.8	17.3	12.5	19.9	11.5	12.0
Total Number	167	846	101	430	385	809	296	741	192	684	768	1,446
Desire for More Children												
Want None Never Had Sex	58.0	55.6	63.3	57.0	51.2	50.9	69.8	54.4	74.4	55.4	61.2	55.0
Don't Want Can't Have More	42.0	44.4	36.7	43.0	48.8	49.1	30.1	45.6	22.5	44.6	38.7	45.0
Total Number	167	846	101	430	385	809	296	741	192	684	768	1,446
Ideal Number of Children												
0-1	1.4	1.7	2.2	2.6	3.6	5.7	1.0	1.8		2.0	2.5	2.9
2-3	23.3	27.1	10.4	46.3	52.1	55.1	37.5	31.1	37.0	28.2	11.9	38.0
4-5	56.1	54.1	49.6	43.1	32.5	31.4	45.9	50.2	12.2	49.4	39.2	43.8
6+	16.9	16.5	7.7	5.8	6.5	4.6	15.5	16.6	10.4	20.3	16.4	15.4
Total Number	167	846	101	430	385	809	296	741	192	684	768	1,446

Most of the respondents of Kalenjin, Kamba, Luhya and Luo and those of other ethnic communities considered between 4-5 children as ideal. Most of the Kikuyu women, and those of other communities, however, considered 2-3 as the ideal number. All the other ethnic groups except the Luo and the Luhya who reportedly considered six children and above as ideal were at risk as Table 4.8 shows.

4.3.7. Age Group

Table 4.9 on fertility patterns by age indicates that age, in Kenya like in many developing countries, remains a major fertility determinant. The majority of the childless were young women aged between 15 and 19 years while those who reported to have had 1-2 and 3-4

children were mainly those aged 20-24 and 25-29, and 30-34years respectively. Most of those aged 35 years and above had had at least seven children. This steady increase in parity with age of women though common to both risk perception statuses, slightly higher proportions of women who reported to be at risk had higher parities of five children and above.

Table 4.9. Fertility Patterns by Age

Fertility Indicator	Percentage Distribution by Age Group													
	15-19		20-24		25-29		30-34		35-39		40-44		45-49	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born														
0	86.7	77.3	39.0	27.9	8.5	6.3	4.5	2.9	2.6	2.7	0.7	1.2	2.0	1.4
1-2	11.1	22.1	51.9	56.0	45.0	43.4	24.6	18.8	9.9	9.0	7.5	3.8	5.3	5.5
3-4	0.2	0.3	12.6	14.7	33.1	35.3	37.1	35.1	28.0	24.7	15.6	21.3	9.9	11.3
5-6			0.1	1.4	12.8	14.6	25.0	30.6	27.6	32.2	19.7	23.2	24.3	22.7
7+					0.6	1.7	8.7	12.8	31.9	31.7	56.5	49.5	58.6	59.1
Total (Number)	817	944	468	1,007	329	951	264	690	232	699	147	414	152	291
Desire for More Children														
Want More/Never Had Sex	96.1	93.8	82.7	79.1	50.5	58.4	36.4	33.1	13.8	19.3	9.5	9.7	3.3	2.7
Don't Want More/Can't Have More	3.9	6.3	17.3	20.9	49.5	41.6	63.6	62.9	86.2	80.7	90.5	90.3	96.7	97.3
Total (Number)	817	944	468	1,007	329	951	264	690	232	699	147	414	152	291
Ideal Number of Children														
0-1	1.3	3.4	4.9	3.9	1.5	3.2	1.1	3.2	3.4	1.4	2.0	3.0	1.3	1.1
2-3	44.9	47.4	48.1	48.1	46.8	39.9	42.0	41.1	26.3	25.6	22.9	23.9	13.8	22.0
4-5	51.7	42.5	41.7	42.4	45.6	48.7	44.3	49.1	47.8	49.1	36.7	36.1	50.7	46.0
6+	2.1	6.8	5.3	5.7	6.1	8.5	12.5	16.6	23.7	23.9	38.4	29.0	34.2	30.6
Total (Number)	817	944	468	1,007	329	951	264	690	232	699	147	414	152	291

Table 4.9 also indicates that the proportion of those who desired more children was inversely related to age. Except for the extreme age groups of 15-19, 20-24 and 45-49 years the rest of the age groups especially those at risk desired more children. On the other hand, among the ideal number of children categories, children between four and five were considered by all the age groups except 15-19, 20-24, and those aged 25-29 who considered 2-3 as ideal for families. Very few women in those three lower age

categories especially those at risk considered 6+ as the ideal number of children for families compared to other age categories

4.3.8. Current Marital Status

From Table 4.10, it's evident that most of the never married women were mainly young childless females. Majority of those currently married, divorced/separated and widowed had given birth to between 1-2, 3-4, and 7+ children respectively. If those who reported to have had no children were ignored, there was a general decrease in the proportion of respondents with increase in number of children ever born in all the current marital status categories except for the widowed. The pattern was reversed among the widowed. Slightly higher proportions of respondents especially the never married and the currently married who reported to have had at least three children were at risk. This was the reverse of the experience among the widowed and the divorced/separated women where lower proportions of those at risk reported to have had three children and above.

Table 4.10. Fertility Patterns by Current Marital Status

Fertility Indicator	Percentage distribution by Current Marital Status							
	Never Married		Currently Married		Widowed		Divorced separated	
	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk	No Risk	At Risk
Children Ever Born								
0	85.5	72.0	6.0	5.4		1.2	3.0	8.0
1-2	12.9	25.0	35.3	39.4	17.0	12.9	26.1	41.9
3-4	0.7	2.0	24.8	29.8	16.0	23.8	42.4	28.6
5-6	0.6	0.6	15.8	19.1	23.0	31.0	16.2	13.4
7+	0.3	0.3	17.2	19.0	44.0	32.2	12.1	6.1
Total (Number)	976	1,275	1,234	3,272	100	171	99	258
Desire for More Children								
Want More/Never Had Sex	92.0	86.6	35.3	43.9	9.0	13.5	19.2	41.7
Don't Want Can't Have More	8.0	13.4	64.7	56.1	91.0	86.5	80.8	58.8
Total (Number)	976	1,275	1,234	3,272	100	171	99	258
Ideal Number of Children								
0-1	3.1	3.6	1.4	1.5	2.0	2.3	1.0	3.9
2-3	38.4	53.6	31.4	31.2	21.0	26.9	42.1	15.8
4-5	41.4	36.2	46.5	50.2	44.0	46.8	37.4	39.5
6+	7.2	1.9	16.3	17.1	30.0	22.0	9.1	8.8
Total (Number)	976	1,275	1,234	3,272	100	171	99	258

The majority of the never married women expressed desire for more children. This included the never had sex females. While most of the never and currently married who expressed undesire for more children including those who could not have more children for whatever reasons were those at risk, their widowed and divorced separated counterparts who desired no more children were not at risk.

Opposition to childlessness or one child culture is evident in all age categories. Most of the never married and the divorced separated especially those at risk reportedly considered between 2-3 as the ideal number of children while their counterparts who were currently married, widowed and the divorced separated considered 4-5 as the ideal number of children. Those who reported to have never married were especially, however, more likely to consider 2-3 as the most ideal number of children. Table 4.10 also shows

that women at risk were more likely to consider at most three children as the most ideal for families

4.3.9. Contraceptive Use

Table 4.11 on fertility patterns by contraceptive use status indicates that most of those who reported to have never contracepted were mainly childless women who were not at risk of HIV AIDS infection. Generally, the proportion of respondents decreased with increase in parity among those who reported to have never contracepted and those who had ever contracepted alike. This is true irrespective of perceived risk of infection, a clear indication that risk perception did not alter the actual reproductive performance among the respondents.

Table 4.11. Fertility Patterns by Contraceptive Use

Fertility Indicator	Percentage Distribution by Contraceptive Use			
	Never Used		Ever Used	
	No Risk	At Risk	No Risk	At Risk
Children Ever Born				
0	59.3	39.1	9.5	8.0
1-2	17.6	23.6	35.4	32.5
3-4	8.1	11.9	25.4	25.2
5-6	5.9	10.1	15.5	18.8
7+	9.1	12.4	14.2	15.1
Total (Number)	**1,392**	**2,307**	**1,017**	**2,649**
Desire for More Children				
Want More Never Had Sex	75.6	68.1	42.6	41.1
Don't Want Can't Have More	1.10	31.9	57.1	58.9
Total (Number)	**1,392**	**2,307**	**1,017**	**2,649**
Ideal Number of Children				
0-1	2.2	2.7	2.0	2.9
2-3	39.1	35.4	12.9	39.2
4-5	44.0	45.0	44.9	46.7
6+	14.8	16.9	10.2	11.2
Total (Number)	**1,392**	**2,307**	**1,200**	**2,649**

Those who expressed undesire for more including those who reported to be unable to have more children were mainly those who reported to be at risk in both contraceptive use categories. While higher proportions of never contraceptors desired more children including the never had sex, their colleagues who reported to have ever contracepted did not want could not have more children for whatever reasons.

On the other hand, opposition to childlessness or one child culture is yet again evident here. Most of the respondents in both contraceptive use categories considered between 4-5 children and above as ideal number of children for families. There was also consistent dislike to large family size of six children and above for both contraceptive use categories irrespective of risk perception as shown in Table 4.11. This is an indication that both risk

perception and contraceptive use did not perhaps play a major role in altering fertility intentions among Kenyan women

4.4. FERTILITY PATTERNS BY HIV/AIDS PREVALENCE

4.4.1. HIV/AIDS Risk Perception

Generally, Table 4.12 on HIV AIDS risk perception by Prevalence Zone shows that a majority (66.6%) of the respondents were at risk. The percentage of those who reported to be at risk were almost similar (33.4 and 34.4 per cent) for the low and the moderate zones respectively, however, the figure was noticeably low (27.5%) among those in the high prevalence zone.

Table 4.12. HIV/AIDS Risk Perception by Prevalence Zone

Risk Perception	Respondents		Prevalence Zone					
			Low		Moderate		High	
	No.	%	No.	%	No.	%	No.	%
No Risk	1,329	33.4	404	33.4	801	34.4	125	27.5
At Risk AIDS	2,656	66.6	804	66.6	1,523	65.6	329	72.5
Total	3,985	100.0	1,208	100.0	2,323	100.0	454	100.0

The results in Table 4.12 therefore conforms to the general expectation that most of the respondents in the high HIV-prevalence zone would perceive themselves to be at risk compared to those in low HIV-prevalence zone.

4.4.2. Contraceptive Use

Table 4.13 indicates that most (52.5%) of the respondents reported to have ever contracepted. Most of the respondents (55.2%) in the low prevalence zone had never used/practiced contraception.

Table 4.13. Contraceptive Use by HIV/AIDS Prevalence Zone

Contraceptive Use	Respondents		Prevalence Zone					
			Low		Moderate		High	
	No.	%	No.	%	No.	%	No.	%
Never Used	1,893	47.5	667	55.2	1,007	43.3	219	48.2
Ever Used	2,092	52.5	541	44.8	1,316	56.7	235	51.8
Total	**3,985**	**100.0**	**1,208**	**100.0**	**2,323**	**100.0**	**454**	**100.0**

Table 4.13 shows a different situation when the moderate and high prevalence zones were considered. In these two categories, majority of the respondents 56.7 and 51.8 per cent reported to have ever contracepted respectively. Generally, there was no great variation among the respondents in terms of contraceptive use by the various prevalence zone categories.

4.4.3. Fertility Patterns

Table 4.14 on fertility patterns by zonal prevalence shows a general decrease in the proportion of respondents with increase in the number of children ever born among those in low prevalence zone irrespective of contraceptive use status. This pattern was maintained among those in the moderate and high prevalence zones. This could be a

clear indication that contraceptive use did not play a major role in altering actual fertility performance of the respondents as measured in terms of children ever born in all the zones

Table 4.14. Fertility Patterns by Zonal Prevalence

Fertility Indicator	Zonal Prevalence							
	Low		Moderate		High		Total	
	Never Used %	Ever Used %	Never Used %	Ever Used %	Never Used %	Ever Used %	Never Used No	Ever Used No
Children Ever Born								
0	44.4	6.7	55.4	10.5	44.1	7.7	941	192
1-2	19.6	31.2	21.1	36.6	19.6	42.1	386	749
3-4	12.0	27.9	11.1	28.3	14.3	30.6	223	670
5-6	9.6	17.2	6.2	15.4	9.1	13.9	146	338
7+	14.1	17.0	[illegible]	9.2	12.8	13.8	107	243
Desire for More Children								
Wants More (never had Sex)	66.7	42.0	73.6	39.7	67.6	36.3	1,114	858
Does Not Want/Can't Have More	33.3	58.0	26.4	60.3	32.4	63.6	550	1,234
Ideal Number of Children								
0-1	1.8	2.8	4.0	1.9	3.2	4.7	59	96
2-3	31.8	40.1	47.3	49.6	43.8	46.4	784	928
4-5	50.7	37.1	36.6	38.8	38.4	32.6	701	921
6+	15.7	9.8	12.1	7.7	13.6	8.8	259	170
Total	100.0	100.0	100.0	100.0	100.0	100.0	1,803	2,092

Table 4.14 shows that while more women in the low prevalence zone who had never contracepted expressed desire for more children including those who reported to have never had sex, many of their counterparts who had ever contracepted never wanted or could not have more children for whatever reasons. This pattern was maintained in all the prevalence zones, an indication that prevalence rate did not affect the fertility intentions of the respondents in terms of desire for more children.

There was a general pattern of increasing proportion of respondents with increase in the number of children considered ideal for families in low prevalence zone irrespective of contraceptive use status. However, this pattern was reversed in the moderate and high

prevalence zones. Here, we experienced decreasing proportions of women with increasing number of children considered ideal for Kenyan families. Most of them also reported to have ever contracepted. In both cases, the patterns were more vivid on ignoring the extreme (first and last) ideal number of children categories. This could give the indication that women in low prevalence zones were slightly more likely to consider higher number of children as the most ideal for families than their colleagues in the moderate and high prevalence zones.

4.5. THE EFFECT OF HIV/AIDS RISK PERCEPTION ON FERTILITY

4.5.1. Introduction

It was the main of the objective of the study to examine the effect of HIV risk perception on each of the three measures of fertility while controlling for other fertility determinants. To achieve this, Multiple Linear Regression was performed on the HIV/AIDS perceived risk of infection and ideal number of children while controlling for the selected background and intermediate fertility determinants. Similar operation was performed for the number of children ever born. But it was assumed in this case that HIV/AIDS perceived risk of infection of respondents did not change over time. However, due to dichotomous nature of the third measure of fertility (desire for more children), a logistic regression was carried out. The procedure used in both the multiple linear and logistic regressions was the Enter Method. This was to facilitate assessment of the effect of each of the explanatory variables considered in the analysis on each of the three dependent

variables. The multiple linear and logistic regression results are presented in Tables 4.15, 4.16 and 4.17.

4.5.2. The Effects on Children Ever Born

(a). Socio-economic Factors:

Table 4.15 shows that with reference to primary level of education, having no education had a significant positive effect on the number of children ever born while having secondary and above level of education had a significant negative effect.

Considering type of place of residence, the table indicates that urban residence relative to rural residence had a negative effect on the number of children ever born. This effect was statistically significant at $\alpha = 0.05$. On the other hand, being in employment (currently working for payment) as compared to unemployment had an insignificant negative effect on the number of children ever born

Table 4.15. Determinants of Number of Children Ever Born Based on Multiple Linear Regression Model

Variables	Coeff. (β)	Error	t-significance	Significance
Education Level				
Primary Education	(Ref.)			
No Education	0.136	0.030	4.495	0.000
Secondary Education+	-0.328	0.020	-16.262	0.000
Type of Place of Residence				
Rural	(Ref.)			
Urban	-0.261	0.028	-9.285	0.000
Current Employment Status				
Not Employed	(Ref.)			
Employed	-0.004	0.018	-0.227	0.820
Religion				
Protestant	(Ref.)			
Catholic	0.056	0.019	2.886	0.420
Muslim	0.009	0.044	0.217	0.828
Other	-0.089	0.031	-2.878	0.004
Region of Residence				
Rift Valley	(Ref.)			
Nairobi	-0.173	0.051	-3.383	0.001
Central	-0.208	0.044	-4.721	0.000
Coast	0.052	0.043	1.181	0.241
Eastern	-0.091	0.035	-2.115	0.034
Nyanza	0.026	0.042	0.621	0.535
Western	-0.063	0.034	-1.836	0.162
Age Group				
15-19	(Ref.)			
20-24	0.351	0.029	12.041	0.000
25-29	0.910	0.033	27.226	0.000
30-34	1.511	0.037	41.132	0.000
35-39	1.974	0.042	52.886	0.000
40-44	2.311	0.045	51.322	0.000
45-49	2.495	0.046	53.689	0.000
Current Marital Status				
Currently Married	(Ref.)			
Never Married	-0.690	0.026	-26.028	0.000
Widowed	-0.067	0.047	-1.418	0.168
Divorced/Separated	-0.369	0.041	-8.933	0.000
Ethnicity				
Other	(Ref.)			
Kalenjin	0.138	0.032	4.212	0.000
Kamba	0.063	0.033	1.912	0.027
Kikuyu	-0.027	0.042	-0.636	0.529
Luhya	0.148	0.042	3.533	0.001
Luo	0.154	0.034	4.551	0.000
Contraceptive Use				
Never Used	(Ref.)			
Ever Used	0.195	0.020	9.948	0.000
HIV/AIDS Risk Perception				
No Risk	(Ref.)			
At Risk	0.032	0.019	1.679	0.093
Constant	0.793	0.047	16.932	0.000
Adjusted R^2 = 0.720	**F = 654.070**		**Model Significance = 0.000**	

(b). Socio-cultural Factors:

Using Protestant other Christian as the reference category, Catholic and Muslim had insignificant positive effect while other religious affiliation registered an insignificant negative effect on the number of children ever born at $\alpha = 0.05$

In comparison to other ethnic groups, Kalenjin, Luhya and Luo had significant positive effect on the number of children ever born while Kamba had a positive but insignificant effect. However, Kikuyu relative to the reference category had insignificant negative effect on the number of children ever born at $\alpha = 0.05$.

Table 4.15 also shows that using Rift Valley region/province as the reference category, Nairobi, Central, Eastern regions had significant negative effect on the number of children ever born while Coast and Western had negative but insignificant effect. It was only Nyanza region that had a significant positive effect on the number of children ever born relative to the reference category at $\alpha = 0.05$.

(c). Demographic Factors:

Age has been taken to be a very important factor in reproduction. Table 4.15 shows that taking age group 15-19 as the reference category, all the other categories showed increasing positive effect on the number of children ever born with increase in age. The effects were found to be statistically significant at $\alpha = 0.05$ for all the age groups.

Relative to the currently married, all the other current marital status categories had negative effect on the number of children ever born. However, whereas the never married and the divorced separated had statistically significant negative effects, being widowed relative to being currently married had insignificant negative effect at $\alpha = 0.05$.

(d). Proximate Factors:

Unexpectedly, ever use of contraceptives relative to never use of contraceptives had significant positive effect on the number of children ever born. This was perhaps due to relatively higher number of never contraceptors childless women. For instance, from our cross-tabulations, while only 308 out of 7,365 (4.2%) were childless ever contraceptors, 1,723 out of the 7,365 (23.4%) were childless never contraceptors. The effect of this on the general number of children ever born in the multi-linear equation could be responsible for the anomaly. On the other hand, this could perhaps indicate that most women contracepted after having achieved their fertility desires.

Looking at HIV AIDS risk perception, Table 4.15 indicates that in comparison to no risk perception, being at risk had positive effect on the number of children ever born. However, the effect was found to be statistically insignificant at $\alpha = 0.05$.

4.5.3. The Effects on Ideal Number of Children

(a). Socio-economic Factors:

From Table 4.16, its shown that in comparison to primary level of education, having no education had a positive effect on the number of children considered ideal while secondary and above level showed a negative one. The effects of both categories on ideal number of children relative to the reference category were found to be statistically significant.

Compared to rural type of place of residence, urban residence had a statistically significant negative effect on the number of children considered ideal for families at $\alpha = 0.05$. In comparison to being unemployed, being employed had an insignificant positive effect on ideal number of children at $\alpha = 0.05$.

Table 4.16. Determinants of Ideal Number of Children Based on Multiple Linear Regression Model

Variables	Coeff (β)	Error	t-significance	Significance
Education Level				
Primary Education	(Ref.)			
No Education	0.199	0.017	11.965	0.000
Secondary Education +	-0.211	0.018	-11.707	0.000
Type of Place of Residence				
Rural	(Ref.)			
Urban	-0.250	0.025	-9.881	0.000
Current Employment Status				
Not Employed	(Ref.)			
Employed	0.054	0.017	3.221	0.820
Religion				
Pentecostal/other Christians	(Ref.)			
Catholic	0.011	0.017	0.614	0.420
Muslim	0.065	0.030	1.103	0.828
Other	0.319	0.018	2.488	0.000
Region of Residence				
Rift Valley	(Ref.)			
Nairobi	-0.107	0.051	-2.116	0.001
Central	-0.224	0.040	-6.421	0.000
Coast	0.041	0.039	1.068	0.286
Eastern	-0.262	0.040	-6.511	0.011
Nyanza	0.071	0.037	1.951	0.542
Western	-0.013	0.040	0.337	0.462
Age Group				
15-19	(Ref.)			
20-24	-0.068	0.026	-2.584	0.000
25-29	0.028	0.030	0.918	0.000
30-34	0.167	0.033	5.016	0.000
35-39	0.295	0.034	8.785	0.000
40-44	0.361	0.038	9.509	0.000
45-49	0.383	0.041	9.285	0.000
Current Marital Status				
Currently Married	(Ref.)			
Never Married	-0.226	0.024	-9.619	0.000
Widowed	-0.119	0.042	-2.831	0.005
Divorced/separated	-0.233	0.037	-6.116	0.000
Ethnicity				
Other	(Ref.)			
Kalenjin	0.106	0.038	2.792	0.005
Kamba	0.098	0.043	3.074	0.002
Kikuyu	-0.087	0.038	-2.289	0.022
Luhya	0.093	0.038	2.388	0.013
Luo	0.083	0.031	2.595	0.007
Contraceptive Use				
Never Used	(Ref.)			
Ever Used	-0.080	0.018	-5.019	0.000
HIV/AIDS Risk Perception				
No Risk	(Ref.)			
At Risk	-0.037	0.017	-2.200	0.028
Constant	2.823	0.048	63.431	0.000
Adjusted R^2 = 0.212	**F = 69.217**		**Model Significance = 0.000.**	

(b). Socio-cultural Factors:

Using Protestant other Christian as the reference category, Catholic, Muslim and Other religious groups had insignificant positive effect on ideal number of children at α = 0.05. Relative to Rift Valley region, Nairobi, Central and Eastern regions had statistically significant negative effect on the number of children considered ideal for families while Western region had an insignificant negative effect. Nyanza and Coast reported insignificant positive effect on ideal number of children in comparison to the reference category.

With reference to Other ethnic groups, being Kalenjin, Kamba, Luhya and Luo had statistically significant positive effect on ideal number of children while being Kikuyu produced an insignificant negative effect at α = 0.05.

(c). Demographic Factors:

In comparison to being currently in marital union, being never married, widowed or divorced separated had statistically significant negative effect on the number of children considered ideal for families at α = 0.05. On the other hand, taking the 15-19 age group as the reference category, all the other categories except 20-24 had positive effect on ideal number of children. However, all the categories attracted statistically significant effect on ideal number of children relative to the reference category.

(d). Proximate Factors:

Relative to never use of contraceptives, ever use of contraceptives had a statistically significant negative effect related on the number of children considered ideal for families at $\alpha = 0.05$. Meanwhile, perception of being at risk had a significant negative effect on ideal number of children relative to being at no risk

4.5.4. The Effects on Desire for more Children

(a). Socio-economic Factors:

In comparison to primary education, having no education and secondary and above level of education had significant positive effect on desire for more children at $\alpha = 0.05$. Meanwhile, urban residence relative to rural residence produced a statistically significant negative effect on desire for more children at $\alpha = 0.05$. On the other hand, compared to being currently employed, Table 4.16 shows that being in employment had an insignificant negative effect on desire more children at $\alpha = 0.05$

(b). Socio-economic Factors:

Taking Protestant other Christian to be the reference category, while being Catholic had significant negative effect on desire for more children, Muslim and Other religious affiliation had significant and insignificant positive effect respectively on desire for more children at $\alpha = 0.05$. On the other hand, relative to Other ethnic groups, being Kalenjin and Kikuyu had negative effect on desire for more children, while being Kamba, Luhya

and Luo had positive one. All the categories produced statistically insignificant effect on desire for more children relative to reference category at α 0.05.

In comparison to the Rift Valley region, only Central and Eastern regions had negative effect on desire for more children. Nairobi, Coast, Nyanza and Western regions produced positive effect relative to the reference category. All the categories, however, had statistically insignificant effect on the dependent variable at α 0.05.

(c). Demographic Factors:

In comparison to age group 15-19, all the age group categories had statistically significant negative effect on desire for more children. Relative to those who reported to be currently in marital union, being widowed and divorced/separated had significant negative effect on desire for more children while never married had a significant positive effect on desire for more children at $\alpha = 0.05$.

Table 4.17. Determinants of Desire for More Children based on Logistic Regression Model

Variables	Coeff (B)	Std. Error	Exp (β)	Significance
Education Level				
Primary Education	(Ref.)			
No Education	0.237	0.119	1.267	0.165
Secondary Education +	0.551	0.076	1.741	0.000
Place of Residence				
Rural	(Ref.)			
Urban	-0.289	0.103	0.749	0.005
Current Employment Status				
Not Employed	(Ref.)			
Employed	0.015	0.078	0.956	0.845
Religion				
Protestant	(Ref.)			
Catholic	0.041	0.073	0.960	0.577
Muslim	0.343	0.164	1.410	0.036
Other	0.251	0.201	1.285	0.211
Region of Residence				
Rift Valley	(Ref.)			
Nairobi	0.148	0.189	1.160	0.433
Central	-0.482	0.162	0.921	0.017
Coast	0.261	0.166	1.298	0.061
Eastern	-0.242	0.161	0.785	0.092
Nyanza	0.000	0.156	1.000	0.997
Western	0.148	0.165	1.159	0.369
Age Group				
15-19	(Ref.)			
20-24	-1.065	0.139	0.345	0.000
25-29	-2.029	0.142	0.130	0.000
30-34	-2.766	0.139	0.063	0.000
35-39	-3.436	0.160	0.026	0.000
40-44	-3.874	0.260	0.010	0.000
45-49	-4.882	0.516	0.008	0.000
Current Marital Status				
Currently Married	(Ref.)			
Never Married	0.493	0.095	2.637	0.000
Widowed	-1.009	0.164	0.365	0.000
Divorced/separated	-0.430	0.204	0.650	0.003
Ethnicity				
Other	(Ref.)			
Kalenjin	-0.133	0.156	0.875	0.395
Kamba	0.246	0.136	1.279	0.070
Kikuyu	-0.087	0.154	0.917	0.572
Luhya	0.000	0.156	1.000	0.976
Luo	0.168	0.129	1.181	0.194
Contraceptive Use				
Never Used	(Ref.)			
Ever Used	-0.215	0.072	0.870	0.000
HIV/AIDS Risk Perception				
No Risk	(Ref.)			
At Risk	0.053	0.072	1.054	0.466
Constant	2.578	0.168		0.000

-2 Log Likelihood = 6181.148 Degree of Freedom = 29 Model Significance = 0.000

(d). Proximate Factors:

Relative to never use, ever use of contraceptives had a significant negative effect on desire for more children at α = 0.05. In comparison to being at no HIV-infection risk, being at risk had insignificant positive effect on desire for more children at α = 0.05.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1. INTRODUCTION

This chapter gives summary of main research findings, conclusion and recommendation of the study. Due to the numeric nature of data on the dependent variable, multiple regression was used to establish the nature of effect of the various selected fertility determinants on fertility patterns as measured in terms of number of children ever born and ideal number of children for families. On the other hand, to determine the effect of these fertility determinants on desire for more children, a multiple logistic analysis was performed. This was preferred due to the dichotomous nature of data on desire for more children. Cross-tabulations were also carried out to establish the distribution of respondents by fertility measures and correlates, and the relationship between HIV/AIDS perceived risk of infection and prevalence rate on fertility measures.

5.2. SUMMARY OF FINDINGS

One of the objectives of this study was to establish the impact of selected fertility determinants on HIV/AIDS-risk perception

The hypotheses examined were:

1. Women of no education are likely to be at risk of HIV-infection.

2. HIV AIDS perceived risk of infection does not vary by type of place of residence.

3. Being widowed, divorced/separated or never married increases the chance of HIV AIDS risk of infection.

4. Women in the age group 45–49 are less likely to be at risk of HIV AIDS-infection than those in the 20-24 age group.

5. Ever use of contraceptive is likely to have a negative effect on risk of HIV-infection.

According to this study's findings, it was realized that while only 66 per cent of those of primary level of education reported to be at risk, about 70 and 69 per cent of their counterparts with no education and secondary and above level of education respectively reported to be at risk. This is a clear indication that women of no education, relative to those with some higher levels of education were at slightly greater risk of HIV-infection perhaps because of their lower bargaining power on issues relating to sexuality and also inefficient, low or non-contraceptive use. This confirms the study hypothesis that women of no education are likely to be at a higher risk of HIV-infection.

Among women in urban type of residence, only 65 per cent reported to be at risk while about 68 per cent of their rural resident colleagues rural reported the same. The slightly higher proportion of those at risk among the rural dwellers could be explained by among other things high-risk behaviour patterns like widow inheritance, serial or polygynous marriage and non-use inefficient use and/or practice of modern contraception. This disapproves the study hypothesis that there is no variation in HIV AIDS perceived risk of infection by type of place of residence.

Considering the current marital status, marriage was found to be still universal in Kenya. Despite the fact that there was a general expectation that there could be comparatively lower proportion of those at risk of HIV-infection among the currently married, the never married reported the lowest proportion (57%) of those who perceived themselves to be at risk followed by the widowed (63%) and divorced separated (71%). The currently married reported the highest proportion of about 73 per cent being at risk. This could be showing the relatively higher level of concern married couples attach to the pandemic. The finding disapproves the study hypothesis that being widowed, divorced separated or never married increases the chance of HIV AIDS perceived risk of infection

Age has been taken as one of the major factors in HIV AIDS-infection variations. In Kenya, the majority of women in the age group 15-49 reported to be at risk irrespective of age. However variations existed and as hypothesized, women in the age group 45-49

were less likely to be at risk compared to their counterparts aged 20-24 years. The risk was highest among those aged 25-44 years.

Despite the fact that slightly higher number of respondents reported to have never contracepted, unexpectedly higher proportion (72%) of those who had ever contracepted reported to be at risk compared to only 62 per cent among the never contraceptors. The hypothesis that ever use of contraceptives is likely to be negatively related to risk of HIV AIDS-infection is disapproved. This could be due to among other things, high proportion of 'never had sex' among the never contraceptors, and perhaps this could be an indication of inconsistency in use practice of contraception.

The second objective was to examine the effect of prevalence rate on fertility patterns. The hypothesis examined was:

1 The lower the level of HIV AIDS prevalence, the lower the number of children ever born.

According to this study's finding the proportion of respondents decreased consistently with the increase in number of children ever born irrespective of zonal prevalence. This is a clear indication that prevalence rate was not a major factor in altering actual fertility patterns as measured in terms the number of children ever born.

The third objective of the study was to investigate the extent to which HIV AIDS perceived risk of infection affects fertility patterns.

The following hypotheses were considered:

1. HIV AIDS perceived risk of infection is likely to be having a negative effect on ideal number of children.

2. Women who perceive themselves to be at risk are likely not to desire for more children.

The study's findings revealed that being at risk had a significant negative effect on ideal number of children relative to being at no risk. This confirms the study hypothesis that HIV AIDS perceived risk of infection is likely to have a negative effect on ideal number of children. This was contrary to this study's other findings based on the number of children ever born and desire for more children where the effect was found to be positive though statistically insignificant at $\alpha = 0.05$. However, ideal number of children is known to be a weak measure of fertility levels and hence patterns. Its potential effect on fertility is minimal in relation to other fertility indicators. It's by and large an indicator of the general community fertility norm, which may not necessarily tally with individual fertility intentions. Alternatively, this could have been due to a general negative community attitude towards higher number of children in order to reduce burden related to HIV AIDS infection, death and related effects.

On the other hand being at risk though hypothesized to have a negative effect on desire for more children; the study shows that the reverse was true. However, the effect was found to be statistically significant at $\alpha = 0.05$.

5.3. CONCLUSION

The findings of this study revealed that HIV/AIDS perceived risk of infection has an insignificant positive effect on the number of children ever born (assuming that risk perception remained unchanging over time) and desire for more children. Though insignificant, this effect could be attributed to the impact of the scourge on morbidity and mortality especially on infant and child mortality, which is known to affect fertility positively. Such deaths often shorten post partum amenorrhoea due to curtailed breastfeeding period hence high fertility (other factors being constant). In such high infant and child morbidity and mortality environment, families tend to have more children than they would actually desire 'hoard' and or replace the dead children. These effects induced by HIV/AIDS pandemic normally impact on fertility positively.

However, the study established that HIV/AIDS risk perception has a significant negative effect on ideal number of children. Though this measure of fertility is known to be a poor one especially with regard to estimation of fertility levels from which patterns are gauged, it confirms the study hypothesis that HIV/AIDS risk perception is likely to have

a negative effect on the number of children considered ideal for families. Ideal number of children, being largely used to predict the general community fertility norm expectation, could be taken in this case and context to suggest an emerging trend of negative attitude of the Kenyan society towards higher number of children. This could be to reduce burden on community upon disabling sickness or death resulting from HIV/AIDS scourge.

5.4. RECOMMENDATIONS

5.4.1. Policy Recommendations

The following are policy recommendations based on the findings of this study:

(i) From the findings of this study, women of no education were more likely to be at risk and therefore the need to increase both primary and secondary enrolments especially in high prevalence zones. This shall not only help control population growth through birth control, but will also improve their bargaining power on issues relating to their sexuality.

(ii) The government should do everything possible to narrow the rural-urban gap in terms of infrastructural facilities and services. This would help curb high incidences of HIV risk among the rural women dwellers in Kenya especially those in their reproductive age.

(iii) Family planning awareness and/or services programmes should be enhanced In areas where such programmes are already existing, expansion is necessary, and areas where they do not exist, such be set-up This is as a result of the study's realization that contraceptive never users were more than ever users among Kenyan women.

5.4.2. Recommendations for Further Research

The following are the recommendations for further research based on the findings of this study

(i) Research methodologies need to be re-examined particularly the application of "fertility models" to determine and hence recommend the most suitable model for the most effective analysis of HIV AIDS This study borrowed from the Bongaart's model among other fertility models that exist. Although the results were satisfactory and in some circumstances in line with the existing literature and expectations of the study, they nonetheless did not fully satisfy the theoretical assumptions of the model.

(ii) Re-definition of HIV/AIDS-risk perception and accompanied follow-up of individual cases in order to establish which components of it could perhaps alter fertility patterns. This would enable researchers to understand why some women would have lower fertility and others maintain higher fertility after

being exposed to similar conditions of risk as some results of this study have suggested.

(iii) There is need for methodologies that would enhance the conversion of sentinel surveillance data into reliable community district level estimates of HIV/AIDS prevalence rates.

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