REPRODUCTIVE MORTALITY AND ITS SIGNIFICANCE TO HEALTH PLANNING IN KISII DISTRICT, KENYA

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Abstract

The research in this study was carried out between 1991 and 1995. Research investigated the phenomenon of reproductive health in Kisii district, Kenya. The broad objectives were to estimate the levels, portray any trends and to identify the determinants of maternal mortality and its significance to health planning. The conceptual hypothesis was that maternal mortality was a function of a complex web of phenomena incorporating demographic, biomedical, socioeconomic, cultural, political, and environmental factors.

Hospital records from a random sample of the two major hospitals in the district, namely Kisii District Hospital and Tabaka Mission Hospital were examined and a total of 159 maternal deaths recorded by the two hospitals during the study period were analyzed. Details on socioeconomic, demographic, biomedical conditions and health-seeking behaviour of the deceased women as reflected in their hospital records were then examined. These data were also supplemented with primary data collected from health personnel, community leaders and women focus group discussions from different parts of the district.

Demographic and statistical techniques, especially regression, correlation and factor analysis from the hospital data were used to establish the nature and magnitude of relationship between maternal mortality and its major determinants. The research revealed that Kisii district has a high maternal mortality ratio, which has been rising steadily. In 1991 maternal mortality ratio was 397.5 deaths per 100,000 live births. This increased to 530 deaths per 100,000 live births in 1993 and 663 deaths per 100,000 live births in 1995. Factor analysis identified five major determinants of maternal mortality to be poor health-seeking behaviour, demographic events, mode of delivery, birth-interval and occupation. On the basis of these findings, the study recommends intensified reproductive health education to target all young and old women. There is also an urgent need to improve the provision of maternal and child health programmes in the district.
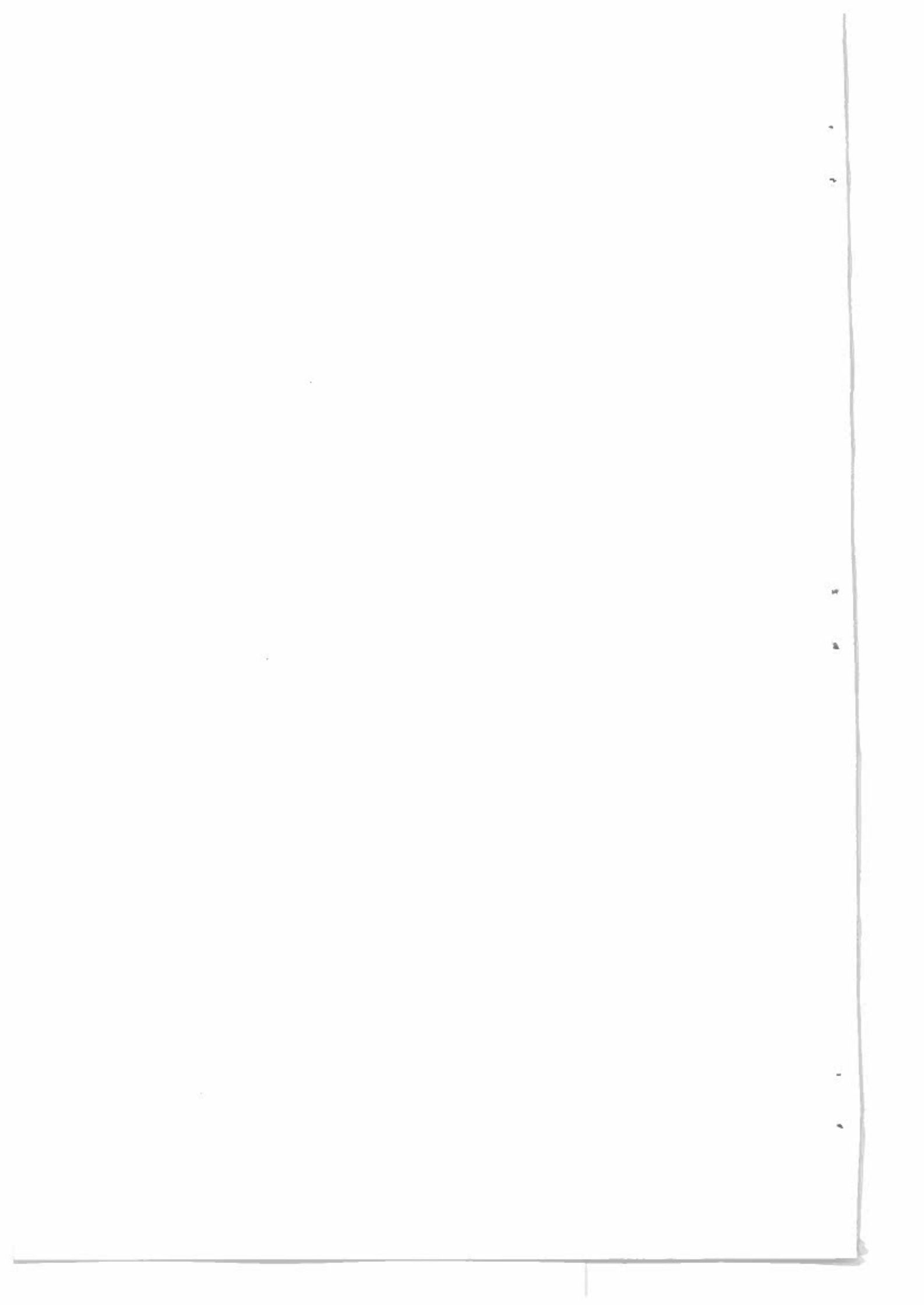
Background to the problem

The concept of reproductive health as a basic human right emerged during the International Conference on Population and Development (ICPD) in Cairo, Egypt in 1994. Thereafter, maternal and prenatal health status are increasingly being utilized by international agencies and national governments as basic indicators of the level of socioeconomic development and a measure of gender equality or main-streaming in the development process. In the majority of developing countries, reproductive mortality is the greatest life-threatening risk and cause of death among women of reproductive cohorts aged 15 to 49 years old. Annually, approximately 500,000 women die of complications related to maternal and prenatal health problems (WHO, 1986; Herz and Measham, 1987). According to WHO (1991), 98.9 percent of global maternal deaths occur in developing countries compared to a mere 1.2 percent or 600,000 cases experienced in developed countries. High maternal deaths experienced by developing countries are attributed to a complex web of situation factors commonly grouped as demographic, socioeconomic, cultural, biomedical, environmental health status, physical infrastructure, medical services infrastructure and inadequate policy strategies. These situation factors conceal the fate of many women who are destined to early and premature death. Since medical statistics relating to maternal and prenatal mortality are scanty and grossly inaccurate, the true picture of maternal mortality levels, trends and regional disparities are unknown.

According to UNDP (1989), Africa and Asia account for 90 percent of all maternal deaths reported annually from all developing countries. Africa alone accounts for 30 percent (150,000) of such deaths reported annually from developing countries. In fact some remote rural parts of Africa experience as high as 1000 maternal mortality ratio per 100,000 live births annually. Statistically for African women the lifetime risk of dying from causes related to childbearing are at least 1 in 22 as opposed to 1 in 54 in Asia, 1 in 73 in South America, 1 in 6366 in North America and 1 in 9850 in Northern Europe. On average a pregnancy is 16 times more likely to end in a woman's death than in a developed country (Jacobson, 1991; Tinker, et al. 1993; McCauley, 1994). Further evidence from developing countries show that 20 to 45 percent of all deaths among women of reproductive cohorts are from pregnancy-related causes as opposed to less than 1 percent in the United States of America and most of Europe.

The worst affected part of Africa is the sub-Saharan region (East, West, and Middle), where the maternal mortality ratio is approximately 700 per 100,000 live births (Tinker, et al. 1993). These statistics should, however, be interpreted with extreme caution because of the high levels of unreliability and inaccuracy affecting mortality statistics in Africa. In East Africa the situation is equally bad. Kirumbi (1996) reports that 57 women in East Africa die hourly due to some preventable pregnancy-related causes. Kenya is among the East African countries with extremely high maternal death rates due its high birth rates and poverty. A recent government report indicates that of the total national population estimated at 30 million, about 56 percent, or 13 million are experiencing abject poverty or earning less than 1 dollar per day for their livelihood. Several studies have demonstrated that poverty and maternal mortality are positively associated (Sadik, 1993; Lettenmaier et al, 1988).

The recent Kenya Demographic and Health survey report of 1998 estimates Kenya's maternal mortality ratio as 590 deaths per 100,000 live births (KDHS, 1998). This study, however, finds little evidence of the impact of the dreaded HIV/AIDS on maternal mortality rate. Nevertheless, it argues that the impact of HIV/AIDS will be greatly felt during the

next decade when those already infected will have succumbed to death. The KDHS (1998) estimates definitely indicate that maternal mortality in Kenya is rising rapidly. Estimates made using the civil register indicated a maternal mortality rate of 204 and 186 deaths per 100,000 live births for 1970 and 1977 respectively (GOK/UNICEF, 1992).

The Population Studies and Research Institute (PSRI) of the University of Nairobi, in 1994 using the direct method based on the sisterhood method approach, estimated maternal mortality ratio for Kenya as 498 deaths per 100, 000 live births. The greatest risk was experienced by women under 20 years and above 40 years of age. The cohort with the highest incidence of maternal death was 25 to 29 years because it accounted for 24.84 percent of all maternal deaths recorded, while all cohorts under 30 years accounted for 65.6 percent of all deaths (PSRI, 1994). On the basis of these analyses, districts in Kenya were spatially categorized into three distinct spatial enclaves. Districts with very high maternal death rates embraced Busia district with 22.3 percent of all reported maternal deaths; the former South Nyanza district now split into five districts (Migori, Homa Bay Kuria,Rachuonyo and Suba) with 21.7 percent and Kitui district with 10.2 percent. All these districts accounted for 68.8 percent of all reported maternal deaths (Ayiemba, et al, 1999). The second category of maternal deaths included many districts with moderately high maternal mortality ratios. In this category Baringo district topped the list with 9.6 percent, while Embu was at the bottom of the list with 5.1 percent. It was found that Kisii district is in this category and had maternal mortality ratio of 233.6 deaths per 100,000 live births. Kisii district, which is the focus of this study, experiences high risks to childbearing because of its relatively high total fertility rate of 7.1 in 1989, 5.8 in 1993 and about 5.2 in 1998 (KDHS, 1993; KDHS, 1998).

The third category consisted of only one district namely Nyeri district with less than 5.1 percent of all reported maternal deaths.

The Research Problem

Childbearing is a serious life-threatening role undertaken by women in Kisii district, as is the case in other parts of Kenya. This study therefore aims at analyzing any trends, levels and determinants of maternal mortality in Kisii district. It seeks to analyze the correlation between independent variables in the analysis such as parity, marital status, occupation, place of residence, antenatal clinic attendance, mode of delivery and birth-interval on the one hand and, maternal mortality on the other hand. Two important research questions addressed are: to what extent is abortion contributing to high incidence of maternal mortality? And does maternal mortality rates vary significantly at micro-regions (divisions)? The study finally makes appropriate recommendations for policy intervention strategies for reducing maternal deaths.

The Study Area

Kisii district is located in Nyanza Province, Western Kenya, close to Lake Victoria, but without any shoreline. It shares common borders with Nyamira district to the north and east, Narok and Transmara to the south, and Homa Bay and Migori districts to the west. It lies between latitude 0".30" and 1° .00" South and longitude 34". 38" and 35".00 East. Its proximity to the Equator and Lake Victoria makes it susceptible to tropical diseases that affect human health. Lately the district has suffered heavily from an epidemic of highland malaria and respiratory diseases, which claimed hundreds of lives, especially women and

children. Furthermore its rugged topography characterized by undulating hills and valleys make travelling to the scattered health centres difficult especially during the rainy season on un-tarmacked roads. This situation often complicates sets of choices pregnant women have to make particularly in times of emergency.

The district is a high-potential agricultural region that supports commercial and subsistence agriculture for the production of tea, coffee, pyrethrum, maize, bananas and beans among a wide range of vegetables and livestock products. However, increased productivity to support rapidly growing population and extremely high population densities ranging from 395 to 1395 persons per square kilometer has required heavy dependence on chemical fertilizers and herbicides that pollute streams and rivers, thus endangering the lives of the population who depend on such water sources to meet domestic needs. Several swamps in the many river valleys and flat open lands have provided suitable breeding habitats for mosquitoes and other water-borne diseases such as typhoid fever, dysentery and cholera. Almost all the raw water used in Kisii district, particularly in rural areas is untreated. For this reason, environmental diseases such as diarrhea, malaria and sleeping sickness are common. See table 1. Which list the top ten diseases in the region.

Table 1
Morbidity structure in Kisii district from 1994 to 1995

Diseases	1994	Percent	1995	Percent.
Malaria	253,081	55.6	229,275	48.6
Respiratory diseases	86,864	19.0	104,841	22.0
Diseases of the skin	39,464	8.6	31,897	6.7
Diarrhoeal diseases	14,381	3.1	20,969	4.5
Intestinal worms	17,535	3.8	17,539	3.7
Ear infection	N/A	N/A	17,503	3.7
Urinary track infection	11,263	2.4	13,656	2.9
Accidents	13,377	2.9	13,466	2.9
Anemia	N/A	N/A	9,724	2.1
Eye infection	5,900	1.3	9,366	2.0

Source. Mogere, 1997 Table 4.1 p. 104.

Methodology

In developing countries research on maternal mortality has been hampered by many problems relating to methodology and study design. In some developing countries over 73 percent of women deliver at home (Van Ginneken, et al. 1984). Deliveries occurring in rural homes under the management of Traditional Birth Attendants (TBAs), who in most cases keep no records, render accurate sampling in maternal study difficult to attain. This is definitely the case in Kenya where distribution of maternal deaths by place of occurrence is almost a fifty-fifty situation (PSRI, 1994). Recording vital events in Kenya is either nonexistent or where it exists, very poor indeed. Designing a research study in such a situation is problematic as other factors such as poor physical accessibility, cultural taboos on naming the dead and insecurity of researchers limit adequate collection of such data. Moreover high levels of illiteracy also contribute to the un-reliability and inaccuracy of existing data

(Ayiemba, E. *et al.* 1999). It is further observed that mortality in a micro-setting is a very rare phenomenon (PSRI, 1994). Therefore, to elicit sufficient data necessary for estimating reliable levels and trends of maternal deaths, a very large population is required. Though hospital-based records offer an alternative source of data, it has been observed that in some developing countries, few deliveries take place in hospitals. This is the realty in Kenya where most women deliver at home (Koening *et al.* 1988). Koening *et al* further argue that women who deliver in modern health care facilities are a select group who may not accurately represent the experiences of most rural women. Moreover in Kenya most district hospitals serve as referral centres. Therefore, the choice of Kisii District Hospital and Tabaka Mission Hospital in this study could help to identify determinants of maternal health problems that cut across many communities in Kenya, because these two famous hospitals in the study region have catchment areas that extend over several districts in Kenya.

When the study was carried out in 1996, Kisii district had a total of 50 health care facilities. The government operated 62 percent of these facilities and missionaries and private organizations managed the remaining 38 percent. Most of these facilities are concentrated in Kisii Municipality and in Masaba Division. Due to limited resources it was difficult to cover all hospitals and health centres which handle maternal cases. Some of these centres are scattered and are located in remote and inaccessible areas especially during rainy seasons. Since the entire district has only 5 hospitals, 2 were randomly selected. The selected two hospitals for the study were Kisii District Hospital and Tabaka Mission Hospital. The target population was women aged 15 to 49 years who had died due to maternity-related causes from 1991 to 1995. A total of 159 maternal deaths were thus obtained from the two hospitals during the period in question. These maternal mortality statistics were supplemented with in-depth interview data from medical personnel in gynaecology wards, maternity wards and antenatal clinics in order to identify other predisposing factors to maternal mortality. Secondary data were also obtained from population census records, Kenya Demographic and Heath Surveys and District Development Plans covering the period from 1989 to 1996. Other hospital records were also scrutinized.

Techniques of data analysis incorporated mostly essential demographic and statistical approaches techniques such as the application of the sisterhood method in estimating maternal mortality ratios, and application of total fertility rate. The sisterhood method is a demographic technique for indirect estimation of maternal mortality. In fact, the technique is an outgrowth of the sibling survivorship method of estimating early adult mortality (Marckwardt, 1993). The basic questions asked depend on the social and cultural context: either a particular age or the date of marriage can be used to mark the beginning of exposure to childbearing. The questions normally asked are:

i)   How many sisters born to the same mother as the respondent ever reached the age of 15?
ii)   How many of these are still living?
iii)   How many have died? and if, How many of the dead sisters died of maternal causes such as pregnancy, died during childbirth or died during the six weeks after the end of a pregnancy (Marckwardt, 1993).

After collecting such data, information is then tabulated by the standard 5-year age groups of respondents, and the calculation of a life-time risk of maternal mortality ratio is done. This data is then converted into maternal mortality ratio.

The main advantage of this method is that it is cost-effective in data collection. Its major disadvantage is that only an estimate of maternal mortality ratio can be produced at a point of time approximately 12 years prior to the survey, where adults aged 15-49 years have been interviewed. For detailed computation procedure refer to Marckwardt (1993). Other statistical techniques incorporated were regression and factor analysis.

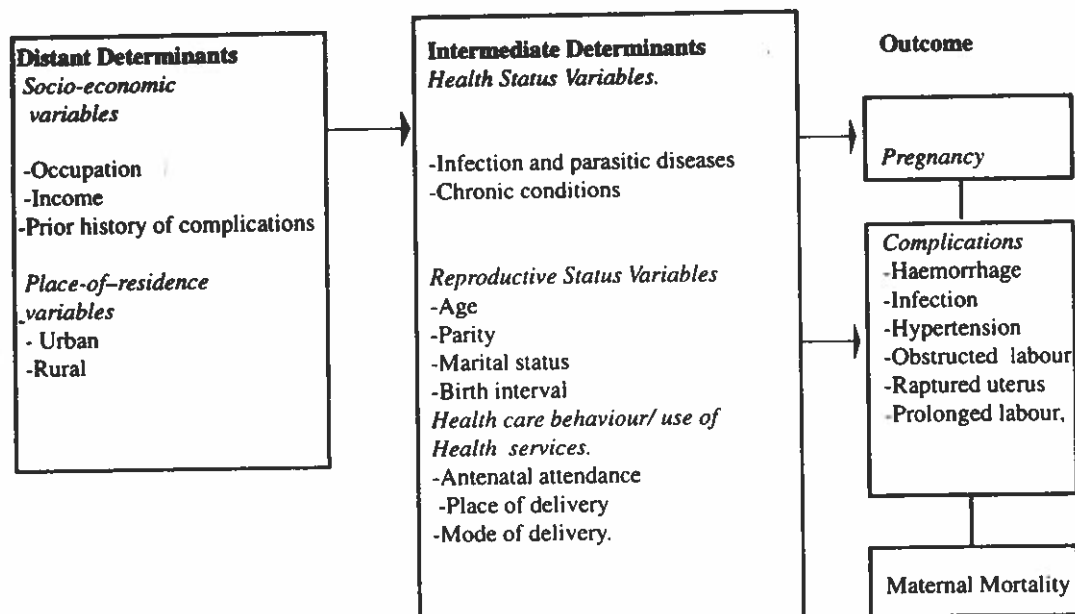### Synopsis of Literature Review and Conceptual Framework

The WHO (1986) lists determinants of maternal health as constituting a complex web of factors such as age of the mother, parity, birth-interval, antenatal care, postnatal care, social environmental factors as determined by social, cultural and economic forces. Smyke (1986) expands on this list by including sex preference especially for male progeny, political factors, customary beliefs and practices, violence and exploitation of women, and nutrition. These views are underscored by GOK/UNICEF (1992) report, which emphasizes the role of violence against women as a significant factor in maternal health status. Other studies, especially that by UN (1991), emphasize inadequate health care facilities as the basic problem. Untimely and sometimes too-late decisions are made to attend to health complications which exacerbate the problem. The issue of poverty, unplanned birth and poor sanitation also contribute to greater maternal health risks (Sadik, 1993). According to Lettenmaier *et al* (1988), chronic diseases and malnutrition increase the risk of maternal death during pregnancy. For example, anaemia often as a result of poor nutrition affects about 40 percent to 60 percent of women in developing countries excluding China. Furthermore, according to Herz and Measham (1987), malaria, STDs and infectious hepatitis are killers of pregnant women unless the disease is diagnosed early and treated. Some of these determinants are now closely examined under the following thematic groups

The Research Model

Several conceptual models have been used to explain differentials in maternal deaths and to prioritize its determinants. For example, Mosley and Chen (1984) proposed an analytical framework for the study of infant mortality. This model has been adopted in many studies because it integrates both social and biological variables through which social, economic and physical environmental factors work at different levels to influence proximate determinants of infant and maternal mortality. The study by McCarthy and Maine (1992) proposes another theoretical model with three groups of determinants designated as distance determinants, intermediate determinants and outcome indices. These factors influence maternal mortality through intermediate variables of health status, reproductive status and health care use. The outcome is pregnancy, development of pregnancy complications and death.

This study has adopted the McCarthy and Maine (1992) model of determinants of maternal mortality. This model, however, was modified slightly to suit the current study. The model is based on the argument that distant factors operate through intermediate variables to influence maternal mortality. The distant factors variables were categorized into two groups namely, socioeconomic factors of occupation and income, and environmental factors of place of residence. Furthermore, intermediate variables were also classified into three groups namely, health status, reproductive status, and health care behaviour and use of health services as depicted in figure 1.

Figure1:
A Conceptual Framework for Determinants of Maternal Mortality.

Distant Determinants	Intermediate Determinants	Outcome
Socio-economic variables -Occupation -Income -Prior history of complications *Place-of-residence variables* - Urban -Rural	*Health Status Variables.* -Infection and parasitic diseases -Chronic conditions *Reproductive Status Variables* -Age -Parity -Marital status -Birth interval *Health care behaviour/ use of Health services.* -Antenatal attendance -Place of delivery -Mode of delivery.	*Pregnancy* *Complications* -Haemorrhage -Infection -Hypertension -Obstructed labour -Raptured uterus -Prolonged labour, Maternal Mortality

These intermediate variables are assumed to influence maternal mortality through events that determine pregnancy outcome. For example, these are factors that determine frequency of pregnancy, complications of pregnancy or childbirth and factors that improve the outcome of pregnancy complications. Finally, these three outcomes are sequential, e.g. one cannot die a maternal death without first being pregnant. Thus pregnancy is a pre-condition for maternal death (Mogere, 1997). Figure 1 gives detailed presentation of this mechanism and shows the direction of association between independent variables and the dependent variable, which is maternal mortality.

Maternal Age

The relationship between age at pregnancy and at childbirth *vis-à-vis* maternal death, is best illustrated by the J-shape, U-shape or reversed J-shape curves ably discussed by Omran, *et al* (1981). Many studies, therefore, correlate high maternal deaths with primi-gravidas (first pregnancy), or first birth during teenage years. Young women, therefore, have greater risks during pregnancy and childbirth particularly when malnourished, be-cause their pelvic growth is not fully developed for normal delivery. The risk of maternal mortality is therefore commonly greater among cohorts aged 15 to 19 years. The risk is also highest in primigravidas. Physical immaturity due to stunted growth subsequently leads to greater risks of pregnancy complications resulting from obstructed labour, cervical trauma, toxemia, raptured uterus and abortion, which may eventually lead to death. Seyum (1989) further reiterates that pregnancy-induced hypertension, cephalopelvic disposition, iron de-ficiency anemia, low birth weight, premature delivery, infection, maternal injury, occur-rence of vesica, cesarean births and postpartum haemorrhage all appear to be accounted for in the lower age groups. This is endorsed by several other studies (Omran *et al*. 1981; Aggarwal and Mati, 1982).

Young women under 20 years of age have a greater risk of dying during pregnancy and birth, just as do women above 40 years of age. In medical circles the concept of the "four too", namely; too early, too late, too many, and too close, is a reality (UN, 1991). Often, first births and births after fourth parity are dangerous (Rinehart, *et al.* 1984; Winikoff and Sullivan, 1987; Harrison, 1988). Despite these positive correlations between demographic variables and maternal mortality, Yunes (1992) argues that age and parity are not risks in themselves, but they stand in for the likelihood of specific risks associated with age and parity. Koening (1985) also argues that obstetric complications involving especially haemorrhage, infection, and prolonged labour tend to increase with age regardless of socio-economic status.

Parity

A scrutiny of studies on maternal mortality reveals that for most communities maternal mortality is lowest at parities 2 and 3 and highest for parities 1 and 4 (Nortman, 1974; Maine, 1981). Nortman further argues that birth-interval, socioeconomic circumstances, cultural factors and beliefs, genetic predispositions, environmental conditions and medical care mediate parity and age. These sentiments are supported by Eckholme, *et al* (1988) who argue that socioeconomic factors are the most important determinant of the level of risks during pregnancy and childbirth and the risks increase as parity exceeds three. Kitagwa (1973) also endorses this.

Impact of Abortion and Unwanted Pregnancy

WHO (1986) noted that abortions account for many maternal deaths in both developed and developing countries. An estimated 10 to 22 million women worldwide either choose or resort to abortion in order to prevent unintended or unwanted births, according to Winikoff and Sullivan (1987). Henshaw (1990) reports that between 100,000 to 200,000 women die annually as a result of attempts to procure abortion where the procedure is illegal or too costly. More precisely, 1 out of 100 women aborts, and 20 to 40 percent of all maternal deaths is attributable to abortion. Since abortion is illegal in some developing countries, women often clandestinely seek such services, which are often based on unsafe procedures. Even where abortion is legalized, poor quality services and lack of qualified personnel put women at risk. In Africa abortion rates are high though poorly documented. Women under 20 years account for 68 percent of abortion complications admitted to referral hospitals (Adetero, 1986; Aggarwal and Mati, 1982). Kwarst *et al* (1986) reported that in Addis Ababa abortion accounted for 54 percent of direct obstetric deaths in a majority of single women, and illicit methods were the leading cause of maternal deaths. In Mauritius, where abortion is illegal, Boerma (1983) noted that abortion accounted for 30 percent of all maternal deaths.

Health Status of Mother

There is a strong positive correlation between the health status of a mother and pregnancy outcome resulting in death. One causative factor to poor maternal health is nutritional deprivation. According to the United Nation's Children Fund Report (1989), girls are more nutritionally deprived than boys. Gender discrimination in food allocation, education and health care is widespread in both Africa and Asia. Another contributor to poor

health is genital mutilation. It contributes to both fistula and other complications during pregnancy. Malaria during pregnancy could also lead to maternal death, miscarriage and anaemia (Najera, *et al* ,1993). Sexually transmitted diseases, including HIV/AIDS now regarded as a major public health hazard in many countries, heavily affect women.

Other Socio-economic and Environmental Conditions.

The situation analysis on women is constituted by several closely inter-linked phenomena such as income, education, occupation, housing and sanitation, and safe drinking water. Although evidence from developed countries associate higher socio-economic status and healthy environmental conditions with relatively low maternal deaths, the results from developing countries indicate mixed findings often influenced by research methodology and research objectives (Orubuloye and Caldwell, 1993). To illustrate this point, Alaudin (1986) found that in rural Bangladesh, women with higher socio-economic status experienced higher mortality. This finding goes against conventional expectations. It should be stressed that poverty that is so prevalent in urban slums, semi-arid environments and heavily populated rural areas, often subjects women to extreme work pressure, because women and children are, for practical purposes, the beasts of burden in such situations. The nexus between poverty, illiteracy, malnutrition and environmental degradation often leads to poor health status for the population in general and for women in particular, because household members depend on women for sustenance.

Health-seeking Behaviour and Quality of Care

There is ample evidence to suggest that initiatives for seeking medical services are associated with availability of quality and timely services. Jocabson (1991) gives a myriad reasons why women are unable to utilize medical services that are perceived to be available and accessible. These reasons include: lack of education and awareness on the importance of prenatal care; lack of freedom to make decisions; problems relating to physical distance from home to clinic; cost of transportation; influence of traditional beliefs, norms and practices; and the perceived quality of medical services. These are real bottlenecks in the way of access to health care services. According to Jocabson the **"four too", with regard to the utilization of services are: too far from home; too few trained birth attendants; too poorly equipped to identify and handle complications; and too deficient in quality care;** these are the vices that must be eliminated, in order to reduce maternal deaths. These sentiments have been supported by a study in Egypt by Younnis *et al* (1993).

Research Findings

Among the major causes of maternal death, both malaria and anaemia accounted for 36.8 percent of all cases. According to the 1979 population census, Kisii district had a population of 568,556 people with an average population growth rate of 3.6 percent annually. By 1993 the population had increased to 932,846 and was projected to increase to 1,037,262 by the end of 1996 (Mogere, 1997). This upward trend in the population growth rate is partly due to high fertility rate, which was about 5.8 in 1993 (KDHS, 1993). This high fertility rate is a function of early marriage and late age at stopping childbearing.

Moreover, contraceptive prevalence rate is also very low and the district has a very low proportion of childless women who in 1979 constituted only 2.1 percent of the total women population in the reproductive cohorts (GOK, 1979). All these indices prove that the proportion of women at risk in childbearing is very high. To illustrate this point, women in the reproductive ages have increased since the1979 census. In 1979 they constituted 40.8 percent of all women in the district, and this proportion has been maintained to-date. The sex ratio as per the 1989 census was 0.93 meaning that for every 100 females there were only 93 males.

Trends in family planning indicate that contraceptive prevalence rate is very low. For instance in 1987 and 1989 only 283 and 285 (respectively) first visits to family planning clinics were recorded. Currently, the acceptance rate is between 60 to 65 percent (Republic of Kenya, 1993). These statistics indicate that the risk of maternal mortality due to unwanted pregnancy and infection from STDs including HIV/AIDS is very high. It should be emphasized that traditional beliefs and practices have marginalized women in the district, because women are discriminated against in food allocation and education. Certain rites and rituals such as female circumcision (clitoridectomy) are still widely performed and this practice has been proved to be harmful to the health of women and girls (NCPD, 1982).

A study conducted by the Maendeleo Ya Wanawake Organization (MYWO) in Kisii, Narok and Meru found that early marriage is a common practice and that 89.6 percent of women aged above 14 years old were circumcised. Our focus group discussions in the district confirmed that female genital mutilation is widely practised and traditional taboos on food affect women more than men. For example, Abagusii women who are pregnant do not eat eggs, and are generally expected to eat less because they believe that eating less leads to the growth of a small foetus and easy labour. In other words, they are oblivious of the fact that malnutrition also leads to anemia that increases risk during pregnancy and childbirth. In addition, many children, particularly boys, are highly valued by families. Polygyny is also another common cultural practice that reinforces the spread of STDs/HIV/AIDS to married women. Finally, focus group discussions confirmed that the decision to seek medical care does not belong to women, and in such situations delays and untimely health care often precipitate pregnancy complications. Kisii men also have a reputation for violence. Rates of murder and rape in the community are relatively high (Raikes, 1992). Male out-migration has also increased the burden of domestic work on women and children, and this causes stress, hypertension and other psychological problems that pose health risk to pregnant women. In conclusion, there is evidence that women have not been economically empowered and depend mostly on men for support and decision-making, even in matters that touch on their reproductive health status.

Background to Maternal Mortality

A woman's personal health status prior to and during pregnancy can have an important influence in her chances of developing and surviving a pregnancy-related complication. The pre-existing health conditions that are exacerbated by pregnancy and delivery account for 25 percent of maternal deaths. The most common diseases affecting pregnancy are malaria, hepatitis, anaemia and malnutrition (Fleming et al. 1968). Communicable diseases, nutritional disorders and the interactions between the two dominate the overall pattern of morbidity in the district. Ecological conditions thus favour prevalence of vector borne diseases. Malaria for example, accounts for 48.6 percent of reported cases of morbid-

ity as portrayed in Table 1. Anaemia and malaria account for 36.8 percent of all maternal deaths. Medical officers reported that during epidemic seasons, often in July, there is always a temporary increase in abortion, particularly spontaneous abortion. The majority of infections are caused by *Plasmodium falciparum*, which is responsible for cerebral malaria in severe cases. Malaria is thus one of the major indirect obstetric causes of maternal deaths accounting for 19.7 percent of all indirect obstetric causes of maternal deaths. Respiratory tract ailments are the second most significant   cause of morbidity in the district.

Tuberculosis (TB) and pneumonia accounted for 7.9 percent of indirect obstetric causes. Anaemia is a common nutritional disorder in mothers (Baker, 1978). Anaemia is therefore another significant indirect cause of maternal mortality, accounting for 16.6 percent of indirect obstetric causes. Nutritional anaemia makes women susceptible to disease, exacerbates fatigue, increases the risk of haemorrhage, infection and cardiac failure, and aggravates placental insufficiency and premature labour. Venereal diseases also influence maternal mortality. The STDs most common in Kenya women are gonorrhea, syphilis, chlamydia, and more recently, HIV/AIDS. Most of these infections may remain undiagnosed for a long time in females who later develop infertility, ectopic pregnancy, pelvic inflammatory disease, sepsis,which lead to death if not treated. Because of cultural stigma attached to most of these infections, most women tend to suffer in silence for long, especially as some live in rural areas where routine screening in antenatal clinics is not frequently done. A majority, therefore, seek treatment only when the disease is well advanced and is presenting a real hazard, especially in pregnancy. Widespread illiteracy and poor health-seeking behaviour that emphasizes traditional care at the expense of modern treatment, compound the situation. HIV/AIDS is a real health hazard in the district. The spread of HIV infection has accelerated during the last five years. In 1987 only 4 confirmed cases were reported. The number increased to 648 in 1992 and 2008 in 1994. By the end of 1999 there were over 3131 confirmed cases according to the Kenya National Aids Control Programme Secretariat. These reproductive health problems indicate that women are more exposed because of their role in reproduction and lack of empowerment in decision-making that affect their sexuality. Illiteracy and poverty aggravate their marginalization.

Reproductive Mortality

The trend of maternal death has been increasing since 1991, despite maternal, child and health (MCH) services being provided. The study identified 159 maternal deaths in the two hospitals during the study period that covered 1991 to 1995. The study estimated maternal mortality ratio to be rising as follows: in 1991 it was 397.5 deaths per 100,000 live births, and this increased to 663.8 deaths per 100,000 live births in 1995. The risk of maternal death in the district is therefore high, due to the high incidence of malaria, lack of qualified personnel, and insufficient equipment in health institutions. The distribution of maternal deaths by cohorts indicates that women in their teens, especially those aged between 15 and 20 years, generally had the highest risk of death, because 25.3 to 29.3 percent of such women experienced obstetric deaths. Furthermore, the majority of the deaths (54.6 percent) occurred to women aged 15 to 24 years. This finding is consistent with that of Njeri (1990). It was also observed that advanced ages above 40 years, also experienced high death rates. Regression and correlation analysis indicated that there exist a linear and weak negative relationship between maternal death and age. The correlation analysis gave correlation coefficient (R-square) of –0.32576 and coefficient of determination (R-square) of 0.10612. This is equivalent to 10 percent of the proportion explained by age,while hold-

ing other factors constant. When the test of significance of the correlation coefficient was applied at 0.005 significance level it was concluded that there is no significant

Table 2.
Test of hypotheses.

Variables	Correlation coefficient	Coefficient of determination	Test of significance at 0.005 and comments on hypothesis.
Age	-0.32576	0.10612	Rejected
Parity	+0.98712	0.97440	Accepted
Birth-interval	-0.44997	0.20247	Accepted

relationship between age and maternal mortality. This is plausible because, with the application of modern medical technology, risks related to pregnancy at an early age could be minimized. This was found to be the case among women who were educated and those living close to health facilities with modern medical equipment. Focus group discussions with health care providers revealed that maternal care during pregnancy associated with good antenatal services and good nutrition could also reduce the risk of maternal death.

Medical Officers however reported that younger women suffered mostly because of immaturity of their pelves (cephalopelvic disproportion), iron deficiency and pregnancy-induced hypertension. Young girls also tended to resort more to illegal abortion because of the social stigma attached to having a child out of wedlock. On the other hand older women suffered due to their accumulation of various health problems during their reproductive life. Problems such as hypertension and diabetes were common obstetric complications during pregnancy and childbirth.

The hospital data further revealed that women having their first pregnancy (primigravidas) who died contributed a greater proportion to maternal deaths than those who had two and three births (parities). Medical Officers reported that primigravidas cases also suffer from immaturity of their pelves and lack of prenatal care. Correlation analysis indicated a correlation coefficient of –0.98712 and a coefficient of determination of 0.97440 (97%). This depicts that a strong relationship exists between maternal deaths and parity. When the hypothesis was tested at 0.005 level of significance using the F-ratio test method, the hypothesis that parity significantly influences maternal death was demonstrated. Further analysis on birth-interval indicates that primigravidae had the highest percentage contribution of maternal deaths, being 40.7 percent, and this was followed by those with a birth-interval of 12 months accounting for 26 percent, while those with a birth-interval of 18 to 24 months accounted for 22.0 to 4.0 percent (respectively). This suggests that closely-spaced births significantly impact on the chances of a mother's survival. When the regression and correlation analyses were computed, a moderately negative relationship giving a correlation of 0.20247 was found. The study therefore shows that the chance of maternal death occurring increased with reduced birth-interval.

Finally the analysis of marital status revealed that a significant increase of maternal deaths affected more currently married women than those divorced and separated. Divorced women accounted for 2.6% of total maternal deaths recorded in hospitals, while

those separated accounted for only 4%. The rest of maternal deaths were experienced by those currently married. This suggests that maternal mortality is experienced mostly in situations where fertility is also high and regularly experienced, as in uninterrupted marital unions. The other analysis focusing on occupation and place of residence yielded insignificant results.

Summary and Conclusion

Information collected through interview blended well with both hospital -based data and other secondary data. The study revealed that maternal mortality in Kisii is high and calls for tremendous improvements in primary health care services. This alone cannot reduce maternal deaths without co-operation from the women themselves and men who still exercise authority through household decision-making process.

The finding that, direct and indirect obstetrics are among the most important causes of maternal mortality also underscores the need for closer monitoring of the complications. In order to stem the problem, this research recommends that female education be intensified at all levels. In addition, medical care should emphasize preventive rather than curative services. This demands a vigorous programme for the provision of modern obstetrics and gynaecology facilities, and the training of health personnel in using such facilities besides general improvement of health care infrastructure, as well as the enhancement of accessibility to such services. Lastly, there is a great need to improve storage and collection of health-care statistics; this initiative should include the training of TBAs to keep vital records.

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