

DEMOGRAPHIC, SOCIO-ECONOMIC AND ENVIRONMENTAL
FACTORS INFLUENCING MATERNAL MORBIDITY AND
MORTALITY IN NAIROBI:

1977 - 1986.

FAST AFRICANA COLLECTION

BY

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A Thesis Submitted in Part fulfillment of the
Requirements for the Degree of Master of Arts
(Population Studies) at PSRI University of Nairobi.

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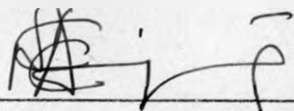


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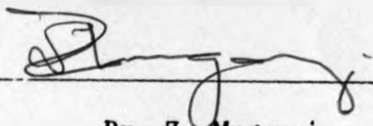
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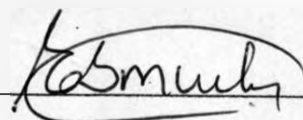


Colette Aloo-Obunga

This thesis has been submitted for examination with our approval as University Supervisors.



Dr. Z. Muganzi



Dr. E. K. Muchunga

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DEDICATION

To my mum, Rosa, and to all Kenyan mothers.

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gently ask me every morning (while they themselves were preparing for school), "Mama are you not going to school today?" Their encouragement and faith in me have always been my greatest source of inspiration and courage.

C. Aloo-Obunga

ABSTRACT

In Kenya, women aged 15-49 years make up almost one-quarter of the total population. This is a significant figure and calls for serious consideration of the women's reproductive health problems as it is now recognized by physicians and public health workers that childbearing brings an added health risk to women during their reproductive career.

Apart from direct obstetric complications that affect women of reproductive ages, it has also now been recognized that such complications are directly or indirectly related to demographic, socio-economic and environmental factors.

This study proposes to establish this relationship and to determine major causes of maternal morbidity and mortality for Nairobi women in their childbearing ages.

The study uses descriptive statistics and makes extensive use of percentages, rates, ratios and graphs to demonstrate some of the relationships between maternal mortality and demographic variables. By this methodology it is shown that maternal mortality rises with age and parity of mother.

The study has also found the major causes of maternal morbidity and mortality in Nairobi to be puerperal sepsis (infection), postpartum haemorrhage, toxæmia and eclampsia and anaemia. At the KNH, Septic

abortion is also shown to be a major cause of maternal morbidity and mortality and involves mostly young, unmarried, unemployed, nulliparous and primiparous women.

Because of the high correlation between maternal mortality and demographic, socio-economic and environmental factors, the study concludes that there is need to make women aware of the risks involved in childbearing and the importance of ante-natal care and hospital delivery. Birth attendants, health workers and policy makers should also be educated to understand the risks pregnant women face and strive to minimize such risks. Such awareness would help in the early detection of the risk groups and lead to prevention of unnecessary maternal illnesses and deaths.

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CHAPTER 1

GENERAL INTRODUCTION:

1.1. Introduction:

Childbirth is an important event in a woman's life as it marks the fulfilment of her womanhood, both physically and emotionally. However, without proper management the process can be risky to the woman's health since her reproductive role exposes her to many health problems such as those associated with malnutrition, infection and diseases brought about by inadequate pre-natal care (Ngoka, 1987). In addition, some of such pregnancy-related ailments can be attributed to the parities and ages at which women bear children.

Maternal mortality seems to strike at the height of women's reproductivity and family responsibility, thereby leading to breakages and disorientation of families and to reduction of children's survival chances (Family Health International, 1987). An international conference on Safe Motherhood - sponsored by the World Health Organization and the United Nations Fund for Population Activities - was organized and held in Nairobi in February 1987 in an effort to focus world attention on the problem and to discuss ways to reduce maternal mortality. Morbidity and mortality among women of reproductive

age is thus increasingly becoming a problem that can no longer be ignored.

For along time in Kenya, maternal deaths have been perceived to be a rare occurrence, at least when compared with infant deaths. Thus more attention has been focused on the aspect of child health through the Maternal and Child Health (MCH) programme. Any maternal death has been more of a family tragedy than anything else. It is not even in Kenya's official statistics. Women aged 15 - 49 years make up 23% of the total Kenyan population (Kenya Census 1979). Their problems, as far as reproductive health is concerned, therefore, warrant serious government attention. This will be in line with the government's aim of health for all by the year 2000 (Alma Ata, 1978).

Maternal morbidity and mortality has been a neglected area in Kenya. In censuses and surveys, no questions about it are asked. There has not been any community-based studies on the phenomenon, either for selected communities, provinces or regions in the country and thus its level and magnitude is not known. The only studies that have been done on the subject were at the Kenyatta National Hospital (Makokha, 1980) and at the largest maternity hospital in the country - the Pumwani Maternity Hospital (Ngoka, 1987), both of which are in Nairobi.

The study at the Kenyatta National Hospital (KNH) found a ratio of 2.0 maternal deaths per 1000 livebirths. The one at Pumwani

Maternity Hospital (PMH) found 0.7 such deaths per 1000 deliveries. Even though these were only hospital rates, they were found to be much higher than those found for whole countries of the developed world. For example, in Britain maternal mortality ratio was 0.5 per 1000 liverbirths in 1952 and 0.1 in 1973 (Malone 1980). Yet in Kenya the figures for city hospitals are still higher than the British rates of the 1950's. At the KNH, the rates for 1977, 1978, 1979 and 1980 were found to be 3.7, 3.0, 2.6 and 3.3, maternal deaths per 1000 deliveries respectively. It is important to determine factors responsible for such high rates.

This study was focused on maternal morbidity and mortality in Nairobi using the KNH and PMH records for the years 1977 - 1986. During this period, 174 maternal deaths were identified at the two hospitals. On the average, the ratios for the KNH and PMH were found to be 2.3 and 0.5 maternal deaths per 1000 deliveries. Apart from finding out the major immediate obstetric causes of maternal illnesses and deaths, the study was designed to also determine some of the underlying demographic, socio-economic and environmental factors associated with these illnesses and deaths. It was hoped that such information might help explain the high rates of maternal morbidity and mortality in Nairobi. The hospitals' maternity data were assumed to be representative of the Nairobi reproductive female population as 81% of deliveries occurred at the hospitals. The two hospitals also handled 85% of the city's maternal deaths on the average (Table 2.1.1. in Chapter 2).

1.2. Statement of the Problem

In Kenya marriage is almost universal. Women marry early (17 years) and their reproductive career follows almost immediately (C.B.S., Kenya, 1979). These factors have been partly responsible for the country's high total fertility rate (TFR) of 8.1 children per woman. The implication is that more women are frequently exposed - for longer periods - to the morbidity and mortality risks associated with reproduction. The frequency and period of exposure and the level of risks need to be reduced. This can be done only through knowledge of factors which affect women's reproductive health.

There are as yet no maternal morbidity and mortality rates - based on either census or surveys - for Kenya or any of its regions including Nairobi. Available data on this phenomenon for Nairobi has been based on prospective studies done by Nairobi physicians at the KNH and PMH. But the studies have been mainly concerned with the direct obstetric complications which cause maternal illnesses and deaths. They do not relate the mothers' morbidities and mortalities to other non-medical factors like age, parity, income statuses and residential conditions of the women concerned. Such non-medical factors that influence maternal morbidities and mortalities need to be looked into.

Abortion has now been recognized as a major cause of morbidity and mortality among Kenyan women of reproductive ages. At the KNH, abortion constitutes a large proportion of all emergency admissions to the gynaecological ward (Aggarwal and Mati 1982). Those affected are often young unmarried students without children who resort to abortion because contraceptives are not easily available to them and because pregnancy also leads to expulsion from schools. Abortion is also reported to be prevalent among young unmarried, unemployed school leavers who are socially, economically and psychologically unprepared to take care of children single-handedly.

Physicians and public health workers now appreciate that the obstetric complications that affect women of reproductive ages are directly or indirectly related to demographic, socio-economic and environmental factors. This study hopes to establish this relationship for Nairobi mothers either during or after pregnancy. Factors such as age, parity and marital status of mother, occupation and residence and region of origin are considered. The study also hopes to establish levels, patterns and trends of maternal mortalities and morbidities in Nairobi over the ten-year period. The problem of abortion and its level and trend at the KNH is also studied.

1.3. Problem Justification and Objectives

Clean water, sanitary conditions and nutritious food have long been recognized as pre-requisites of good health (Eckholm 1977). In recent decades, medical studies have also revealed that uncontrolled fertility directly threatens the health of mothers and infants and may undermine the health of other family members (Koenig et.al. 1988). It has now been recognized that beyond a certain number practice does not make perfect in childbearing but rather entails additional dangers. Women who bear children too early (below 20 years) or too late (over 35 years) in life; women who bear too many children (over 4) and women who bear children at short intervals have higher risks of morbidity and mortality.

Most Kenyan women are in the above categories. This places them at high morbidity and mortality risks due to various complications that are otherwise avoidable. This implies that precious medical resources are utilized which could otherwise be diverted to other medical needs of Kenyans.

Medical technologies for the control of maternal morbidity and mortality need to be focused both on individual, and aggregate levels. Thus to control maternity - related illnesses and deaths, skilled medical attendants ought to be available for each patient. The women must also be educated on the need to

promptly seek such medical help and care. The control of maternal morbidity and mortality is thus a matter of individual response and requires the full participation of the target group - i.e. women. This study is therefore important for assessing the needs of women and the availability, quality and quantity of maternal health services offered. It is also necessary in assessing the maternal risks involved if women do not seek/utilize the health services available to them. This in turn could assist in providing information for educating women about the importance of maternal health care.

It is recognized that in Kenya marriage is immediately followed by two or more decades of uninterrupted pregnancies, deliveries and lactation from which the women never seem to have a chance to recuperate. Furthermore, during their reproductive career the women are also responsible for much of the agricultural work and for other day-to-day tasks of running their homes. Some of the Kenyan women are also involved in the formal employment sector besides running their homes and caring for their families. High morbidity among mothers would thus inevitably affect their performance both at family and community levels.

Abortion has also been recognized as one of the major threats to reproductive health especially in urban areas. The seriousness of abortion in Nairobi is demonstrated, for example, by a study done by Mati which found that the incidence of abortion at the KNH was significantly high with 60% of the acute gynaecological beds being occupied by abortion patients. Thus if the problem

is not addressed, the result would be an increasing hazard to maternal health and a heavy burden on the already hard-pressed health services.

Nairobi was selected as the study area for several reasons. It has several delivery/maternity centres (21) to cater for women of reproductive ages. Over 50% of Nairobi births occur in these maternity hospitals and units. Nairobi was therefore chosen due to easy availability of data from the hospital records - which were to form the main data source for this study. The same cannot be said for provincial or district hospitals where approximately 20% of women they serve deliver or attend ante-natal clinics. The city's maternity hospital records were thus assumed to be more reliable.

Nairobi was also expected to provide any necessary comparison as far as the study variables affecting maternal morbidity and mortality were concerned. It is a place with varied peoples in terms of demographic characteristics, residential and income statuses and ethnicity. By the end of the study it was hoped that an insight into the reproductive problems and needs of urban women would be achieved.

The ten year period was selected for the study since it could give an insight into the trends, patterns and levels of maternal morbidity and mortality in Nairobi. The KNH and PMH were selected as the sources of data because they were known to

deliver 81% of Nairobi mothers. Data from the two hospitals were thus considered representative of the city situation. However, certain assumptions were made before the decision to use the two hospitals' records was made. Firstly, the KNH being a national referral hospital receives maternity patients from other provinces and districts of the country. These are often very critical cases and are therefore usually few compared to cases from within the City itself. As such it was assumed that such referred cases would not affect the general pattern of maternal morbidity and mortality at the hospital.

Secondly, all maternity patients admitted at the PMH were taken to be Nairobi residents as this hospital does not (and is not expected to) admit patients from outside Nairobi. For purposes of this study, a Nairobi mother shall include even the expectant mother who comes from other provinces or districts to stay with her husband/relative in Nairobi to utilize the maternity services of either the KNH or PMH.

From the foregoing, the main objectives of this study were:

1. To establish patterns, levels and trends of maternal morbidity and mortality by major causes at the KNH and PMH.
2. To establish the relationship between age of mother and maternal morbidity and mortality.

3. To establish the relationship between parity of mother and maternal morbidity and mortality.
4. To establish the relationship between occupational and residential statuses of mother and certain maternal morbidity and mortality causes (anaemia and Puerperal sepsis).
5. To establish the relationship between marital status of mother and abortion.
6. To establish the relationship between occupational status and abortion.
7. To establish the relationship between parity and abortion.
8. To establish the relationship between age and abortion.
9. To determine the relationship between ante-natal care and maternal mortality.

1.4. Background Information on the Study Area

Nairobi, the capital city of Kenya had an area of 684 square kilometres which accounted for 0.1% of the total area of Kenya as at 1979. It had a reported population of 827,775 out of whom

189,988 (23%) were females aged 15-49 during the 1979 census. The city's population accounted for 5.4% of the total Kenyan population and 35.9% of the total urban population in the country. Its population density was 1,210 persons per square kilometre. It was therefore considered as one of the main regions of population concentrations in the country (Kenya Pop. Census, 1979). The estimated crude birth rate (CBR) for Nairobi is 37.9 per 1000 (Osiero, 1986) with a total fertility rate (TFR) of 5.3 children per woman. The crude death rate (CDR) as at 1979 was approximately 7.4 per 1000. The average annual population growth rate from 1969 - 1979 (the intercensal period) was 6.2%.

Maternal mortality rates for Nairobi City have never been documented except for PMH which were reported to be 0.7 per 1000 deliveries (Nairobi City Council, MOH report 1967) and confirmed by Ngoka for years 1975 - 1984. At the KNH, Makokha (1980) reported an annual maternal mortality rate of 2.0 per 1000 deliveries between 1972-1977.

Even though Nairobi has over 20 delivery hospitals and homes, the maternal mortalities obtained at the KNH and PMH were considered to be more significant as it was found that 85% of such deaths occurred at the two hospitals. The PMH alone handled the largest number of mothers and deliveries in the country, with an average of 25,000 deliveries annually, giving a weekly average of approximately 500 births. The KNH handled 5-6,000 deliveries annually, with a weekly average of 100

deliveries. As a result, the two hospitals were found to handle 81% of all Nairobi births and 85% of all Nairobi maternal deaths.

1.5. Literature Review

Today at the global level, new attention is focusing on the health problems of women though most studies on the medical impact of childbearing patterns have been carried out in the more developed countries of North America and Europe. However, demographers, public health workers and physicians have along-standing interest in maternal morbidity and mortality as an indicator of the success of maternal health programmes and as an explanation of sex differentials in mortality (e.g. Buchanan, 1975; Burns, 1942; El-Badry, 1969; Gladstone, 1937).

It is also now well documented that the factors of maternal age, parity and birth intervals have a significant impact on maternal health (Buchanan, 1975; Yerushalmy, 1970). Hence to achieve an irreducible minimum of maternal mortality, the frequency and timing of child-bearing must be regulated (Omran 1971b). Some demographers also acknowledge the fact that the influence of maternal age and parity are also mediated by economic circumstances, cultural practices and beliefs, genetic pre-dispositions, health and nutritional status, environmental conditions and medical care; but, that even under the best conditions, differential risks by age and parity persists (Nortman, 1974).

Eckholm and Newland (1977) observed that "since the under nutrition and lack of sanitation prevalent in developing countries multiply hazards of any pregnancy, the findings of the studies in the developed countries almost certainly under-rate the dangers faced by the poor from unlimited fertility" (pg J - 253). They also further reiterate that the absolute extent of risks to hazards of pregnancy is primarily determined by social and environmental conditions. For example, a 42 year-old Swedish woman faces a far lower hazard from giving birth than does a 24 year-old woman in rural Pakistan, and, childbirth among white women in the United States are only one third as frequent as those among non-white American women. But generally, within every society and at every socio-economic level, the odds that the mother or her child will succumb to death or disease increase when the mother gives birth too early or too late in her life (Chen et-al, 1974; Nortman, 1974; Omran, 1971; Wray, 1971).

Regarding the relationship between age and maternal mortality, Nortman (1974) actually analysed parental age as a factor in pregnancy outcome for specified causes by race in the United States. She found that obstetrical complications - i.e. toxemia, haemorrhage and sepsis (infection) rose with age among both whites and blacks.

Berry (1977) also did a study on the influences of age and parity on maternal mortality in the U.S. between 1919 - 1969.

She found that these two demographic variables had some influence on maternal mortality rates even during an era of rapid overall decline and thus concluded that the frequency and timing of births must be regulated if maternal mortality is to be brought to an irreducible minimum. She further observes that the age and parity distributions in the U.S. for the same period of study (1919 - 1969) were more favourable to low maternal mortality than the childbearing patterns prevailing in many less developed countries today. If these more favourable distributions of births influenced maternal mortality rates then, she concluded, the distributions with broader age ranges and more high parity births certainly contribute to the high rates of maternal mortality now prevailing in parts of Africa, Asia and Latin America.

Such documentary evidence on the relationship between maternal age and pregnancy outcome establishes that risk of mortality or morbidity to mother or child is minimal when the mother is neither too young nor too old and when the child is of moderate birth order, not exceeding say, 4. Women who become pregnant before or after their prime reproductive years therefore take on added health risks for both themselves and their infants. United States data, from 1974, show that the incidence of deaths associated with pregnancy and childbirth among American Women climbs steeply after mothers pass age 30 - rising from a low of 10 maternal deaths per 100,000 births among women in their early twenties to 86 deaths per 100,000 births among women in their

early forties, and then to 234 deaths per 100,000 births among women over 45 years.

In the developing countries, maternal risk also climbs dramatically with age. Perkin (1969) studying 18,000 deliveries at women's hospital in Bangkok, Thailand in 1964 found the expected J - shaped gradient by age in complicated deliveries from 13.3% among women aged 15 - 19 dropping to 11.2% at ages 20 - 24 and rising to 23.4% and 21.3% among women aged 40 - 44 and 45+ respectively. Also in Thailand in 1971, maternal death rates rose from 154 per 100,000 births among women in their twenties to a grim 474 per 100,000 births among women in their forties.

Llwellyn-Jones (1965) reported on 10,000 deliveries at the General Hospital at Kuala Lumpur, Malaysia, during the 5 - year period of 1958 - 1962. An interesting feature of this study is that the hospital had two sections in the obstetrics and gynaecology department; one for high, the other for low social class. For both socio-economic groups, toxemia of pregnancy and prolonged labour (defined as effective contractions for more than 24 hours) increased markedly with increasing maternal age.

At Matlab Thana, Bangladesh, between 1968 - 1970, maternal death rates rose from 380 to 810 per 100,000 deliveries for women in their twenties and those in their forties respectively. Another study for the period 1976-1985 found a U-shaped curve with death rates reaching 743 per 100,000 liverbirths for age group 15 - 19

which dropped to 426 per 100,000 deliveries for women in their 20's and then rose again to 791 for women in the forties (Koenig et.al., 1988).

As far as parity of mother is concerned, studies indicate that beyond a certain point, practice does not make perfect in childbearing; quite the contrary it entails escalating dangers. But as Eckholm observes, the actual level of risk involved in bearing large numbers of children depends on the mother's social milieu (pg. J - 255). But, generally, one pattern seems to prevail in every country and in every social class: risks increase as the number of children passes 3 or 4. Women with many children are particularly susceptible to the complications and diseases associated with pregnancy. Some basic biological laws appear to be involved. Socio-economic factors, however, are the overwhelming determinants of the level of risk posed by high fertility. By far, the strongest negative health impact of large families appears among the World's lowest income groups, and many women in Africa, Asia and Latin America bear more than 5 children each.

Parity of mother and nutrition are shown to be correlated in a number of literature (e.g. Arroyave, 1975; Rush, 1975; Gopalan 1972). A woman is in greatest danger if she is poorly fed to begin with, for pregnancy and lactation both exert a heavy nutritional cost that poor women are seldom able to offset by increasing the quantity and quality of the food they eat. When pregnant, a moderately active, well-fed woman needs roughly 300

calories per day more than she would otherwise need. When nursing, she needs an even larger dietary supplement. If she does not get the supplement, her body draws upon its own reserves. Both mother and infant suffer as a result.

In the African region, there is still inadequate research on reproductive health, making data on maternal mortality and morbidity very scanty. Yet, as Mati (1974) observes, there is plenty of data lying in the Ministries of Health, hospitals and schools of medicine in the form of annual reports, maternity file records and student dissertations.

Nevertheless, during the last decade (1970's) Africa has begun to know more about problems related to reproductive health as some of these problems have taken a serious turn, which threatens Africa's future (Mtimavalye, 1982). Reproductive health-care among women in Africa is increasingly becoming a matter of concern to demographers, public health officials and physicians. In most parts of Africa over 20% of all females are in the reproductive age group 15 - 49 years. For example, in Tanzania, 21% of all females are aged between 15 - 44 years (Mtimavalye, 1982). Kenya has about the same proportion (23%).

As had been mentioned in the introduction, some studies have been done on maternal morbidity and mortality in Africa. But these have been done only for specific hospitals and cannot be considered representative for whole countries or communities in which the hospitals are situated. Such data are even more

limiting when one takes into account the fact that a very small proportion of African women give birth in hospitals. Such hospital-based studies include the works of Bullough (in the Central Region of Malawi in 1977); Okiosor (at Lagos University Teaching Hospital - Nigeria between 1970 - 1974); Caffetry (at Ahmadu Bello University - Nigeria between 1976 - 1977), Makokha (at Kenyatta National Hospital between 1972 - 1977), and Mtimavalye (at Muhimbili Medical Centre - Tanzania between 1974 - 1977). The maternal death rates they came up with varied between 10 times and 40 times those of Finland in 1973 which is estimated at about only 0.11 per 1000 deliveries (Mtimavalye, 1982).

However, Mtimavalye acknowledges the fact that most of the numbers of maternal deaths are basically preventable wholly or to a large extent. Such preventable causes include post-partum haemorrhage (the leading maternal killer in all the said studies), ruptured uterus, puerperal sepsis, obstructed labour, anaemia of pregnancy and postabortal sepsis. This is where the knowledge of how demographic, socio-economic and environmental forces influence those maternal deaths and illnesses would help in their prevention.

In East Africa, the picture is much the same; there are no national surveys to ascertain national levels and patterns of maternal mortality and morbidity. However, the works of Mtimavalye and Armon (Tanzania), Mati, Makokha, Ngoka, Aggarwal

(Kenya) and Ndugwa (Uganda) have tried to give an insight into the problem even though only at institutional levels. All their studies single out inadequate health care facilities as the basic problem. Being physicians, they are also more concerned with the immediate medical complications that lead to high maternal mortalities and morbidities in the region.

In Kenya, Malone (1980) observes that it would be reasonable to assume that the quality of antenatal care delivered in hospitals and health centres in Kenya does influence not only maternal but also perinatal morbidity and mortality. Makokha (1980) in his study of maternal deaths at the Kenyatta National Hospital between 1972 - 1977, analysed his findings in relation to actual (medical) cause, annual distribution, age, parity, marital status, antenatal care, complications of pregnancy, labour and the puerperium and their management mode and place of delivery (for the referred cases) and type of attendant (doctor, midwife, nurse, clinical officer or traditional (again for referred cases)). Makokha's findings concerning the relationship between age and parity of mother and the risk of dying rather nullifies the hypothesis that the risk of maternal deaths increases with age and parity. He analysed 99 deaths. More than 50 of those dead mothers were aged between 15 - 25 years half of them being 15 - 20 years old and 27% being 26 - 35 years of age. Only 3% were aged 36 and over years, the maximum age recorded being 40 years. As for parity, he found that 57% of the 99 deaths were mothers of low parity with between 1 - 3 children. Nearly half

of them were young women pregnant for the first time. But he acknowledges that the majority of deaths were related to abortions especially for those found to be single (39.4%) among the 99 cases. Thus he used the other said factors to explain the causes of such deaths. Makokha's work, therefore, went along way in recognizing some of the non-medical factors that operate on women to cause maternal mortalities.

Ngoka (1987) also did a retrospective study of maternal deaths at Pumwani Maternity Hospital for the period 1975 - 1984 and found an incidence of maternal mortality of 67.2 per 100,000 deliveries/births. Of the 223,111 births during the 10 year period at the hospital, there were 150 maternal deaths. He analysed these deaths in relation to age, parity, gestation at time of death and records of ante-natal care. From his analysis, he found that high maternal age is a very important predisposing factor in maternal mortality and that deaths occurred mostly among primigravida and grandmultiparas. Like Makokha, he also acknowledges the contribution of social, personal, medical, health care and administrative factors to increased maternal mortalities in Kenyan hospitals.

On abortion, the works of Ngoka, Muraya, Aggarwal and Mati (1980, 1982, 1985) deserve to be mentioned. At the Kenyatta National Hospital abortions contribute alot to maternal health problems. It was found that teenage pregnancies accounted for 11.1% of the total pregnancies (Ngoka & Mati, 1980). In another

study at the same institution, 28% of all abortions were found to occur in teenage mothers and 43% of all procured abortions were in teenagers (Aggarwal and Mati, 1982). These studies therefore recognize that teenage pregnancy has become a common and important obstetric problem not only in Nairobi but for the whole country as it threatens the health of both mother and child.

Aggarwal and Mati (1982) note the fact that maternal mortality is high in abortion cases. Their retrospective study of abortion cases at the Kenyatta National Hospital from January to June 1978 found 3 abortion deaths per 1000 abortion admissions.

Apart from immediate complications and risks, physicians also warn of the fact that abortion patients later suffer from pelvic inflammatory disease leading to tubal leakage, secondary infertility ectopic pregnancy, miscarriage and premature deliveries due to lacerated cervix. All these later give rise to high rates of maternal and perinatal deaths and illnesses. Most literature on the problem of abortion therefore recommend countrywide health education programmes with particular emphasis on sex education and family planning; making population aware of contraceptive measures and making these services easily available. Such measures could go along way in reducing not only morbidity and mortality from septic induced abortion, but, also the general maternal mortality and morbidity levels among women of reproductive ages.

1.6. Theoretical Framework

A framework for the analysis of maternal mortality and morbidity must take into account several factors that influence the general level of mortality and morbidity in a community or state. From the Literature Review, these can be broadly categorized as:

- (a) Demographic
- (b) Socio-economic
- (c) Environmental
- (d) Medical and Health Care
- (e) Socio-cultural and Personal
- (f) Administrative

1.6.1. Demographic Factors

These are factors that affect the health of the mother to the extent of exposing her to risk of ill-health or death. They include age, parity, marital status and birth intervals. These factors are now known to have a significant impact on maternal health.

Even though the reproductive lifespan for women ranges from ages 15 - 49, ages 20 - 35 are considered to be the safest ages to have children. But, the absolute extent of risks to hazards

of pregnancy is also determined by the social and environmental conditions of the women involved. However, it is known that certain complications of child birth rise with age while others are experienced when a would-be mother is too young - i.e below 20 years of age. in this study, it shall therefore be considered risk of morbidity or mortality to mother is minimal when the mother is neither too young or too old -i.e between ages 20 - 29.

Parity and birth intervals are also factors that affect maternal health in the sense that they involve frequency and timing of births. Unregulated frequency and timing of births adds risks to maternal health. Risk of dying increases as the number of children passes 4 and also when they are closely spaced. This study considered only age and parity of mothers in relation to maternal morbidity and mortality. Birth intervals was not considered as this information was not always available in the studied files.

Marital status determines the socio-psychological state of the mother-to-be and this in turn determines her health status during pregnancy. This variable was considered mostly in relation to abortion.

1.6.2 Socio-economic Factors

These factors may be analysed at the macro and micro levels. At the macro level, the economic level of the whole country must be considered.

For example, it becomes appropriate to consider

whether the country has the resources to have a well-spread and easily accessible network of ante-natal and post-natal clinics, maternity homes, trained midwives and health care centres. The macro level variable also affects the general educational level of the country which in turn affects the level of understanding of mothers and would-be-mothers, and their ability to make use of the said health and/or maternity services and facilities to their advantage.

In micro level terms the economic level of the household or family can greatly influence the health of the mother. It can determine whether a pregnant woman has sufficient adequate food during and after pregnancy. It would also determine the availability of easily accessible transport for emergencies. Where public health care systems are weak, the family's economic situation would also determine whether it would afford private health care services from private medical practitioners or even private hospitals.

Economic well-being of a family also determines its level of hygienic and general eating habits. The Socio-economic variables considered in this study were occupational status of the women or their husbands and residences of the women.

1.6.3. Environmental Factors

Many complications during pregnancy emanate from environmentally determined diseases. Some women are more exposed to mortality

and morbidity risks during pregnancy because they come from malaria zones or because they have inherited health problems associated with certain areas. An example of the latter situation is the sickle cell anaemia.

1.6.4. Medical and Health Care Factors

Such factors include late referrals of patients to hospitals for specialist attention by other doctors and institutions. There is also the factor of poor management of patients e.g. due to overcrowding or lack of senior review of patients. At times, laboratories ignore urgent cases to facilitate immediate medical management of patients.

1.6.5. Socio-cultural and Personal Factors

Certain social considerations lead to adverse effects on pregnancy outcome. This applies e.g. when the question of marital status is considered. High pregnancies among unmarried women tend to go with high chances of abortion which leads to deaths and illnesses mainly from postabortal sepsis and perforated uterus.

In such situations pre-marital pregnancies must be considered as a serious social problem in the community in which they occur as they affect mostly school girls or young school leavers who are still unemployed. This in turn affects the development needs and levels of the community.

Some husbands push their wives too hard due to the desire for more children or due to the desire for a particular sex. This is done regardless of whether the wives are multiparas and/or have complications like renal or heart diseases. Such husbands reject sterilization of wives even when such an operation is medically necessary.

Other personal factors include aspects such as the extreme desire of a mother to have a child which gets to be carried too far even to the detriment of her own life when for example, she is on radio-therapy due to cancer etc. or is a sickler.

There is also the aspect of late presentation for medical treatment when people go for medical help in the terminal stages of their ailment.

1.6.6 Administrative Factors

Overcrowding in hospitals leads to poor management of patients. Indeed, intra-hospital infection cannot be ruled out considering that at times, patients have to share beds and mattresses. Overcrowding also leads to early discharge of patients before they are well enough to survive on their own without medical care and advice.

Delayed transportation for case referrals for specialized attention, lack of clean linen, shortage of essential and

appropriate drugs and lack of certain materials like gloves, antiseptic solutions etc. lead to poor management of patients. Poor maintenance of facilities might result into certain equipment not functioning regularly and the vital cleanliness necessary for health care might not be possible. Overcrowding, shortage of drugs and other facilities and lack of discipline among hospital staff were some of the factors considered in this study.

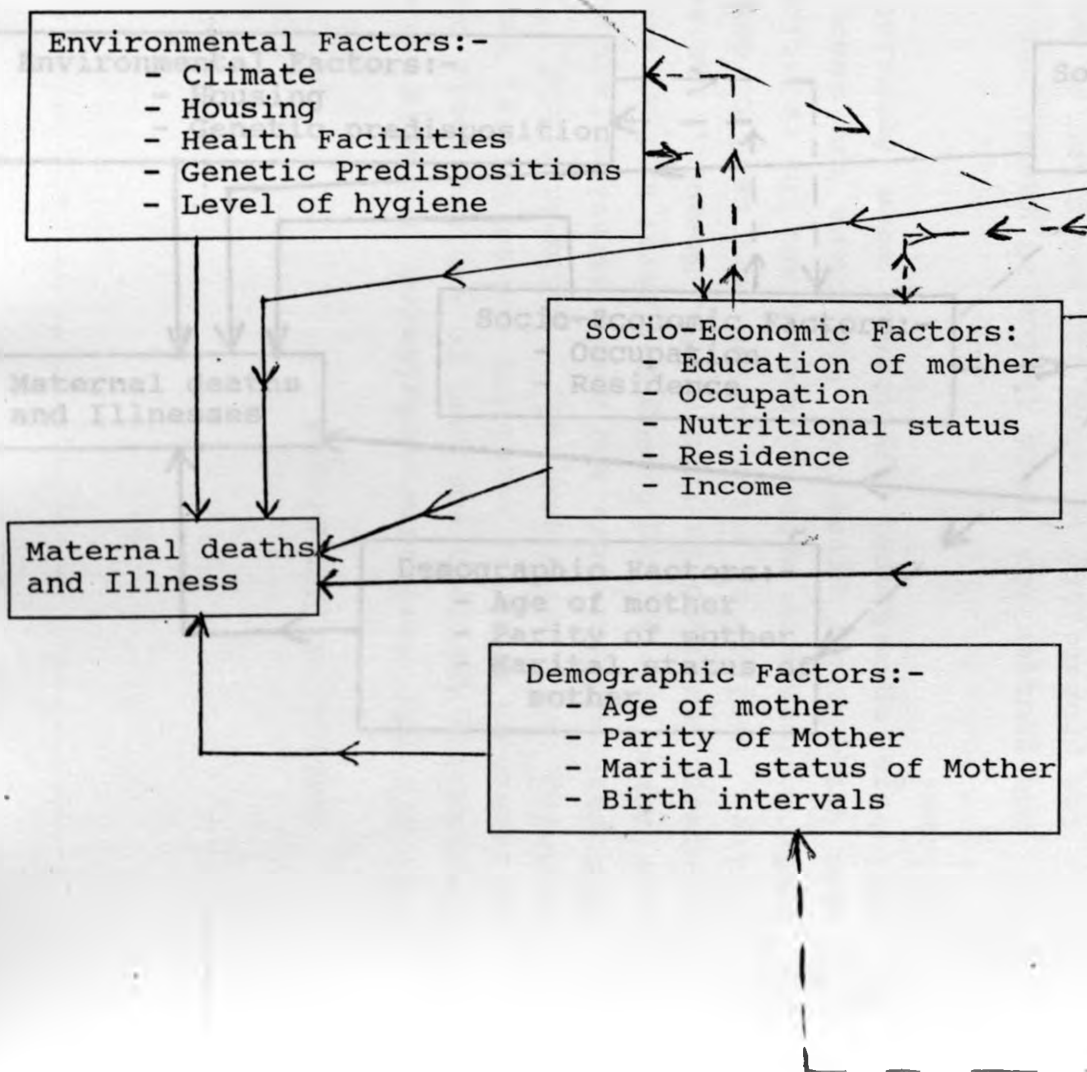
Some of the above factors are correlated in that they affect each other before they eventually influence maternal morbidity and mortality. This correlation is diagrammatically represented in figure 1.6.1. which forms the conceptual model on which this study was based. The model was based on the literature on maternal morbidity and mortality which related demographic, socio-economic and environmental factors to obstetric complications. A trimmed model, showing only the variables used in this study is presented in figure 1.6.2. Thus it is a more specific model to the study.

From the framework a conceptual hypothesis may be stated as follows:

Demographic, Socio-economic, Socio-cultural and Environmental factors are likely to influence maternal morbidity and mortality in any given society.

Fig. 1.6.1

THE CONCEPTUAL MODEL ON THE FACTORS AFFECTING MATERNAL



MORTALITY AND MORBIDITY

Socio-cultural and Personal Factors:

- Pre-marital pregnancies
- Husbands attitude
- Societal expectations
- Rejecting medical advice

Medical Health Care and Administrative Factors:-

- Overcrowding
 - intra-hospital infection
- Early discharge
- Poor management of patients
- Delayed transportation for timely referrals
- Shortage of appropriate drugs and essential items
- Negligence of certain departments e.g. Laboratories
- poor maintenance of hospital equipment and facilities

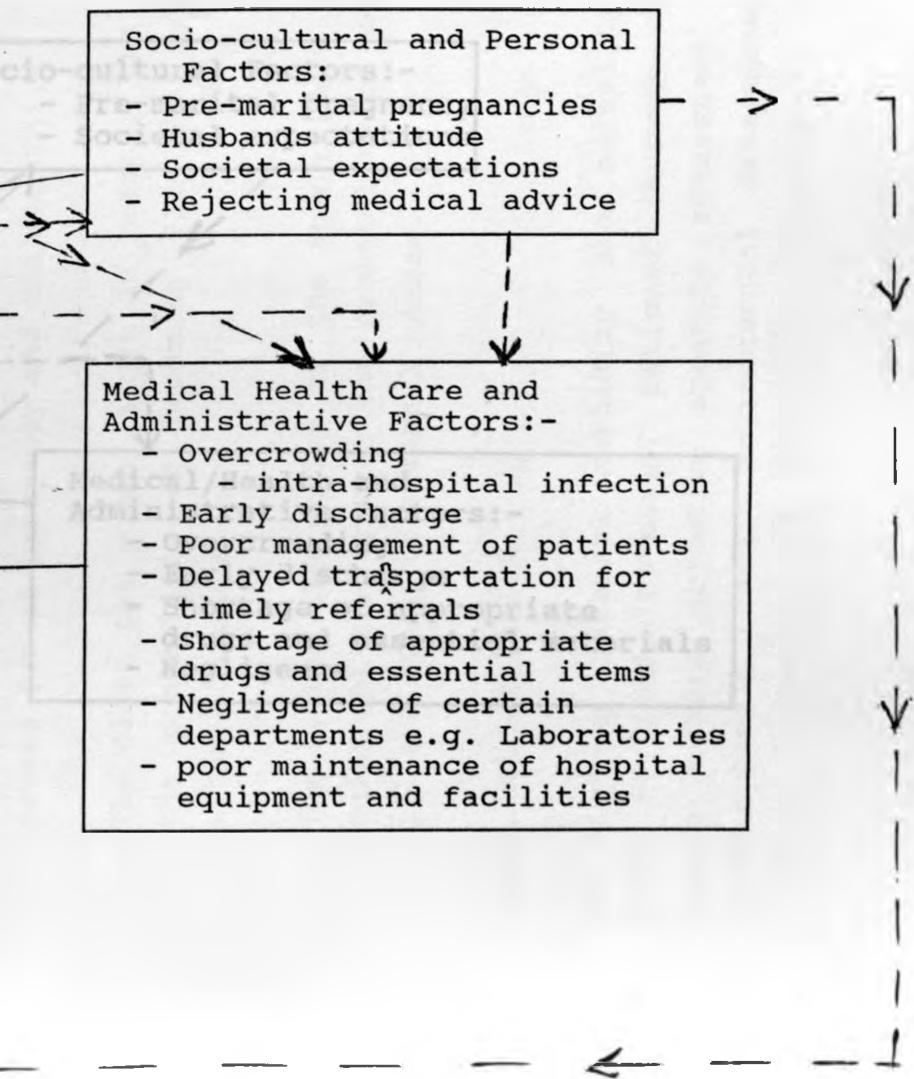
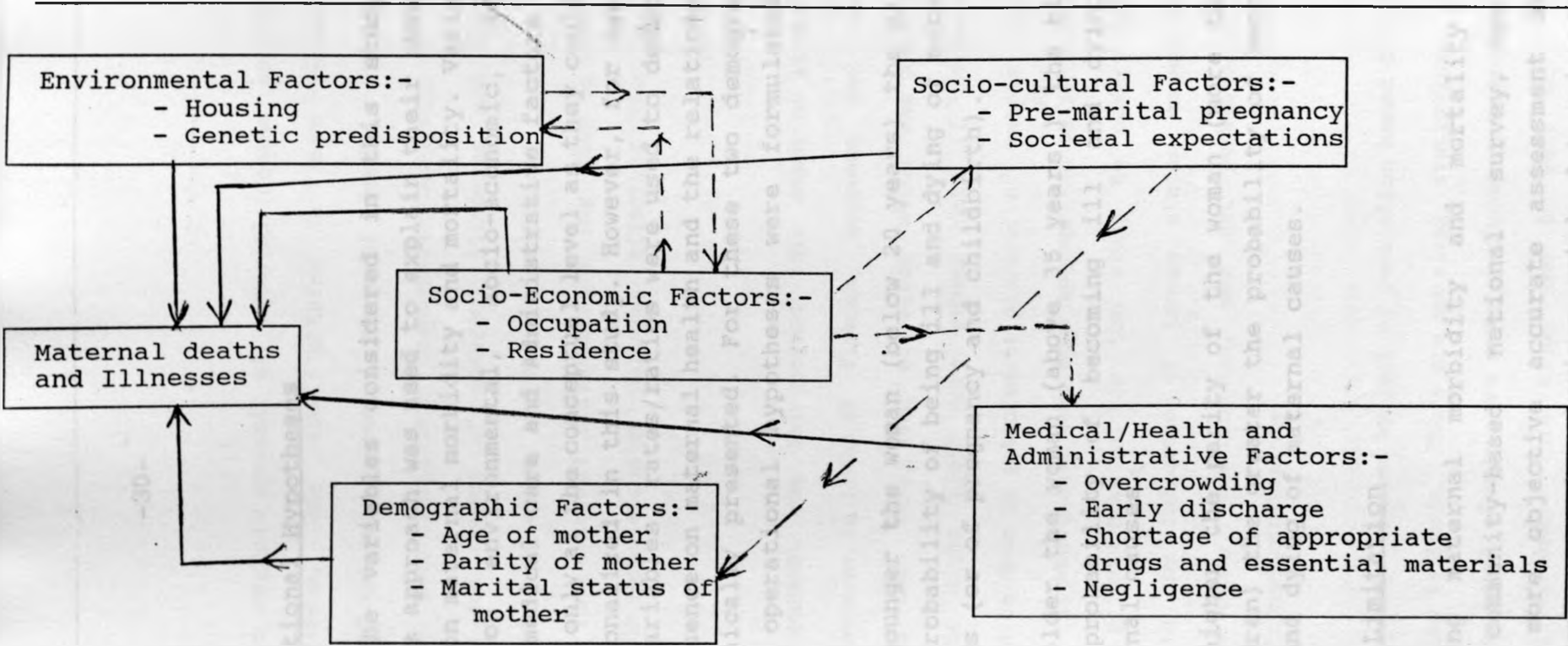


Fig 1.6.2

THE TRIMMED MODEL ON FACTORS AFFECTING MATERNAL MORBIDITY AND MORTALITY CONSIDERED IN THIS STUDY



Operational Hypotheses

For all the variables considered in this study, a descriptive approach was used to explain their observed influence on maternal morbidity and mortality. Variables touching on environmental, socio-economic, socio-cultural, medical care and Administrative factors were considered only at the conceptual level as they could not be operationalized in this study. However, for age and parity variables, rates/ratios were used to determine their influence on maternal health and the relationships were graphically presented. For these two demographic variables operational hypotheses were formulated as follows:

1. The younger the woman (below 20 years) the higher the probability of being ill and dying of maternal causes (or of pregnancy and childbirth).
2. The older the woman (above 35 years) the higher the probability of becoming ill and dying of maternal causes.
3. The higher the parity of the woman (more than 4 children) the greater the probability of becoming ill and dying of maternal causes.

1.8 Scope and Limitation

By studying maternal morbidity and mortality using a community-based national survey, one can obtain a more objective accurate assessment of the socio-economic and environmental determinants of maternal illnesses and deaths. Furthermore, by

obtaining a more complete account of maternal deaths occurring outside hospitals, one also obtains a more accurate classification of the main causes of maternal deaths. Such an approach would also facilitate comparative analysis of the trends, levels and causes of maternal illnesses and deaths between rural and urban areas and/or the different regions of the country. The observed differentials may then be used as guidelines in the formulation of policies affecting the health of women.

But such an approach was far beyond this study as it would require more resources in terms of finance, manpower and time. It is observed that this kind of study which was based on hospital records might yield more robust data if follow-up interviews could be done to get clearer picture of events prior to admission. It would also have been appropriate to include at least one large private hospital in the study to observe any differentials in the influence of income status on maternal morbidity and mortality. But this too, was not possible given the already mentioned constraints.

The study was also limited by lack of population based data on maternal mortality in Kenya. There are no vital statistics, and questions on maternal deaths are never included in censuses or other household surveys. This study had to rely only on hospital records which in most cases were never complete

especially in matters related to marital, occupation/income status, age, parities and birth intervals. This limitation is clearly demonstrated in later chapters.

In Kenya post-mortem examinations are rarely performed as there is no law compelling the operation. This was found to be a particularly major weakness in ascertaining the causes of maternal deaths. It is also an important weakness in the sense that the definition of a maternal death applies for 42 days after delivery (W.H.O. 1979) and unhospitalized deaths would easily be left out even in community based studies on the problem. From the foregoing, it is evident that hospital data as used in this study could not be expected to provide full information on maternal morbidity and mortality in Nairobi.

To obtain even a clearer picture on abortion rates in Nairobi, it would have been most appropriate to interview 'back-street' abortionists by whose hands most abortions in Nairobi are started. But this was not possible given the explained limitations. Moreover it is not easy to identify the so-called back-street abortionists and abortion houses or homes. The study had thus to rely on hospital records, where most of the work began by the abortionists usually ended for further medical attention. In any case, whatever figures obtained in this study were hoped to provide clues into the reproductive problems encountered by women in Nairobi.

Annual Births in Nairobi and Provinces of
CHAPTER 2

Year	Maternity	Provinces	Total	% of Total
1977	26,778	22,482	49,260	84.2
1978	27,179	22,517	49,696	84.7
1979	28,919	22,147	51,066	86.2
1980	29,257	22,323	51,580	87.7
1981	29,408	22,227	51,635	88.1
1982	28,128	22,252	50,380	85.6
1983	28,128	22,252	50,380	85.6
1984	28,128	22,252	50,380	85.6
1985	28,128	22,252	50,380	85.6
1986	28,128	22,252	50,380	85.6
Total	248,028	220,417	468,445	85.5

2.1. Introduction:

This study was designed to cover a ten-year period from 1977 to 1986. Within the period cited above the total births in Nairobi, at Pumwani Maternity and the Kenyatta National Hospitals are shown below in table 2.1.1.

Year	Maternity	Provinces	Total	% of Total
1977	26,778	22,482	49,260	84.2
1978	27,179	22,517	49,696	84.7
1979	28,919	22,147	51,066	86.2
1980	29,257	22,323	51,580	87.7
1981	29,408	22,227	51,635	88.1
1982	28,128	22,252	50,380	85.6
1983	28,128	22,252	50,380	85.6
1984	28,128	22,252	50,380	85.6
1985	28,128	22,252	50,380	85.6
1986	28,128	22,252	50,380	85.6
Total	248,028	220,417	468,445	85.5

1. Source: Metropolitan Registrar and Registrar-General's Office
 2. Source: Pumwani Maternity Hospital Annual Reports
 3. Source: The Kenyatta National Hospital Annual Reports
 4. Source: Annual Statistical Returns.

TABLE: 2.1.1. - Annual Births in Nairobi and Proportion of the Births at Kenyatta and Pumwani Hospitals.

Year	Nairobi ⁺	Pumwani ⁺⁺	Kenyatta ⁺⁺⁺	Pumwani and Kenyatta	% at K.N.H. & PUM. H.
1977	30,768	22,687	3,256	25,943	84.3
1978	32,179	23,617	3,962	27,579	85.7
1979	28,940	21,568	4,978	26,546	91.7
1980	42,129	23,997	5,477	29,474	70.0
1981	41,337	28,548	6,917	35,465	85.8
1982	43,945	27,323	6,514	33,837	77.0
1983	46,079	28,067	6,877	34,944	75.8
1984	48,397	29,323	8,124	37,447	77.4
1985	36,406	27,537	7,967	35,504	97.5
1986	50,145	25,750	8,662	34,412	68.6
TOTAL	400,325	258,417	62,734	321,151	$\bar{X}=81.4$

+ Source: Statistical abstract and Registrar-General's Office

++ Source: Pumwani Maternity Hospital Annual Reports

+++ Source: The Kenyatta National Hospital Disease Index cards; Annual Statistical Returns.

From the table it can be seen that on the average, the Kenyatta National Hospital (KNH) and Pumwani Maternity Hospital (PMH) handle more than 80% of all Nairobi Births, and more than 65% in any one given year. In fact when the births which the two institutions handle are considered on an annual basis, there are some years (e.g. 1979 and 1985) when they recorded having delivered more than 90% of Nairobi babies. Using this observation as a reference point it was felt that a study of maternal experiences of the women at the two hospitals might give some understanding of the general maternal experiences of Nairobi women. Therefore the study had to be designed to look at women who were admitted for obstetric care and management at the two hospitals within the period of study. This made it inevitable that most of the data used in this study had to be obtained directly from hospital records.

Thus, the study was based on secondary data-sources such as the disease index cards, statistics registers, in-patient files, mortality lists and morbidity/mortality reports as prepared by the hospitals' administrative personnel. Where available, the hospitals' annual reports were also referred to. Apart from hospital records, other sources such as 1969 and 1979 census reports provided information on age-group distribution while the statistical Abstracts were found to be useful as a source for yearly births and female deaths in Nairobi. However, some of these sources of data were found not to be reliable as discussed below.

2.2. Sources of Data

2.2.1. The Disease Index Cards^a

These were the most readily available source of hospital information at the KNH. The cards contain details of patients listed according to the codes of diseases from which they (patients) suffered. The diseases are classified according to the World Health Organization (W.H.O.), International Classification of Disease (I.C.D.) Code. The cards also contain other details such as the unit or in-patient number, age, and sex of the patient and an indication whether the patient had recovered or died.

In this study, the codes of interest were codes 630 - 676^b. These codes were for abortion and its associated complications, normal delivery and complications of pregnancy, childbirth and the puerperium. They were the obstetric codes. For example labour and delivery codes ranged from 650 - 669. Thus women who had delivered normally-spontaneous vertex delivery (SVD) - were entered into cards coded 650. Women whose deliveries were complicated by one reason or another were classified under codes 651 - 669 depending on the nature of complication. Those women

a - see Appendix 'A'

b - see Appendix 'B'

whose pregnancies ended up with abortive result were classified under codes 630 - 639 while those who experienced complications during pregnancy were classified under codes 640 - 649. Problems of puerperium came under codes 670 - 676. Under data collection section (2.3.1.) the number of cases enumerated under the various mentioned codes are given.

The disease index cards also provided information on other forms of maternal morbidity, either before or after delivery (i.e. during the puerperium). Such complications fell under 640 - 649 and 670-676. In this study, the cases which were considered were those listed under codes 642 (Hypertension); 648 (other current condition of mother complicating her pregnancy, childbirth and the puerperium) and 670 (major puerperal infection) as these were the problems considered most topical as influencing maternal morbidity/mortality.

As alluded to earlier, the statistics to be found on the disease index cards are only age, sex and the in-patient number of the patient, as well as the code of the disease from which the patient suffered. It is also indicated on the cards whether the patient recovered or died (i.e. Alive or Dead). But, for this kind of study to be comprehensive and accurate, this is not enough, and, herein lies the major weakness of the disease index card as a source of data. This study also examined the parities, residences/occupations, marital statuses of the women

and birth interval (calculated from the last delivery date). Yet all these variables could not be found on the cards. It therefore became necessary for the unit (or IP) numbers of the patients to be taken for later tracing of the patients' files for other details.

2.2.2. The Statistics Registers^c

These registers are used at Pumwani Maternity Hospital. The statistics register operates almost like the disease index card, except that it contains more information about the patient. For example, apart from the in-patient number, name and age, it also contains parity of patient, mode of delivery of the patient's baby (viz whether normal delivery, caesarean section, vacuum extraction etc.). It also contains columns for the most serious complications suffered by the patient during pregnancy and delivery. Such recorded complications include antenatal problems like low haemoglobin, ante-partum haemorrhage, blood loss during delivery, prolapsed cord, eclampsia and ruptured uterus. The information is entered by the medical/nursing staff immediately he/she completes delivering the patient.

*c - see Appendix C

Like the disease index card, the register does not have columns for marital status, residence, occupation and date of last delivery. Hence one has to refer to the in-patient files to fill the gaps. Another major weakness with the registers- at least as they are used at the PMH - is that some dead mothers' deliveries are omitted from the registers yet most of such mothers die after delivery. It would seem therefore that such deliveries are easily left out if the registers were to be used as the only source for enumerating deliveries at the hospital.

2.2.3. Mortality Lists

Both at the Kenyatta Hospital and Pumwani Maternity Hospital, the records personnel have taken the initiative to prepare monthly/yearly mortality lists. At the KNH, the lists are drawn according to hospital wards, thus in this study, the deaths that occurred in the labour and maternity wards were the ones of interest. Such cases included deaths from causes such as puerperal sepsis, post-partum haemorrhage, eclampsia, post-partum renal failure etc. As for abortion deaths, the cases were mostly listed under gynaecological wards. Some of the maternal deaths also occurred at the Intensive Care Unit (I.C.U.) and it was rather difficult for someone who is not medically oriented to determine for sure. It was thus possible to leave out such cases especially if they had been omitted in the other sources. However, clarification with the medical personnel at the hospital was sought when there was any doubt as to the maternal death in the Intensive Care Unit.

At the Pumwani Maternity Hospital, it was not necessary to draw the mortality lists according to wards as all deaths at the hospital are maternity - related - hence maternal deaths. Such lists provided easy access to the enumeration of the dead mothers. Since the lists also identify the cases by their IP numbers, it became possible to identify and retrieve the files for further study. The lists were also found to be valuable in supplementing and/or verifying the information on the cards or reports.

2.2.4. In-Patient Files

The disease index cards and mortality lists proved to be inadequate in providing the study variables. It therefore became necessary to take the in-patient identification numbers from the cards/lists for tracing and retrieval of the files of the patients concerned. The files thus provided the final source of information concerning the patients. They provided information on age, parity, marital status, occupation and residence of patients. Information on birth interval could also be obtained from the files. The files were also used to verify some of the recorded ages - as had been found on the cards and registers - for consistency. But two major difficulties were that not all the files were easily available and the ones available did not contain all the required information.

2.2.5. Annual Reports and Returns

Such documents contain morbidity/mortality reports and general annual reports which summarize hospital activities (e.g. admissions, operations, deaths, state and quality of facilities etc and recommendations). At the PMH such reports are prepared monthly, culminating into the more detailed annual report at the end of the year or at the beginning of the following year. At the KNH, the records personnel compile their returns in what they call 'Statistical Annual Returns' and these contain the same information as the annual reports. Such reports proved to be very valuable at a time when the only other alternative left could have been to physically count the number of admissions - for deliveries and other obstetric conditions - from the cards or the statistics registers. The reports proved to be a valuable basis on which to compute maternal morbidity and mortality rates and ratios.

2.2.6. Census Data

The Kenya 1969 and 1979 census reports provided information on the female population aged 15 - 49 years for Nairobi. Both censuses were used for the calculation of the intercensal growth rate for the population. Such a rate was necessary in working out estimations for this population for the years under study.

2.2.7. Statistical Abstracts

These are publications of the Kenya Central Bureau of Statistics which provide information on statistical returns on diverse subjects as economy, agriculture, and public health among others. In this study the abstracts were used to obtain information on the annual number of births in Nairobi from 1977. This information was to form the basis for working out the proportion of Nairobi births handled by the KNH and PMH which was found to be 81%.

One major problem encountered at the time of obtaining the relevant information from the abstracts was that data on births in Nairobi were not available for years 1983 to 1986. For these years the required information was obtained from the office of the Registrar-General.

2.3. Collection of Data

Data collection took most of the time for this study - from the time the study proposal was accepted in November 1987 to July 1988. The first five months (November 1987 - March 1988) were spent in seeking permission to collect data at the two hospitals. Permission for the study at the KNH was not given until January, 1988 while that for PMH did not come until mid-March, 1988. Thus getting clearance from the concerned authorities presented the first major problem during the data collection stage.

Once authority to conduct the research at the KNH had been obtained, data collection was commenced immediately and, as has been mentioned before, the disease index cards were the first source to be perused due to their ready availability. The cards were used as the first step towards obtaining, on an annual basis, the number of births, maternal complications and deaths. Abortion patients to be studied were also sampled from these cards.

During the years 1977 - 1986, total patient admissions at the KNH was approximately 511,926 patients out of whom 114,243 were obstetric admissions (including deliveries and abortions). Abortion admissions accounted for 36% of all obstetric admissions while deliveries (normal and complicated) accounted for 55%. Other maternity-related admissions accounted for 9%. The figures are shown in table 2.3.1. next page.

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Total Admissions	511,926									
Obstetric Admissions	114,243									
Deliveries										
Abortions										
Other maternity-related admissions										

From the statistical reports of the KNH, it was also found that some cases of abortion were included (certain manifestations of abortion, stillbirths and the perinatal deaths) but were incorrectly classified.

Table 2.3.1. - Estimated Obstetric Admissions to total admissions at the KNH, 1977 -86

TOTAL ADMISSIONS - 511,926

Obstetric Admissions	Total No.	% Total Admissions	%Obstetric Admissions only
Deliveries	62,734	12.3	54.9
Abortions (all types)	41,158	8.0	36.0
Others	10,351	2.0	9.1
TOTAL	114,243	22.3	100.0

From the statistical reports at the KNH, it was also found that, when normal deliveries were excluded -certain complications of pregnancy, childbirth and the puerperium tended to occur more frequently than others.

Such complications were observed to be haemorrhage in early pregnancy and after delivery with the former cases being admitted at an average rate of 220 patients per year. Post-partum haemorrhage (PPH) patients during the period were admitted at an average rate of 150 per year. Other common complications were hypertension, anaemia and puerperal sepsis. Patients who suffered from puerperal sepsis during the ten-year period were admitted at an average rate of 126 patients per year while hypertensive patients were admitted at an average rate of 44 patients per year.

Out of the above mentioned morbidity causes at the KNH, only patients who suffered from hypertension (395), postpartum haemorrhage (1394), puerperal sepsis (1263) were selected for detailed study as it was noted that most maternal deaths occurred among such patients. However, women with other medical conditions which tended to complicate their pregnancy, childbirth and puerperium were also studied as it was observed that very few deaths occurred among them. This was unexpected as they were the women at highest risk of dying from pregnancy/childbirth given that they were already sick women. Thus the appropriately coded cards were used to enumerate such patients. Indeed some patients were selected for further study based on information in their files.

At the KNH, births were also enumerated from the cards and these were distributed according to five-year age groups of mothers

(except for ages below 20 and 40 and above). This could only be done for the years 1982-1986 for which most of the cards were available. The same could not be done for years 1977 - 1981 as the available cards gave an average of only 819 births per year for the hospital as it was reported that most of the cards had been lost (personal communication). Indeed it is known that the KNH delivers at least 3000 babies per year. Thus it was not possible to determine the 1977 - 1981 births by mothers' ages as this latter information was not available in the reports where only total deliveries could be obtained.

Table 2.3.2. gives the age distribution of mothers at the KNH. From the table it is shown that between ages 30 to 34, births diminished drastically such that the frequency of births in this age-group was less than that

Table 2.3.2: Distribution of Births by Mothers' Ages

KNH, 1982 - 1986

Maternal Age	1982	1983	1984	1985	1986	TOTAL	%
Below 20	1077	1060	1256	1392	1545	6330	16.6
20 - 24	2332	2433	3086	3059	3403	14313	37.5
25 - 29	1545	1803	2033	1977	2261	9619	25.2
30 - 34	810	920	1053	873	904	4560	12.0
35 - 39	330	379	408	376	377	1870	4.9
40 and above	83	144	149	121	123	620	1.6
Unknown	337	138	139	169	49	832	2.2
TOTAL	6514	6877	8124	7967	8662	38144	100.0

for teenage women. Births among women aged 40 plus years accounted for only 1.6% of total births. The percent distribution obtained for the five years (1982 - 1986) was used to distribute all the KNH births during the ten years under study.

Table 2.3.3 gives the annual deliveries and maternal deaths (excluding abortion deaths) at the KNH for the years 1977 to 1986. Maternal death ratios per annum are also presented in the table.

At the PMH, the annual reports provided information on total deliveries and maternal deaths. Details of the findings are presented in table 2.3.4.

TABLE 2.3.3.-ANNUAL DELIVERIES, MATERNAL DEATHS AND MATERNAL MORTALITY RATIOS; KNH, 1977-1986

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL
Births	3256	3962	4978	5477	6917	6514	6877	8124	7967	8662	62,743
Maternal Deaths	12	12	13	18	3	17	7	21	17	16	136
Deaths per 1000 Births	3.7	3.0	2.6	3.3	0.4	2.6	1.0	2.6	2.1	1.9	$\bar{X}=2.3$

TABLE 2.3.5: Birth distribution by mothers' ages:

PMH, JULY, 1981

Maternal age	No. of Women	%	% at KNH
< 20	209	20.9	16.6
20 - 24	368	36.8	37.5
25 - 29	205	20.5	25.2
30 - 34	75	7.5	12.0
35 - 39	31	3.1	4.9
40+	9	0.9	1.6
Unknown	103	10.3	2.2
TOTAL	1000	100.0	100.0

From Table 2.3.5, it is evident that 70% mostly delivered vaginally (some being their first babies). The hospital has had a consistently lower of cases of preterm babies & low birth weight. It is the hospital's policy to take all such women back that are considered to be normal at highest fetal weight and after delivery. The partly distribution of births based on the PMH was prepared to reflect the pattern for hospital deliveries in the PMH in the 1980s per year on the average.

TABLE 2.3.6: Birth distribution by mothers' parities

PMH, JULY, 1981

Previous Parity	%
0	30.6
1	14.2
2	16.9
3	14.8
4	8.6
5	7.3
6+	7.6

TOTAL 100.00

From table 2.3.6, it is evident that PMH mostly delivers primigravidas (women having their first babies). The hospital also handles a considerable number of women of previous parities 4 and above (24%). It is the hospital's policy to take in such mothers since they are considered to be the ones at highest risk during and after delivery. The parity distribution of births found at the PMH was assumed to reflect the pattern for Nairobi births as it handles 26,000 births per year on the average.

For the mothers who had died at both hospitals, their files were retrieved for further study for ages, parities, marital status, occupation and residence. A major obstacle was that not all the deceased women's files could be retrieved. Some of the files had been removed from the shelves to provide space for new ones. This was a particularly major problem at the KNH where out of the 136 enumerated maternal deaths only 80 files could be traced. At the PMH all, except two of the 138 deceased women's files were retrieved for study. But obtaining the files did not guarantee getting the required information. Some demographic and social statistics of some patients had been left out. But it was hoped that whatever information was found might provide some understanding of maternal morbidity and mortality in Nairobi.

As already indicated, maternal morbidity data was obtained from the KNH in-patient records. The KNH is a referral hospital but as relates to obstetric referrals, the rate diminishes drastically with physical distances between the provincial and district hospitals and the KNH. Thus most of the women who experienced maternity-related illnesses at the KNH were residents of Nairobi.

Using the disease index cards, it was possible to enumerate and compile for study the women who suffered complications of pregnancy, childbirth and the puerperium. Such complications, included anaemia of pregnancy and the puerperium, hypertension of pregnancy (including pre-eclampsia and toxæmia), some puerperal problems such as postpartum haemorrhage, puerperal

sepsis, psychosis, and current condition of mother affecting or complicating her pregnancy, childbirth and the puerperium. The latter group included mothers who suffered from diseases like diabetes mellitus, cardiac diseases, sickle cell trait and disease, anaemia and other forms of nutritional deficiencies. Table 2.3.7 gives the number of maternal morbidity cases enumerated for the ten-year period, number of deaths due to the specific illnesses and the number sampled for study in more detail.

It should be noted that only the maternal diseases which appear on the table were chosen for study in relation to the women's demographic and socio-economic status because they were found to be the most significant of all maternal complications.

TABLE 2.3.7. Enumerated maternal morbidity patients, cause-specific deaths and samples studied;

KNH, 1977 - 1986

Disease	Patients	Deaths	SAMPLES	
			Anticipated	Actually Studied
Post-Partum Haemorrhage (PPH)	1394	16	300	-
Puerperal Sepsis	1263	32	300	178
Hypertension including pre-eclampsia and eclampsia	432	18	432	-
Current condition of mother (including anaemia)	345	14	345	229
Abortion -all types	41158	83	2051	542

They were found to be significant for two reasons. First, they occurred in greater frequencies and secondly, they were found to be the major causes of maternal deaths.

For both morbidity and mortality data collection, one major shortcoming relating to the in-patient files was that of omissions and/or contradictions regarding socio-demographic information recorded from the patients. Maternity patients include women who may not always, for various reasons, give their correct ages. There were those who genuinely did not know their ages. There were also those who deliberately mis-stated their ages. Some expectant mothers mis-stated their ages for fear of being exhorted for being mothers either too young or too old. Such women either exaggerated or understated their ages to appear older or younger.

In some files there was contradictory information on marital status. On the admission forms some patients were reported to be married, but to the doctors who were examining them they reported single - this being recorded in the doctors' notes in the files. In this study it was assumed that what the patient told the doctor was the truth as it was noted that patients tended to be more confident and open with doctors than with the records clerks who were often stationed at public reception desks.

At times, due to clerical errors, the sex of patient on the cards (which in this study and on all cards coded 630 - 676, should all

be female) were indicated 'male'. During data collection such mislabels were verified using the in-patient files.

Either inadvertently, or as a matter of a time-saving official habit many important socio-demographic details of the patients were omitted during admission/registration. Such omissions were found to include age, parity, education, and marital status of patients, date or year of last delivery, age at menarche, residence and occupation of patients or of patients' spouses and whether or not ante-natal care (in the case of pregnant women) had been sought prior to admission to hospital. Once information like age and sex had been omitted in the file it would not appear in the disease index cards.

Another common practice found at the KNH was that social and demographic details of patients who were admitted into hospital while unconscious were hardly ever taken either from those (usually close relatives) accompanying the patient or from the patients themselves once they recovered. Even for the referred cases, the referral letters hardly contained the necessary socio-demographic information on the patients. Such omissions occurred partly due to lack of awareness of the importance of such information about female patients and partly due to pressure of work.

This study was based mainly on the experiences of women who had been hospitalized for maternity-related care and management. The

obvious problem with generalizing from such data usually is that only a select sample of women deliver in hospital (even in a City like Nairobi). Further more, women who suffer from serious complications like cardiac diseases, diabetes, sickle cell disease and so on are more likely to be hospitalized than those whose pregnancies progress without problems and yet are just also exposed to the same health risks brought about by pregnancy, childbirth and the puerperium. It is thus clear that to calculate maternal morbidity and, mortality levels on the basis of hospital data alone could only provide a rough estimate of the problem. In some instances, a maternity patient may be discharged from hospital only to go home and die from the same complication before going back to hospital. In a country such as Kenya, where post mortem is not compulsory such a death may not be correctly classified and registered as a maternal death so that even a community-based study on maternal mortality would fail to capture it.

Since it is impossible to adjust the data used in this study in order to cater for the above outlined deficiencies the morbidity and mortality patterns obtained from them are, inevitably subject to some error. Nevertheless, it is hoped that some understanding of the reproductive problems of Nairobi women would be drawn from the data.

2.4. Use of Data and Methods of Analysis:

As has already been mentioned, the 1969 and 1979 censuses' reports were used to obtain information on the reproductive female population (aged 15 - 49 years) in Nairobi. It was important to obtain the number of women in this age group as it provided one of the base populations (denominators) used in the calculation of mortality rates.

In 1969, the Nairobi female population aged 15 - 49 years was 107,874 while in 1979 it had increased to 189,988; an increase of 82,114 women for the entire intercensal period. It was necessary to know this population for both censuses in order to determine its intercensal growth rate. The following formula was used to calculate the rate of increase for the women which was found to be 0.0565997:

$$r = \log \frac{Pt(f15-49)1979}{Pt(f15-49)1969}$$

n

where, r = rate of growth

Pt (f15-49)1979 = the female population aged 15-49 in 1979

Pt (f15-49)1969 = the female population aged 15-49 in 1969

n = the number of complete years in the intercensal period

$$\text{Thus, } r = \log \frac{189988}{107874} \div 10$$

An assumption was then made that this rate of growth applied also for the years after the 1979 census. The rate was then used in the calculation of the population for 1977 to 1986 using the formula:-

$$pt_1 (15-49) = poe^r (f15-49)$$

Where, $pt_1 (15-49)$ = the female population aged 15-49 calculated for any one year during from 1977-1986.

$po (15-49)$ = the female population aged 15-49 in 1969.

e = base of the natural log

r = rate of growth

t = time between 1969 and the year for which the population is being calculated.

The application of the formula in calculating this population for 1977 is given below in more detail.

$$P_{t1977}(f15-49) = P_{1969}e^{rt}$$

$$P_{t1977} = 107874e^{(0.0565997)(8)}$$

$$= 107874e^{0.4527976}$$

$$= 107874 \times 1.5727058$$

$$P_{t1977}(f15-49) = 169654.$$

Based on the above method, the respective Nairobi female population aged 15-49 for the years 1977-86 is presented below on table 2.4.1. The table also gives the births and the general fertility rates (GFR) for the corresponding years. General fertility rate is the number of births per 1000 women aged 15 - 49 years.

The denominator of all women aged 15-49 in Nairobi was used in the calculation of maternal mortality rates (i.e. maternal deaths in 1000 or 100,000 women aged (15 - 49)). Such a rate indicates the risk of dying from maternity - related causes for all the city women aged 15 - 49.

Table 2.4.1. - Estimated Nairobi Female Population aged 15 - 49 and General Fertility Rates, 1977 - 1986

Year	Females Aged 15-49 Years	Births	GFR
1977	169654	30768	181.4
1978	179533	32179	179.2
1979	189988	28940	152.3
1980	201051	42129	209.5
1981	212759	41337	194.3
1982	225149	43945	195.2
1983	238259	46079	193.4
1984	252134	48397	192.0
1985	266816	36406	136.5
1986	282353	50145	177.7

The denominator of all women aged 15-49 in Nairobi was used in the calculation of maternal mortality rates (i.e. maternal deaths in 1000 or 100,000 women aged (15-49). Such a rate indicates the risk of dying from maternity-related causes for all the city women aged 15-49.

This rate was roughly estimated on the basis of information obtained from the enumerated total maternal deaths in Nairobi for years 1977 and 1979 by the Population Studies and Research Institute (PSRI, 1983). For years 1977 and 1979 the Institute had enumerated 25 and 24 maternal deaths respectively in Nairobi. At the two hospitals (KNH and PMH) 24 and 17 maternal deaths had occurred respectively for years 1977 and 1979. From this information it was found that on the average the two hospitals handle 85% of maternal deaths in Nairobi and on this basis maternal deaths for Nairobi were estimated. Assuming that all the yearly maternal deaths that occurred at the KNH and PMH represented 85% of the maternal deaths in Nairobi, the remaining 15% were added to all maternal deaths at the two hospitals for each year. The results are tabulated in Table 2.4.2 next page.

Table 2.4.2: Estimated Nairobi Maternal Deaths 1977 - 86

YEAR	KNH + PMH MATERNAL DEATHS	ESTIMATED
		TOTAL MATERNAL DEATHS IN NAIROBI
1977	24	25
1978	22	26
1979	17	24
1980	33	39
1981	25	29
1982	32	38
1983	23	27
1984	38	45
1985	28	33
1986	32	38

Using the estimated total maternal deaths in Nairobi, it was thus possible to estimate maternal mortality rates and ratios for Nairobi.

Nevertheless, it was decided that the more specific maternal morbidity and mortality ratios be the main basis for measuring the level (and also trend and patterns) of obstetric risks among

Nairobi female population who had delivered at the KNH and PMH. Maternal mortality ratio refers to the maternity - associated deaths in 1,000 or 100,000 livebirths (and not in women aged 15-49). This was considered to be a more specific measure since it is concerned with the risk of death experienced only by pregnant women or women who had delivered within the last 42 days before they died. It is a measure that relates maternal deaths to the actual number of births and not to the total female population aged between 15 - 49 years. This was the other denominator used in the study - viz, the number of births or deliveries at both the KNH and PMH on a yearly basis and for the whole study period. By formula it is represented below:

$$\text{mmr} = \frac{\text{Dp} \times \text{k}}{\text{B}}$$

where,

Dp = the annual number of deaths from all pregnancy and puerperal causes (excluding abortion).

B = the annual number of births

K = a constant - here 1,000

mmr = maternal mortality ratio

Morbidity ratios were also calculated using the above denominator with the numerator being complications of pregnancy, childbirth and the puerperium in relation to births at the KNH only. The other base population used was that of total obstetric admissions

at the KNH (including births and abortions). This denominator was used to calculate the cause - specific morbidity ratios and frequencies. Such ratios were found useful in answering questions on what proportion of women suffered from certain specific pregnancy - related and puerperal ailments in relation to all obstetric admissions at the KNH. From this it was possible to determine the major causes of maternal illnesses.

As has been pointed out before and from the foregoing, it is evident that since only the two hospitals' records formed the basic source of information on maternal morbidity and mortality for this study the findings could only be taken to be approximations - which were based on a number of indirect techniques and indicators. This explains why data analysis for this thesis was to rely more on descriptive statistics resulting in much use of proportions, percentages, frequency tables and graphs.

CHAPTER 3

MATERNAL MORBIDITY

3.1. Introduction:

The pregnancy - related complications that cause the most damage to women in Nairobi were found to be haemorrhage; infection or sepsis of childbirth and the puerperium; eclampsia (toxaemia of pregnancy); anaemia of pregnancy and the puerperium; obstructed labour; ruptured uterus, and induced septic abortion. For most of these conditions, it is widely believed by health professionals that appropriate and highly effective preventive measures exist to reduce their prevalence. Thus most of the illnesses and deaths experienced by the mother during and/or immediately after pregnancy are avoidable if preventive measures are applied on time.

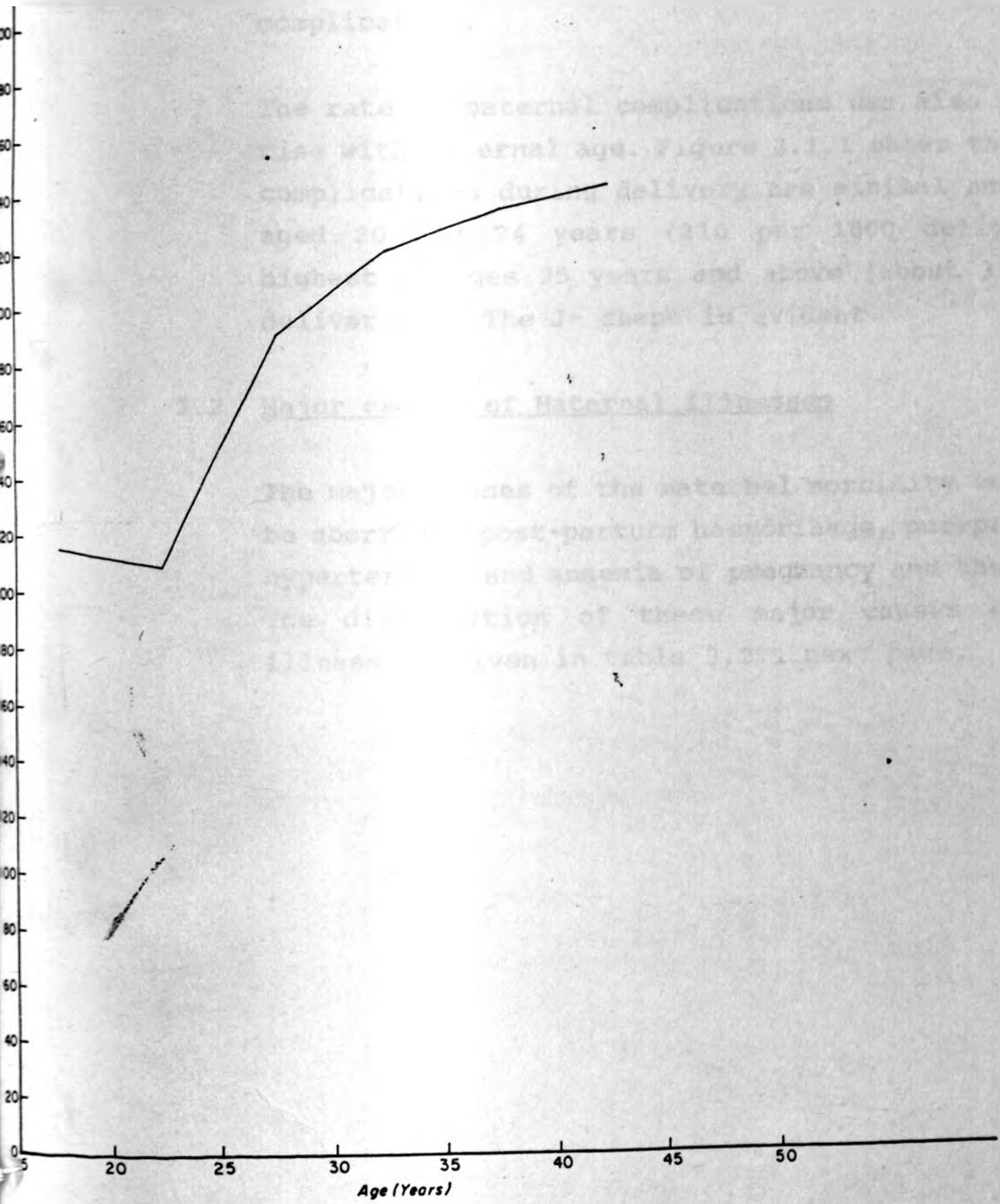
In this chapter an attempt is made to present, analyse and discuss the major causes of maternal morbidity and the issue of abortion, a sensitive area concerning maternal health is also highlighted. Frequency tables, percentages and graphs are the major tools used for analysis. Morbidity data was obtained only from the KNH and therefore the results presented in this chapter are related only to the obstetric admissions and livebirths at the KNH.

Table 3.1.1. gives the general distribution of maternal complications during delivery in relation to total deliveries according to the mothers' age groups at the KNH for years 1982 - 1986 for which data was available. It should be observed that the complications in the table are only those of childbirth and not ante- or post-natal complications.

Table 3.1.1: - Distribution of complicated deliveries in relation to total deliveries by mothers' age groups; KNH, 1982 - 1986

Maternal Age Groups	Total Deliveries	%	Complicated Deliveries	% Complicated	Morbidity Ratio per 1000 Deliveries
Below 20	6,330	16.6	1,368	3.6	216
20-24	14,313	37.5	2,999	7.9	210
25-29	9,619	25.2	2,812	7.4	292
30-34	4,560	12.0	1,468	3.9	322
35-39	1,870	4.9	628	1.7	336
40+	620	1.6	213	0.6	344
Age not Stated	832	2.2	320	0.8	385
TOTAL	38,144	100.0	9,808	25.9	$\bar{X} = 301$

Fig. 3.1.1 MORBIDITY GRAPH : RATIOS OF MATERNAL COMPLICATIONS DURING DELIVERY BY MOTHERS , AGE GROUPS KNH 1982-1986



From the above table it is clear that while births to mothers aged 20 to 29 years accounted for almost 63% of total deliveries, only 15% of women in these age groups experienced any obstetric complications during delivery. On the other hand, births to mothers aged 35 years and above accounted for 6.5% of total births but almost half of the deliveries (2.3%) were associated with complication.

The rate of maternal complications was also observed to rise with maternal age. Figure 3.1.1 shows that maternal complications during delivery are minimal among mothers aged 20 and 24 years (210 per 1000 deliveries) and highest at ages 35 years and above (about 340 per 1000 deliveries). The J- shape is evident.

3.2 Major causes of Maternal Illnesses

The major causes of the maternal morbidity were found to be abortion, post-partum haemorrhage, puerperal sepsis, hypertension and anaemia of pregnancy and the puerperium. The distribution of these major causes of maternal illness is given in table 3.2.1 next page.

Table 3.2.1: - Major Maternal Morbidity Causes; KNH, 1977 - 1986

Cause	Women	% of total maternal (admis- sions - including abortion)	Ratio per 1000 Deliveries
Abortion	41,158	36.0	-
Postpartum Haemorrhage	1,394	1.2	22.2
Puerperal Sepsis	1,263	1.1	20.1
Hypertension	432	0.4	6.9
Anaemia and Other current Condition of Mother	435	1.3	5.5

From the above table abortion accounted for 36% of total maternal admissions while postpartum haemorrhage and puerperal sepsis patients were admitted in almost the same proportion.

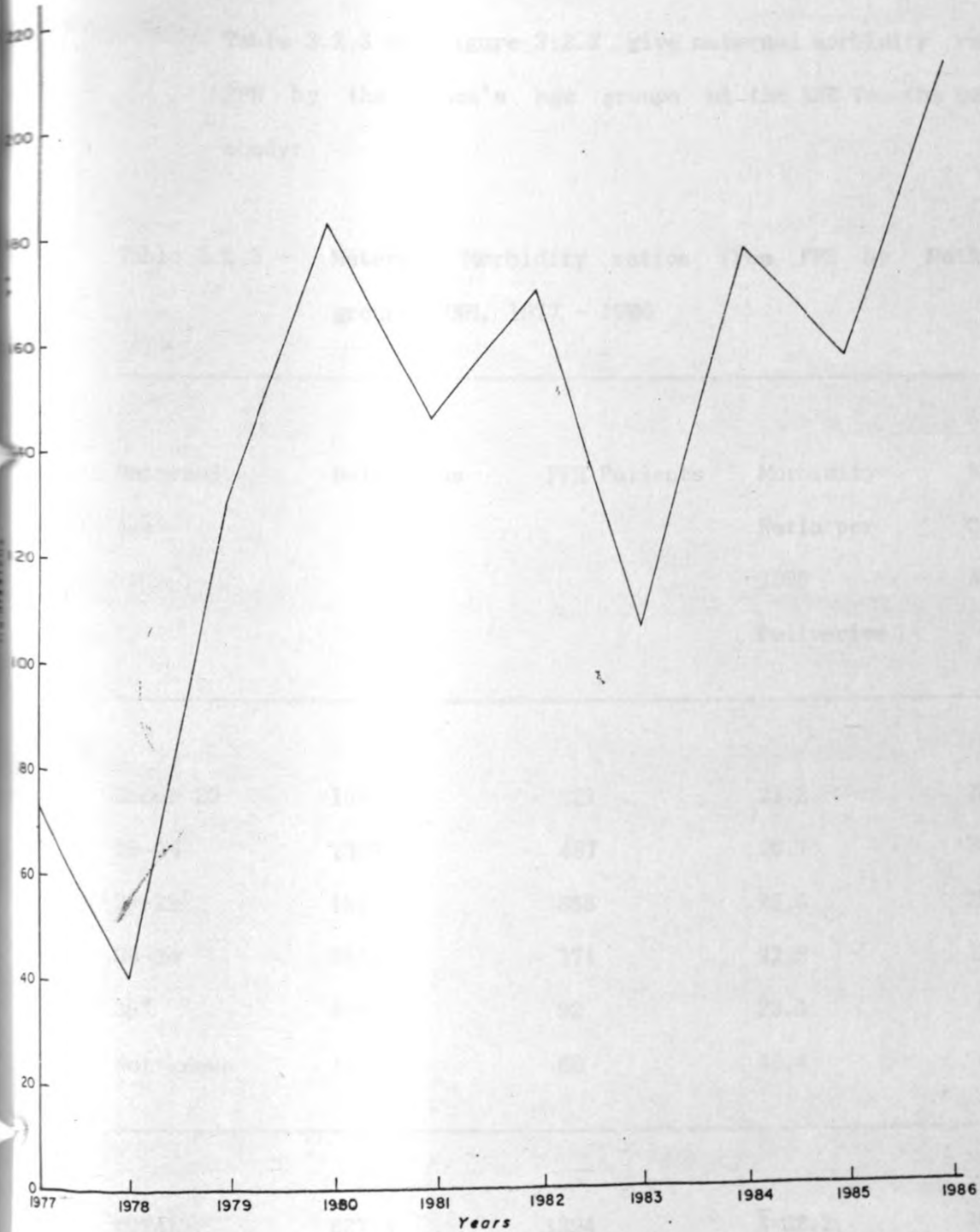
3.2.1 Post-partum Haemorrhage

Postpartum haemorrhage (PPH) is the blood loss of greater than 500 millilitres during or after third stage of labour. Bleeding is therefore considered serious when a mother loses more than the said amount of blood. Specifically PPH is caused mainly by ruptured uterus, retained placenta and episiotomy tear during delivery. During the period under study 1394 women were admitted and managed for the condition at the KNH giving an average annual rate of 22.1 PPH cases per 1000 deliveries. Out of the 1394 patients, 16 died, giving a ratio of 14 deaths per 1000 PPH patients per year. Table 3.2.2. and figure 3.2.2 next page give this information in more detail.

Table 3.2.2 - Yearly distribution of PPH patients in relation to deliveries; KNH, 1977 - 1986

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL
Deliveries	3256	3962	4978	5477	6917	6514	6877	8124	7967	8662	62734
PPH Patients	73	40	129	183	146	170	106	178	157	212	1394
Ratio per 100 Deliveries	22.4	10.1	25.9	33.4	21.1	26.1	15.4	21.9	19.7	24.5	$\bar{X}=22.1$
pph Deaths	1	2	2	0	1	1	1	1	0	7	16
Death Ratio per 1000 PPH Patients	13.7	50.0	15.5	0.0	6.9	5.9	9.4	5.6	0.0	33.0	$\bar{X}=14.0$

Fig. 3.2.2 YEARLY ADMISSIONS OF PPH PATIENTS, KNH, 1977 - 1986



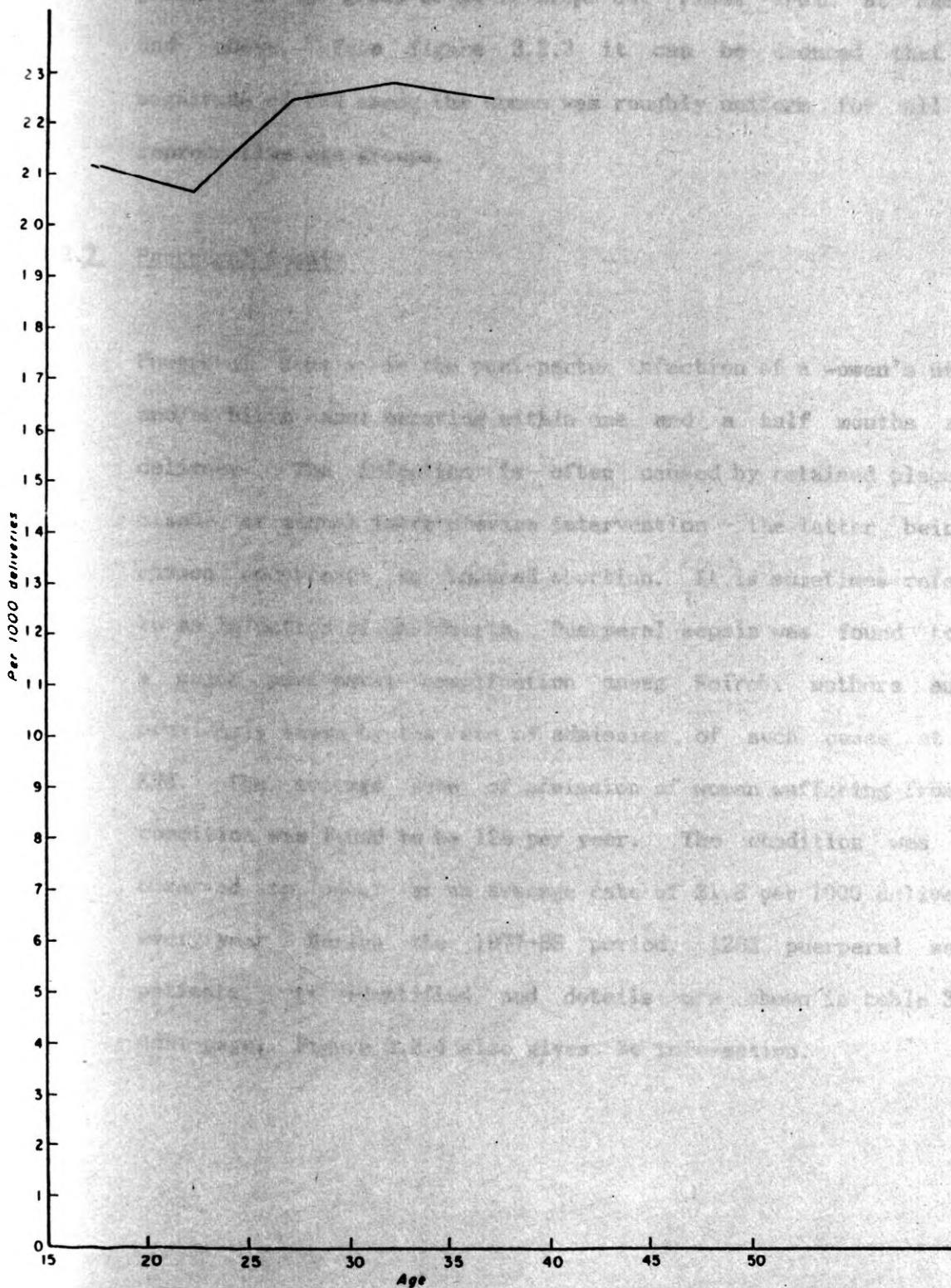
The above figure also indicates that the number of women who suffered from PPH increased in the 1980s and by 1986 the number of women managed for this condition at the hospital had almost trebled from what it was in 1977.

Table 3.2.3 and figure 3.2.3 give maternal morbidity ratios from PPH by the women's age groups at the KNH for the period under study:

Table 3.2.3 - Maternal Morbidity ratios from PPH by Mothers' age groups; KNH, 1977 - 1986

Maternal Age	Deliveries	PPH Patients	Morbidity Ratio per 1000 Deliveries	% of PPH Cases in Age Group
Under 20	10411	221	21.2	15.8
20-24	23535	487	20.7	34.9
25-29	15916	355	22.5	25.5
30-34	7510	171	22.8	12.3
35+	4090	92	22.5	6.6
Not known	1372	68	49.4	4.9
TOTAL	62734	1394	$\bar{X}=22.2$	100.0

Fig. 3.2.3. PPH RATIOS BY AGE, KNH, 1977-1986



The table shows that maternal morbidity from PPH fluctuates between a ratio of 20 and 23 per 1000 deliveries in all age groups. At age group 20-24 it drops but rises again at age 25 and above. From figure 3.2.3 it can be deduced that the magnitude of PPH among the women was roughly uniform for all the reproductive age groups.

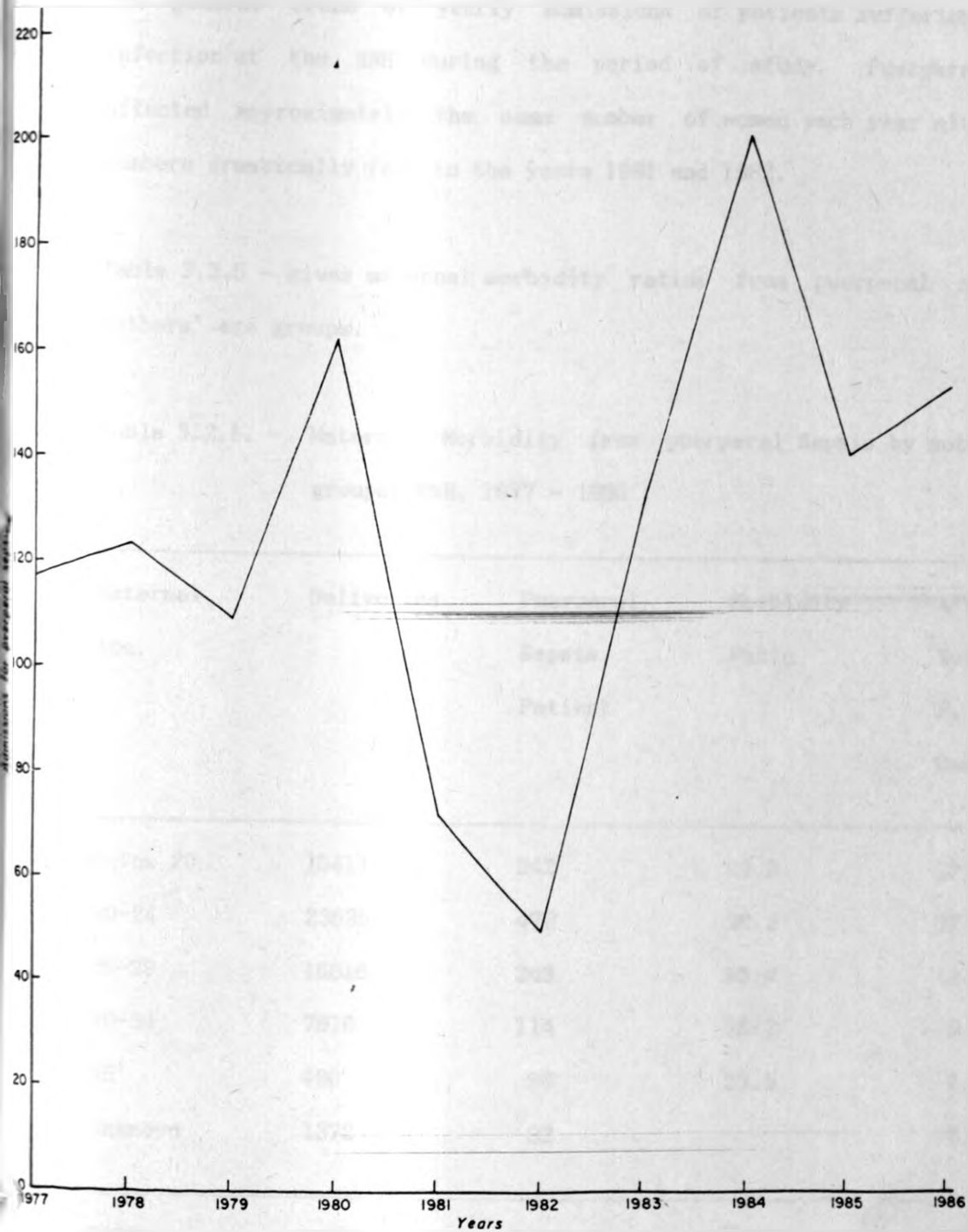
3.2.2 Puerperal Sepsis

Puerperal sepsis is the post-partum infection of a women's uterus and/or birth canal occurring within one and a half months after delivery. The infection is often caused by retained placental tissue, or manual intra-uterine intervention - the latter being a common occurrence in induced abortion. It is sometimes referred to as infection of childbirth. Puerperal sepsis was found to be a major post-natal complication among Nairobi mothers as was previously shown by the rate of admission of such cases at the KNH. The average rate of admission of women suffering from the condition was found to be 126 per year. The condition was also observed to occur at an average rate of 21.6 per 1000 deliveries every year. During the 1977-86 period, 1263 puerperal sepsis patients were identified and details are shown in table 3.2.4 next page. Figure 3.2.4 also gives the information.

Table 3.2.4 - Yearly admissions of Puerperal Sepsis patients in relation to deliveries; KNH, 1977-1986

Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL
Deliveries	3256	3962	4978	5477	6917	6514	6877	8124	7967	8662	62734
Puerperal											
Sepsis	117	123	109	162	72	50	133	202	141	154	1263
Patients											
Ratio per											
1000											
Deliveries	35.9	31.1	21.9	29.6	10.4	7.7	19.3	24.9	17.7	17.8	$\bar{X}=21.6$
Deaths from											
the Condition	8	2	3	5	2	3	8	4	5	4	44
Death Ratio											
per 1000											
Puerperal	68.4	16.3	27.5	30.9	27.8	60.0	60.2	19.8	35.5	26.0	$\bar{X}=37.2$
Sepsis											
Patients											

Fig 3 2.4 YEARLY ADMISSIONS FOR PUERPERAL SEPSIS, KNH, 1977 - 1986



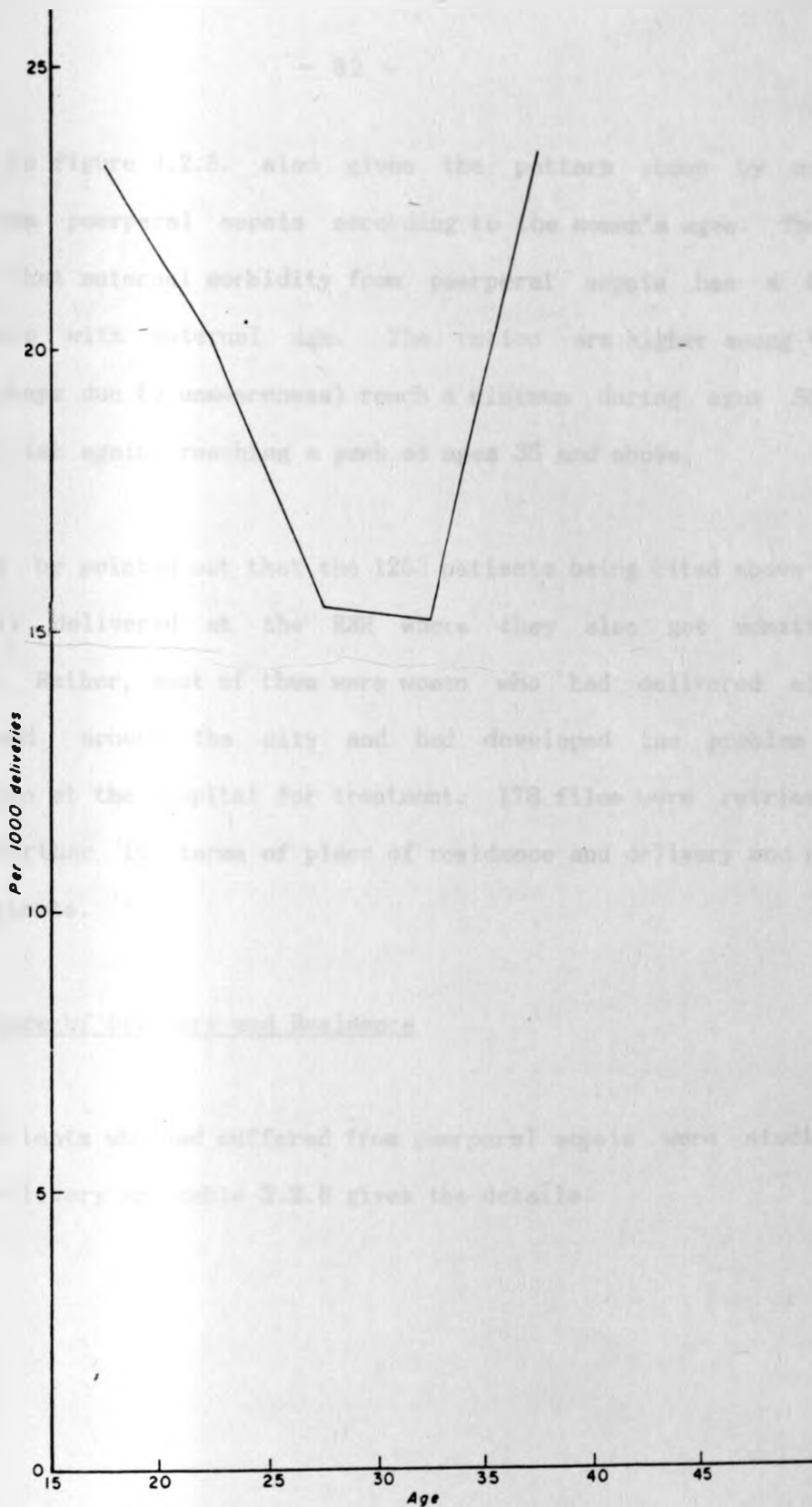
The above table indicates that there were 44 deaths from puerperal sepsis, giving an average annual mortality ratio of 37 per 1000 women admitted at the hospital due to this condition. Figure 3.2.4 also shows the general trend of yearly admissions of patients suffering from the infection at the KNH during the period of study. Puerperal sepsis affected approximately the same number of women each year although the numbers drastically fell in the years 1981 and 1982.

Table 3.2.5 - gives maternal morbidity ratios from puerperal sepsis by mothers' age groups.

Table 3.2.5. - Maternal Morbidity from puerperal Sepsis by mothers' age groups, KNH, 1977 - 1986

Maternal Age	Deliveries	Puerperal Sepsis Patient	Morbidity Ratio	% of Total P. Sepsis Cases
Below 20	10411	242	23.3	19.2
20-24	23535	476	20.2	37.7
25-29	15816	243	15.4	19.2
30-34	7510	114	15.2	9.0
35+	490	96	23.5	7.6
Unknown	1372	92	-	7.3
TOTAL	62734	1263	\bar{x}-19.5	100.0

Fig 3 2 5 MATERNAL MORBIDITY RATIOS FROM PUERPERAL SEPSIS BY AGE OF MOTHER, KNH, 1977-1986



The graph in figure 3.2.5. also gives the pattern shown by morbidity ratios from puerperal sepsis according to the women's ages. The figure indicates that maternal morbidity from puerperal sepsis has a U-shaped relationship with maternal age. The ratios are higher among teenaged women (perhaps due to unawareness) reach a minimum during ages 30 - 34 and then climb again, reaching a peak at ages 35 and above.

It should be pointed out that the 1263 patients being cited above had not necessarily delivered at the KNH where they also got admitted for treatment. Rather, most of them were women who had delivered elsewhere within and around the city and had developed the problem before presentation at the hospital for treatment. 178 files were retrieved and studied further in terms of place of residence and delivery and parities of the patients.

a) Place of Delivery and Residence

The 178 patients who had suffered from puerperal sepsis were studied for place of delivery and table 3.2.6 gives the details.

TABLE 3.2.6 - Puerperal sepsis patients by place of delivery

Place of Delivery	Patients	%
1. At home	63	35.4
2. At PMH/City Commission Maternity Units	61	34.3
3. Other Hospitals, Maternity Homes	33	18.5
4. Not Known	21	11.8
TOTAL	178	100.0

The table shows, that even though the majority of the patients had delivered in maternity hospitals, over one - quarter (35%) of them had delivered at home. Delivery at home denies mother and baby sterile techniques of delivery which would be available in maternity homes and hospitals. Thus the women who delivered at home predisposed themselves to infection soon after delivery.

Out of the 178 patients 63% had reported their residential areas within and around Nairobi. Of these, 71% were found to be residents of low-income areas of Nairobi with inadequate water supply and general poor sanitation such as Kibera, Mathare, Kangemi, Kawangware, Kariobangi, Korogocho and Pumwani/Majengo.

An examination of the occupation statuses of the women revealed that most of them (68%) were full-time housewives while 15% were unemployed single women staying either with parents and relatives while looking for employment. Only 4% of the women were single and employed but mostly as hawkers, housemaids or subordinate staff. For those women who stated their husbands' occupation, it was found that most of them worked as manual labourers or subordinate staff in various government institutions, parastatals and private companies. Thus most of the women who suffered from puerperal sepsis were full time housewives with husbands of low income categories. It is thus possible that the husbands might have been unaware of the dangers involved and thus encouraged their wives to deliver at home in order to avoid hospital expenses.

b) Parity

Table 3.2.7 gives parity distribution of the 178 women. The table shows that the highest incidence of puerperal sepsis was among women with four or more children followed by the primiparas. The occurrence of the infection was lowest among women of parity 3.

Table 3.2.7 - Parities of the 178 women

Parity	No. of Women	%
0*	-	-
1	50	28.1
2	36	20.1
3	26	14.6
4+	58	32.6
Not Stated	8	4.5
TOTAL	178	100.0

28% of the women were of previous parity zero (primigravidas) and had just delivered their first babies. It is also worth noting that teenaged women who had also just had their first babies made up 46% of this group of single parity women. The ante-natal clinic attendance among primigravidas was noted in this study to be poor. Yet it is at such clinics that expectant mothers are given health education talks on maternal and child health.

*Puerperal sepsis is a condition affecting women who have had a birth (i.e. any delivery after 28 weeks of gestation); thus unless those with post-abortal sepsis had been included in this group, none of the 178 women under study could possibly be of parity 0. Hence parity is considered to include the current delivery associated with the mother's condition.

If the young mothers-to-be miss such preparatory guidance they remain unaware of the importance of hygiene and appropriate diet vital for preventing infections including that of childbirth for both the baby and mother.

A significant proportion of the women (33%) who had puerperal sepsis were also found to be of parities 4 and above. This could perhaps be explained by several factors - the poor sanitary conditions in which they lived, poor diet due to perhaps, inadequate income, lack of awareness and too many children to feed, clothe and educate. Such grandmultiparous women also tend to take things for granted especially when the previous births and postnatal periods have generally been uneventful. They tend to believe that practice makes perfect even in childbearing.

3.2.3 Other Current Condition of Mother

A mother who is classifiable in this category would be found under code 648. Such a mother has certain disease(s) or medical condition(s) which are classifiable under other codes when she is not pregnant. Thus when her condition is perceived to complicate her pregnancy, childbirth or the puerperium, she is referred for further obstetric management and care until such a time that she is deemed fit enough to be released for specialist care.

The main current medical conditions of mothers include cardiac disease, diabetes mellitus, malaria, anaemia, sickle-cell disease, thyroid dysfunction and mental disorders. It was found necessary to study this group of mothers as this might give an

insight into the differences, if any, in the manner, timing and intensity of their ante-natal clinic visits compared with the normal expectant women. Moreover, it was observed that fewer deaths occurred among this group of women relative to normal healthy pregnant women.

Total admissions at the KNH - as per cards coded 648 were 345 with only 5 deaths. Out of these, 229 patients were studied for their specific maternal conditions in relation to their ages, parities, occupational statuses and causes (in the case of anaemia). Of these 229 patients, 123 were anaemic; 42 were cardiac cases; 33 had venous complications, 23 were diabetic, and 104 were classified as others. This gives a total of 325 cases (the additional cases over and above 229 was due to the fact that more than one condition occurred in some patients).

All the above cases were then studied separately according to the specific conditions from which they suffered and the significant ones are discussed below.

I. Anaemia

Anaemia of pregnancy and the puerperium was found to have the highest number of cases under this disease category (123 cases). Anaemia in pregnancy leads to maternal morbidity - and mortality when it is severe - and can also cause intra-uterine growth retardation, premature delivery, low birth weight or even intrauterine death (People Magazine 13(2) 1986). Postpartum anaemia also leads to lack of milk for the lactating mother and general body weakness which results in lower productivity on her part.

In tropical Africa, anaemia has become the most important complication in pregnancy as it is caused by malaria, iron and folic acid deficiencies and sickle-cell diseases (People: 13(2) 1986). According to various medical research findings another important cause of the high incidence of anaemia in the African women is low age at marriage accompanied by pregnancy and lactation before the age of 20 years, when growth and blood volume expansion are still occurring. The iron requirements of girlhood with its high growth rate and rapid increase in blood volume accompanied by menstruation, are greater than those of pregnancy. If, in addition, such girls become pregnant, the drain on their iron is indeed far too much. Indeed this situation was observed among Nairobi women. Thus anaemia as a maternal complication was found to be important to this study as its causes were found to ~~relate closely to the~~ demographic, socio-economic and environmental characteristics of the women affected.

A total of 123 anaemic women were identified, out of whom 78 suffered from anaemia of pregnancy while 45 suffered from postpartum anaemia.

(i) Causes of Anaemia

A number of factors were associated with the occurrence of anaemia among the 123 mothers. These factors included malaria

and/or with hookworm; nutritional deficiencies; iron and folic acid deficiencies; frequent pregnancies and deliveries; postpartum haemorrhage, and sickle-cell disease or trait. The above details are shown in table 3.2.8 next page.

Table 3.2.8 - Causes of anaemia among the 123 women.

	Cause	No. of Women	%
1.	Malaria	20	16.3
2.	Postpartum Haemorrhage	20	16.3
3.	Iron, Folic acid and/or nutritional deficiencies	13	10.6
4.	Hookworm	8	6.5
5.	Sickle-cell disease/trait	5 ⁺	4.1
6.	Frequent pregnancies and deliveries	5	4.1
7.	Unspecified	57	46.3
TOTAL		128	104.2*

The table shows the major causes of anaemia to be malaria and postpartum haemorrhage followed by iron/folic acid and/or nutritional deficiencies and frequent pregnancies and deliveries.

* The total exceeds 123 by 4.2% because some women who had malaria also had hookworm and some who had suffered from PPH also had nutritional deficiencies and they were enumerated for both categories.

+ Note that all the 5 sickle-cell cases were from the Western and Nyanza Provinces.

a Analysis by Selected Demographic Variables
Age and Parity

Table 3.2.9 - gives the ages and parities of the 123 anaemic women.

Table 3.2.9 The anaemic women by age and parity, KNH, 1977-1986

AGE	P A R I T Y						TOTAL	%
	0	1-3	4	5	6+	Unknown		
Below 20	19	8	0	0	0	0	27	22.0
20-24	10	32	2	1	1	2	48	39.0
25-29	1	14	1	2	1	0	19	15.4
30-34	0	2	1	5	5	0	13	10.6
35-39	0	0	0	1	5	1	7	5.7
40+	0	0	0	0	3	0	3	2.4
Unknown	1	3	0	0	2	0	6	4.9
TOTAL	31	59	4	9	17	3	123	100.0
%	25.2	48.0	3.3	7.3	13.8	2.4	100.0	

From the above table, it is evident that the risk of anaemia was significantly high among teenaged women, accounting for 22% of all the

women involved. Among those teenaged mothers, it was also found that 30% had one or more children or were pregnant with their second or third babies. An examination of only the ages of the primigravidas (para zero) also reveals that more than half 61.3% - of them were teenaged expectant women.

Women in ages 20 through 29 accounted for 55% of the anaemic women. Of those aged 20-24, it was found that 52% had had three or more children while 42% of those in the next age group (25-29) had had four or more or were expecting their fourth babies. Primigravidas in this morbidity group accounted for 25% while 24.4% had had 4 or more babies. The incidence of anaemia was found to be lowest at exact parity 4 and at ages of 40 years and above.

(b) Analysis by socio-economic and Environmental Variables

Since information on socio-economic factors was not always readily available, their effect could not be controlled to determine whether age or parity rather than the factors played more significant roles in determining the women's anaemic conditions. However a descriptive approach was used to discuss any relationship that could be inferred from the available information.

In the study of the 123 women, the socio-economic factors considered most relevant were nutritional status and occupational

status of the woman or her husband. To highlight some relationship between age, parity and socio-economic factors, 5 women whose anaemia originated from frequent pregnancies and deliveries were considered in greater detail as shown in table 3.2.10.

Table 3.2.10 - Age, Parity and Occupation of the 5 frequently pregnant women

Case	Age	Parity	O C C U P A T I O N O F		Remarks
			Mother	Husband	
1	35	9 ⁺ 4 [*]	Housewife	Labourer	
2	20	6	Housewife	Labourer	
3	25	6	"	Tailor	
4	38	11 ⁺ 2	"	Driver	Requested Tubal Ligation
5	32	12 ^{SBx4} [†]	"	Not Stated	

* Parity P⁺n means P deliveries with n abortions

† SB X 4 means that out of the 12 deliveries 4 were still births

All the five women in the above table were considered to represent the typical childbearing history of the average Kenyan woman: she marries young and starts childbirth almost immediately and continues for two or more decades.

Take case one for example; she was only 35 years old and had already had 13 pregnancies four of which aborted. Assuming she started giving birth at the age of 15, she could not have had birth intervals exceeding two complete years for her to attain her parity. Moreover, she was an unemployed housewife, married to a labourer. Her dietary habits could hardly be anywhere near the required given the low income and the many children to feed, clothe and educate.

~~Case 2 seems to be worse off.~~ She was 20 years old and already pregnant with her seventh baby. Case 3 could be considered luckier than case 2 but her family's general low socio-economic status - implied by the husband's occupation - did not make her any better. According to the information in the file of case 4, she had had 13 pregnancies in 15 years and the diagnosis positively pointed at this as the cause of her anaemia. Her socio-economic status - implied by her husband's job - could not have made things any better for her.

~~Case 5 was only 32 years old but with 12 previous pregnancies,~~ four of which had resulted in still births. It is easy to

speculate that her still births could have been due to her anaemic condition. Like her other colleagues, she was not in any gainful employment.

From the five cases reviewed above it is evident that age of mother, family size and socio-economic status can all play a significant role in determining the health of the mother.

An examination of the 13 women whose anaemia had been caused by malnourishment and iron/folic acid deficiencies also revealed that almost all of them (85%) were unemployed housewives with husbands employed in low-income jobs. Their dietary habits could not therefore be expected to be close to the required average. One of the 13 women was only 16 years - barely mature to give birth and yet she was pregnant.

(ii) Environmental Variables

For the environmental factors influencing maternal morbidity from anaemia, those who suffered from malaria - induced anaemia and from anaemia due to sickle-cell trait or disease present special examples. 16.4% of the women had malaria - induced anaemia. Out of these over 50% had recently travelled to and/or from Western Kenya or the Coastal region of the country. The Western and Coastal regions of Kenya are known to be malaria endemic zones and the chances of getting the disease when one has travelled to or from the areas are very high.

Four percent of the anaemic women were also found to have either sickle-cell trait or disease. Sickle-cell disease (SCD) is a recognized risk factor in pregnancy. It is generally thought that this is due principally to the anaemia (Aluoch et-al. 1987). Pregnant women with SCD and the trait place themselves at great risk with respect to both maternal and foetal outcome. Again environmental factors come into play by the fact that all the cited women were found to have originated from the districts of either Western or Nyanza Provinces. Ethnically, they were either Luo, Luhya or Kisii. These women's genetic predispositions made them easy candidates for anaemia. This finding is in agreement with the findings of Aluoch, Rogo and Otieno (1987) who did a study on 26 pregnant women with either SCD or the trait at the KNH and found that 92% had originated from Nyanza and Western Provinces. The rest (8%) had come from Uganda -another country with high incidence of this genetic disease.

11. Cardiac Diseases

Out of the 229 women with current medical condition 20% were found to have a cardiac disease. The 46 women were studied for age, parity and birth interval to examine whether the women's cardiac conditions influenced their childbearing patterns in terms of the variables.

Table 3.2.11: - and 3.2.12 respectively give the ages and parities of the women.

Table 3.2.11 - Age groups of the Cardiac Women, KNH 1977 -1986

Maternal age	Women	%
Below 20	3	6.5
20-24	21	45.7
25-29	15	32.6
30-34	5	10.9
35+	2	4.3
TOTAL	46	100.0

Table 3.2.11 shows that only 6.5% of the cardiac women had a birth during teenage. The rest - 78% - concentrated their births between ages 20 and 29. 11% of the women had their babies between ages 30 and 34 and only 4% had a birth at ages 35 years and above.

Table 3.2.12 - Parities of the Cardiac Women

Parity	No. of Women	%
0	8	17.4
1	11	24.0
2	14	30.4
3	6	13.0
4+	7	15.2

TOTAL	46	100.0
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From the above table it is evident that most of the women were having either their first second or third babies while 13% and 15% were getting their fourth and fifth or more babies respectively.

Table 3.2.13 shows birth spacing pattern of the cardiac women of whom 39 - 85% - had had at least one birth and were currently pregnant.

Table 3.2.13: Birth Intervals between the last birth and the current pregnancy among the cardiac women.

Birth Intervals (Years)	No. of Women	%
1	4	10.3
2	16	41.0
3	6	15.4
4 ⁺	12	30.8
Not Stated	1	2.5

TOTAL	39	100.0
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From the table it is evident that cardiac women tended to space their births with only 10% reporting birth intervals of less than two years. The majority of the women (87%) had at least two years' interval between their last birth and current pregnancy.

A common family planning method among the cardiac women was found to be tubal ligation. 26% of the women opted for this operation at the average parity of 4 children. A 28 year old woman had

wanted the operation after delivering her fourth baby but her husband objected on the grounds that he wished for a fifth child. The timing of tubal ligation, in terms of age and parity, among 12 women who had had this operation was examined and the findings are shown in table 3.2.14

Table 3.2.14 - Timing of tubal ligation among the 12 cardinal women

Case	Age	Parity including current delivery	Marital Status
1	20	2	S
2	22	2	M
3	22	2	M
4	24	2	S
5	26	3	S
6	35	3	M
7	22	4	M
8	31	4	M
9	24	5	M
10	31	5	M
11	32	6	M
12	32	8	M

From the table, one-quarter of the twelve women were single, while over one half were aged less than 30 years. 67% had four or fewer children. While the figures presented in this section are quite few to draw any conclusions from, they may still be regarded as pointers to the general childbearing patterns and behaviour of cardiac women. For example, it was also noted that expectant cardiac women sought ante-natal care early and on the average by the thirty-second week or eighth month of gestation they got confined in hospital until delivery - usually by vacuum extraction (as delivery by caesarian section is highly discouraged for cardiac women) to prevent or alleviate maternal exhaustion from labour and delivery.

III. Diabetes Mellitus

Among the 229 women with current medical condition 25 - 11% were found to be diabetic. Pregnant diabetic women present an important group in obstetric practice as they are more difficult to manage than pregnant cardiac women. This is because their condition tends to affect their babies (foetuses) too. Indeed it was observed that there was high incidence of foetal distress leading to emergency caesarian sections among these women. There was also high incidence of intra-uterine deaths resulting to still births. It was also learned that this group of women have higher probabilities of getting babies with congenital disabilities (e.g. heart block) than the cardiac women (Personal Communication).

The majority of these pregnant diabetic women - over 50% - got confined in the hospital at an even earlier gestational period. On the average, they got confined during their 23rd - 25th weeks of gestation for stabilization of blood sugar levels through dietary regulations and drugs. 8% of these women had been reported to be poorly controlled diabetic patients - either due to lack of proper dietary observations or general lack of cooperation on the patient's part or due to lack of the appropriate drugs.

Tables 3.2.15 and 3.2.16 give the ages and parities of the 25 pregnant diabetic women.

Table 3.2.15 - Age-groups of the diabetic women

Maternal Age	No. of Women	%
Below 20	Nil	-
20-24	4	16.0
25-29	5	20.0
30-34	11	44.0
35+	5	20.0
TOTAL	25	100.0

Table 3.2.16 - Parities of the diabetic women

Parity	No. of women	%
0	1	4.0
1	3	12.0
2	3	12.0
3	5	20.0
4+	13	52.0
<hr/>		
TOTAL	25	100.0

From the above two tables it is evident that the incidence of diabetes is highest among older (30+ years) and multiparous women. 64% of them were 30 or more years old while 52% had had 4 or more babies.

The foregoing section has focused on some maternal morbidity factors at the KNH and how they are influenced by demographic, socio-economic and environmental factors. The section also focused on some of the major causes of maternal morbidity. While

it was found that age and parity played major roles in obstetric complications during delivery, and specifically, postpartum haemorrhage, puerperal sepsis and anaemia, it was also observed that socio-economic status and environmental background and genetic predisposition also had roles to play especially among women who suffered from puerperal sepsis and anaemia. It was further observed that puerperal sepsis and anaemia as maternal morbidity factors are also dependent on residence, occupation and dietary habits of women. Those who lived in low-income areas with inadequate water supply and poor sanitary conditions, in low-income families, and, by implication, in families with poor dietary habits suffered most from these two conditions. The next section discusses abortion as another major cause of maternal morbidity in Nairobi using data from the KNH.

3.3 Abortion

One problem which, for a long time did not receive general acknowledgement in Kenya is adolescent fertility. One of the effects of the breakdown in traditional African Culture and values consequent upon introduction of non-indigenous civilization has been laxity in sexual behaviour (Mati, 1982). In Kenya, teenage pregnancy rate reaches 20%. But, there are also those women who are not necessarily teenaged but find themselves with unwanted pregnancies. One of the most serious effects of such unwanted pregnancies is septic-abortion. The laws

of Kenya do not allow termination of pregnancy except for medical reasons. Thus women who find themselves with unwanted pregnancies opt to terminate them illegally - often turning to unprofessional people - using crude methods. This is voluntary abortion and it is resorted to as a means of avoiding a birth whose conception has already occurred but was not desired. It is thus used as a method of family planning.

In Kenya, septic abortion alone accounts for more maternal illnesses and deaths than any other obstetric, and gynecological complications (Aggarwal & Mati, 1982; Mati & Muraya, 1985) thus increasingly becoming a threat to reproductive health. At the KNH it was found that abortion accounted for over 30% of total maternal admissions - including deliveries. When deliveries were excluded abortion was found to account for over 75% of all other maternal admissions at the hospital. Table 3.3.1 gives figures of yearly maternal in-patients at the KNH and the proportions accounted for by deliveries and abortions. Abortion also accounted for 6 - 13% of total patient admissions at the hospital. Indeed most (60%) of the acute gynecological beds at the KNH are occupied by the abortion patients (Aggarwal and Mati). Thus abortion contributes significantly to maternal morbidity at the hospital.

Table 3.3.1. - Proportion of abortions, deliveries and other obstetric admissions relative to total maternal admissions, KNH, 1977 - 1986

Year	Total Maternal Patients	% Deliveries	% Abortions	% Others	TOTAL
1977	7876	41.4	47.4	11.3	100.0
1978	8731	45.4	44.3	10.3	100.0
1979	9702	51.3	41.6	7.1	100.0
1980	10106	54.2	35.2	10.6	100.0
1981	11030	62.7	28.2	9.1	100.0
1982	11871	54.9	34.9	10.2	100.0
1983	12799	53.7	37.3	9.0	100.0
1984	14033	57.9	34.1	8.0	100.0
1985	13269	60.0	31.9	8.1	100.0
1986	14826	58.4	33.2	8.4	100.0
\bar{X}		54.0	37.8	9.2	

Out of the 41158 abortion patients identified at the hospital during the ten years under study, there occurred 71 deaths giving an average annual mortality rate of 1.7 per 1000 abortion admissions. During this period, this rate fluctuated between a low of 0.5 (1982) and a high of 3.2 (1979) per 1000 abortion admissions, (see table 3.3.2. below). On the other hand, maternal mortality at the hospital varied between 1.0 and 3.7

Table 3.3.2: - Mortality Ratios from abortion KNH, 1977

- 86

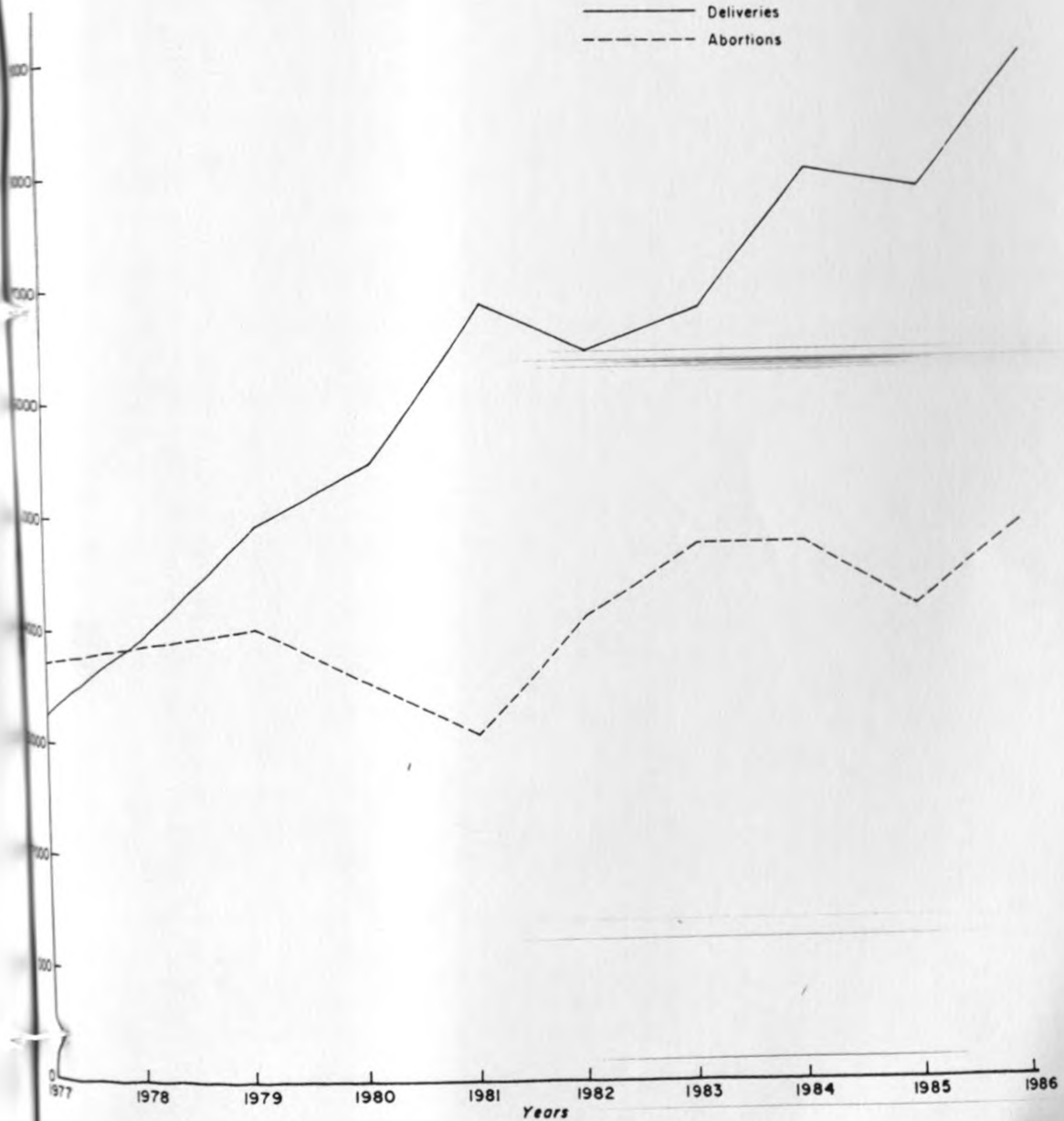
Year	Abortion Patients	Abortion Deaths	Mortality Ratio Per 1000 Abortion Patients
1977	3730	11	2.9
1978	3871	5	1.3
1979	4032	13	3.2
1980	3559	4	1.1
1981	3111	4	1.3
1982	4139	2	0.5
1983	4775	6	1.3
1984	4782	7	1.5
1985	4235	11	2.6
1986	4924	8	1.6
TOTAL	41,158	71	$\bar{x} = 1.7$

per 1000 deliveries. In this study therefore, maternal mortality (from Obstetric Causes) was found to be higher than maternal mortality from abortion at the KNH during the 1977 - 86 period. Figure 3.3.1 gives the trend in abortion admissions in relation to deliveries at the KNH during the period under study. The figure shows that in 1977 abortions were more than deliveries while in 1978 deliveries exceeded abortions by a small margin. Deliveries began to be significantly more than abortions only in 1980 and the trend has persisted throughout the 1980s. However, the impact of abortion on maternal morbidity and mortality in Nairobi was not one of the objectives of this study. The inclusion of abortion data in the study was mainly to have an insight into the characteristics of women who abort and the trend, levels and pattern of abortion at the hospital.

3.3.1 Types of Abortion

At the KNH - and following the International Classification of Diseases -four types of abortion patients are admitted. These four types include spontaneous, legal, illegal and unspecified abortions (see Appendix B). Of all these four types, unspecified abortion, was found to have the most patients with an average of approximately 4,100 patients per year. The type with the least recorded cases was observed to be illegal abortion with only 12 recorded cases for the whole study period. It was learnt that the low figures for the illegal abortion was not due to its low occurrence. Rather it was because very few women were ready to

Fig. 3.3.1 ABORTIONS AND DELIVERIES AT THE KNH 1977-1986 (ALL TYPES)



admit interference (with foetus). Unless they admit or are proved to have interfered with foetus they cannot be classified under illegal abortion. Instead they get to be classified under unspecified abortion. This explains why thousands of unspecified abortion patients are recorded at the hospital. During the period under study, there were 28 spontaneous, 106 legal, 12 illegal and 40,987 unspecified abortion patients identified.

3.3.2 Some Characteristics of Women who had abortion

Table 3.3.3 - gives the proportion (in percentages) of the women who had three types of abortion (excluding spontaneous) in terms of age and parity. For unspecified abortion 458 patients were analysed. For legal abortion all the 106 patients were studied for age and 74 for parity while all the 12 illegal cases were examined.

Table 3.3.3: - Proportion of Abortion Patients by age and Parity, KNH, 1977 - 1986

Type		Illegal (%)	Legal (%)	Unspecified %
Age	Below 20	33.3	22.6	18.9
	20-24	58.4	37.7	41.8
	25-29	Nil	21.7	20.6
	30-34	Nil	9.4	8.4
	*35+	Nil	7.6	5.8
	Unknown	8.3	1.0	4.5
Parity	0	50.0	41.9	18.8
	1	30.0	2.3	12.9
	2	20.0	10.8	16.8
	3	Nil	8.1	14.4
	4+	Nil	13.5	34.1
	Not Stated	Nil	1.4	3.0
TOTAL		100.0	100.0	100.0

* All women aged 35 years and above were aggregated due to the small

number of these women in abortion.

From the above table, it is evident that young women (aged below 25 years) are disproportionately represented in abortion regardless of type - 92% for illegal, 60% for legal and 61% for unspecified. For illegal and legal types the majority of the patients were of parities 0 - 2; 100% and 77% respectively.

(a) Illegal Abortion

Only 12 cases were recorded under this type of abortion at the KNH. It was therefore decided that this figure was too low to draw conclusions from. This was one of the reasons why some unspecified abortion patients were also selected for analysis, since most of the illegally procured abortions ~~get to be~~ recorded under the unspecified type.

Nevertheless, the twelve women were studied and it was found that 33% were teenagers while 58% were aged between 20 - 24 years. Indeed 92% were less than 24 years old. It was also observed that 50% were of parities one or two. None of the women had more than two children.

In terms of marital status, 70% were found to be single and unemployed school leavers or college girls. 30% had had a previous delivery while the rest were of parity zero.

Considering that all the women had admitted to interference, it was difficult to believe that young married childless women would want to procure abortion. It was thus concluded that all the women in this type of abortion who reported being married had perhaps deliberately mis-stated their marital status.

It was also found that 90% of the women had had no history of any family planning - i.e. contraceptive use. It was therefore concluded that women who induced abortion are mostly young, single and unemployed. Since almost all of them had never practised contraception, it was also concluded that they resorted to abortion as a family planning method.

(b) Legal Abortion

Women who were recorded under this type of abortion were those whose physical and/or mental conditions were found not conducive to the development of their pregnancies. Their pregnancies were therefore usually terminated on medical grounds and the operation always referred to as Termination of Pregnancy (TOP). It was observed that this was the safest abortion method as it resulted into fewer morbidities and mortalities for the women involved.

As has been mentioned 106 patients were identified under this abortion type. Table 3.3.3 indicates that this type of abortion occurred in about the same frequency among both teenaged women

and those aged 25-29 years with 22.6% and 21.7% respectively. The operation was highest among those aged 20-24, years accounting for 38% of the total. But this was not unexpected as it has been observed that these years form the peak ages for reproduction among Kenyan women. The incidence of this type of abortion drastically dropped from age 30 years and above.

74 files - representing 70% of the total number of women who had TOP - were retrieved for more detailed study. Table 3.3.4 shows the age and parity distribution of the 74 women.

Table 3.3.4: - Legal Abortion patients by age and parity

Age	P A R I T Y								TOTAL	%
	0	1	2	3	4	5	6+	Not Stated		
Below 20	19	2	-	-	-	-	-	-	21	28.4
20-24	11	12	1	2	-	-	-	-	26	35.1
25-29	1	3	5	3	3	1	-	1	17	22.9
30-34	-	1	2	1	-	-	1	-	5	6.8
35+	-	-	-	1	1	3	-	-	5	6.8
TOTAL	31	18	8	6	4	2	4	1	74	100.0
%	41.9	24.3	10.8	8.1	5.4	2.7	5.4	1.4	100.0	

The table shows that 63% (almost the same proportion as 60% when all the 106 women were studied) were less than 25 years of age. About 15% were 30 and above.

In terms of parity, almost half of the women (42%) were of parity 0 while 24% were of parity one. Thus the majority of the women were either nulliparous or primiparous. The proportion dropped at parities 2 and 3 and then rose again at parities 4 and above (14%). For this latter parity group (4+) it was further observed that 60% were older women of 30 years and above.

By marital status, 76% of the women were found to be single while 22% were married. It was also observed that all the nulliparous women were all single as well. Of the primiparous ones, 78% were single. For those who had had two previous births, 75% were single. But at parity 4⁺ only 3.6% of the women in this parity were still single. For all the single women, 77% were observed to be less than 25 years with 35% being teenagers. It was further observed that the proportion single in this type of abortion fell drastically at ages 25 years and above, accounting for only 18% of the total single.

It was considered that employment status and parity influenced the decision whether or not to terminate a pregnancy. Table 3.3.5 gives the distribution of the 74 women by employment status in relation to parity.

Table 3.3.5 - Legal Abortion Patients by employment Status and Parity

Employment Status	P A R I T Y							Not Stated	TOTAL	%
	0	1	2	3	4	5	6+			
Student	23	6	-	-	-	-	-	-	29	39.2
Unemployed	3	4	1	3	1	1	2	-	15	20.3
Employed	4	6	6	3	3	1	1	1	25	33.8
Not Stated	1	2	1	-	-	-	1	-	5	6.8
TOTAL	31	18	8	6	4	2	4	1	74	100.0
%	41.9	24.3	10.8	8.1	5.4	2.7	5.4	1.4	100.0	

From the table, it is evident that the majority of the women (60%) were either students or unemployed. 34% were employed. Of the unemployed (including students) 60% were nulliparous while 23% had one child. The rest were of parities 2 and above. Of the unemployed (excluding students) 20% were nulliparous while the rest (80%) had at least one child to look after. As for the students 21% already had a child to look after. Among the employed only 16% were nulliparous. The remaining 84% had at least one child the majority being of parities 1 - 4 (72%).

It was observed that one half of the single women were students. Of the single who were employed, 69% already had at least a child. Of the unemployed single, 70% also already had at least a child. 47% of the unemployed were housewives. Table 3.3.6 gives the socio-demographic profiles of all the married women (22%) in this type of abortion.

Table 3.3.6 - Demographic profiles of the Married Women who had legal abortion.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
1	22	3	Housewife	Depression	Unplanned pregnancy; last baby only 6 months old; other 2 also still young. No contraceptive method
2	26	5	Housewife	Depression	Conceived with coil in situ; has sickle-cell trait; one child died of sickle cell disease; one is paralysed at the same hospital due to the disease; has

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
					other 2 who are sicklers. She thus fears the current pregnancy might also produce a sickling baby.
3	35	10	Housewife	Depression	Was due for tubal ligation when she conceived.
4	39	5	Business	Depression	Failed contraception (depopovera) doesn't want baby; husband is unemployed.

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
5	38	8	Housewife	Mentally ill	Has an eight month old baby; Pregnancy might aggravate her mental health; had tubal ligation following year.
6	28	3	Secretary	Depression	Uses no contraceptive method; husband threatening to send her away if she goes on with pregnancy to term; the couple does not want 4th child as they cannot afford it.

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
7	23	1	Teacher	Psychiatric	Had severe puerperal psychosis after delivering her last baby and has not recovered fully; still getting psychiatric treatment; pregnancy may affect mental health.
8	42	6	Housewife	Psycho-social	Was on contraception for 11 years. Predisposed to having mongloid baby by virtue of age; wants TOP and tubal ligation.

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
9	27	4	Housewife	Reactive Depression	Conceived with coil in situ; couple not financially able.
10	22	1	Housewife	Depression	Post-rape depressive psychosis
11	28	2	Home/Economist	Depression	Conceived with coil in situ
12	29	4	Lab/Technician	Depression with severe anxiety	Conceived with coil in situ; fears baby may suffer deformity.

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
13	27	2 ⁺¹	Not stated	Depression	Conceived with coil in situ; has marital problems; extremely distressed; is already unable to support the 2 children adequately.
14	26	2	Physiotherapist	Depression	Contraceptive failure
15	22	1	Housewife	Depression	No contraceptive method; is a refugee and this status makes her unable to support another child; has a disabled child.

Table 3.3.6 Con'd.

Case	Age	Parity	Occupation	Medical Reason for TOP	REMARKS
16	34	6+1	Housekeeper	Pre-eclamptic case	Has tried several contraceptive methods but failed. Wants the operation and tubal ligation.
17	26	3	Teacher	Depression	Failed contraception.

From the table, over one-half of the women had been failed by the contraceptive methods they had been using. Therefore, they were carrying unwanted pregnancies which led to their state of anxiety and depression that medically necessitated termination. All in all, however, it was found that over 90% of the women who had their pregnancies legally terminated were distressed, depressed and generally psychologically unfit to carry on with their pregnancies. Yet this is usually also the situation among women who illegally induce abortions. But the latter group may not have access - either due to unawareness or low socio-economic status - to the specialists to assess their mental fitness in relation to their pregnancies. The result is that the former group have their pregnancies terminated using the safest means both medically and legally. The latter group, if they survive, have to risk legal charges and later morbidities associated with induced septic abortion. But as with illegal abortion, it was found that the majority who had legal abortion were also young (less than 25 years), single, unemployed or students in schools/training colleges. Over one-half (58%) were also found to be mothers already.

(c) Unspecified Abortion

Approximately 40987 patients under this type of abortion were admitted at the KNH during the period of study, giving an average of about 4,000 patients per year. 1935 patients (5% of

the total) were picked randomly and distributed according to the women's age - groups. These are shown in table 3.3.3. on page 111. As was to be expected, the majority (61%) of the women in this type of abortion were found to be less than 25 years old. As was the case with legal abortion, it was also observed that the frequency of abortion was also almost the same among teenagers and those aged 25-29 - 19% and 21% respectively. This frequency decreased drastically at ages 30 years and above.

458 unspecified abortion patients were randomly selected from the above 1935 cases. Their files were studied for parity, marital status, employment status and contraceptive use. Table 3.3.7. give the parity distribution of the 458 women.

Table 3.3.7 - Parity of the women

Parity	no. of women	%
0	86	18.8
1	59	12.9
2	77	16.8
3	66	14.4
4+	156	34.1
Unspecified	14	3.0
TOTAL	458	100.0

This type of abortion was highest among women of parities 0 - 3, accounting for 49% of them. It was also high among the grand multiparous (4+) women. Taken singly, the incidence of the abortion was highest at parities 4 or more followed by parity 0. This finding seems to indicate that the women used abortion to prevent either a first live birth or any more livebirths for the grandmultiparous ones. Hence abortion was used as a family planning method.

In terms of marital status, it was found that the majority (63%) of the women were reportedly married while 35% were single. 2% had not declared their marital status. This is in discrepancy with the findings for legal and illegal abortions and also with what had been expected. The over representation by the married women in this type of abortion could be due to either misstatement of marital status or over-representation of the married in the sample. On the other hand, it might signify the beginning of a new trend and pattern - that married high parity women are starting to increasingly resort to abortion as a means of family planning. This abortion pattern is commonly found in countries of the Middle East and other Moslem Countries(e.g, Eckholm, 1977).

(i)

Single

Among the single it was further observed that 30% were teenaged, 48% were aged 20-29 years, while the rest, (22%) were 30 years and above. Table 3.3.8 gives the parities of the 162 single women in this type of abortion.

Table 3.3.8 - Parities of the Single Women

Parity	No. of Women	%	% in Total Sample
0	54	33.3	11.8
1	30	18.5	6.6
2	24	15.0	5.2
3	18	11.0	5.9
4+	30	18.5	6.6
Unspecified	6	3.7	1.3
TOTAL	162	100	35.4

From the table, it is evident that most abortions under this code among the single occurred among the nulliparous women followed by the primiparous and the grand multiparous women. The frequency dropped at parities 2 and 3. It was further observed that 15% of the single women were students while 42% and 41% had reported unemployed and employed respectively. But most of the employed (94%) were in low-income occupations. Only

6% of the working single women were in higher income jobs e.g. as nurses, teachers or clerks. 32% had reported that they were single, unemployed and already caring for one or more children. This number was found to account for 55% of the total unemployed single women. Thus about 45% of the single had not had any previous livebirth.

(ii) The Married

Table 3.3.9 gives the ages of the 289 married women under the unspecified abortion.

Table 3.3.9: - Age groups of the Married Women

Age Group	No. of Women	%	% in Sample
Below 20	25	8.7	5.5
20-24	52	18.0	11.4
25-29	87	30.1	18.9
30-34	59	20.4	12.9
35+	56	19.4	12.2
Not Specified	10	3.4	2.2
TOTAL	289	100.0	63.1

From the above table, married teenaged women in this type of abortion were the least - 8.7%. This was not unexpected as by age 19, about 84% of Nairobi women are still single (Kenya Census, 1979). Thus most pregnancies among Nairobi teenagers occur among the single. This also explains the apparent low incidence of abortion among the married teenaged women compared to the incidence of abortion - legal or otherwise - among the single in the same age-group. The majority of the married women in this type of abortion were found in ages 25 years and above.

Table 3.3.10 gives the parities of the 289 married women.

Table 3.3.10 - Parities of the Married Women

Parity	No. of Women	%	% in Sample
0	31	10.7	6.8
1	28	9.7	6.1
2	53	18.3	11.6
3	47	16.3	10.3
4 ⁺	125	43.3	27.3
Unspecified	5	1.7	1.1
TOTAL	289	100.0	63.2

The table shows that the majority of the women had 4 or more children (43%). A significant proportion (35%) had 2 or 3 children. About 11% were nulliparous and most of these were found to be the reported teenagers. Perhaps this latter group had mis-stated their marital status.

From the foregoing, it is possible to conclude that abortion is increasingly being indulged in by older high parity married women in Nairobi. Abortion is therefore being used to prevent livebirths of unwanted pregnancies. There was indication of low contraceptive use among all the women studied under this abortion type. Only 20.5% acknowledged any history of having used some method of modern contraception. 39% reported non-use. Of the users, 25.5% reportedly experienced contraceptive failure. Of the single women, over one-third (41% reported non-use while only 20% reported having used any method of contraception. Out of the single users, 19% reported contraceptive failure. The same pattern was exhibited among the married women with 21% reporting use and 38% reporting non-use of any contraceptive method.

The analysis in this section seems to point to one main subject: that abortion of whatever type, was generally used to avoid a livebirth after an unwanted conception had already occurred. Yet a very small proportion of the women involved were found to practise contraception. Two certain conclusions can also be

drawn; first, that these findings imply a rather high rate of pregnancy wastage in Nairobi-even though these were just figures from one Nairobi hospital. Secondly, that with the rate of at least 4000 abortion admissions per year, the Kenyatta National Hospital is being forced to divert a significant amount of its precious resources from the other better uses to the management and treatment of abortion patients. The study has also found evidences of hints to a trend that has hitherto not been imagined in black Africa; that married urban women of high parities could increasingly be starting to indulge in abortion as a family planning measure.

CHAPTER 4

MATERNAL MORTALITY

4.1. Introduction

The Nairobi female population aged 15 - 19 years was estimated to be 282,353 with 400,325 births during 1977-86 period. Within this period it was found that there were approximately 325 maternal deaths in Nairobi. These figures correspond to an overall maternal mortality rate of 115 per 100,000 women aged 15-49 years. On the other hand, they correspond to a maternal mortality ratio of 0.8 per 1000 livebirths. Table 4.1.1. gives the estimated maternal mortality rates for Nairobi on an annual basis from 1977 to 1986. This information is also shown in figure 4.1.1. which depicts the trend of the rates during the ten years. It is evident that the rates fluctuated between 11 and 19 maternal deaths per 100,000 reproductive women, reaching a peak in 1980. However, there were no clearcut differences in the levels of maternal mortality between the 1970s and the 1980s.

Table 4.1.2 gives the annual maternal mortality ratios (per 1000 livebirths) for Nairobi, Pumwani Maternity Hospital and the Kenyatta Hospital from 1977-86.

Table 4.1.1. - Estimated maternal mortality rates (per 100,000 women aged 15-49), Nairobi - 1986

Year	Estimated Female Population 15-49 Years	Maternal Deaths	Maternal Mortality Rate per 100,000 women aged 15-49
1977	169654	25	14.7
1978	179533	26	14.5
1979	189988	24	12.6
1980	201051	39	19.4
1981	212759	30	14.1
1982	225149	38	16.9
1983	238259	27	11.5
1984	252134	45	17.8
1985	266816	33	12.4
1986	282353	38	13.5

Fig. 4.1.1 ESTIMATED MATERNAL MORTALITY RATES, NAIROBI, 1977 - 1986

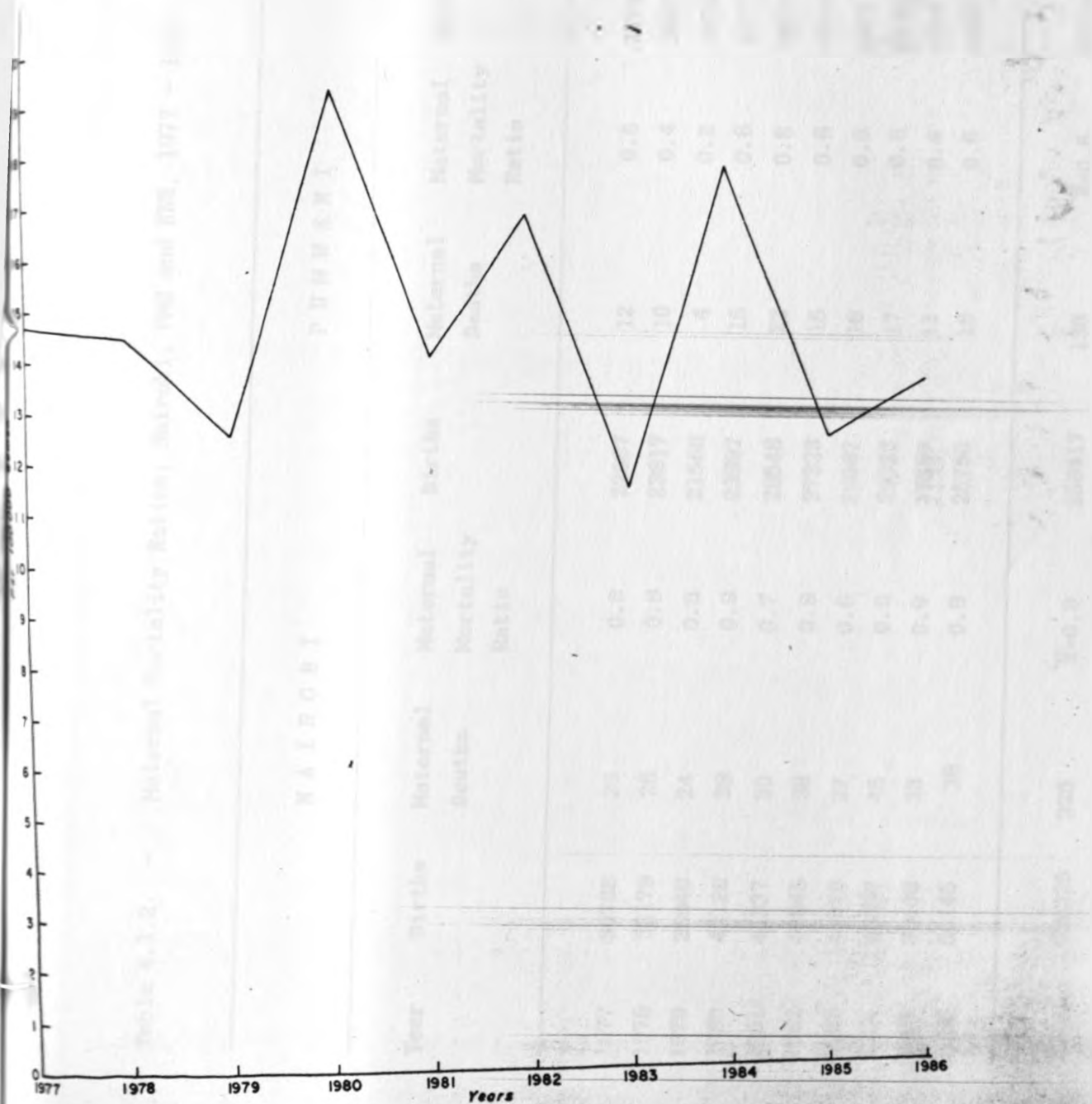


Table 4.1.2. - Maternal Mortality Ratios; Nairobi, PMH and KNH, 1977 - 1986

Year	N A I R O B I			P U M W A N I			K E N Y A T T A		
	Births	Maternal Deaths	Maternal Mortality Ratio	Births	Maternal Deaths	Maternal Mortality Ratio	Births	Maternal Deaths	Maternal Mortality Ratio
1977	30768	25	0.8	22687	12	0.5	3256	12	3.7
1978	32179	26	0.8	23617	10	0.4	3962	12	3.0
1979	28940	24	0.8	21568	4	0.2	4978	13	2.6
1980	42129	39	0.9	23997	15	0.6	5477	18	3.3
1981	41337	30	0.7	28548	22	0.8	6917	3	0.4
1982	43945	38	0.9	27323	15	0.6	6514	17	2.6
1983	46079	27	0.6	28067	16	0.6	6877	7	1.0
1984	48397	45	0.9	29323	17	0.6	8124	21	2.6
1985	36408	33	0.9	27537	11	0.4	7867	17	2.1
1986	50145	38	0.8	25750	16	0.6	8662	16	1.9
TOTAL	400325	325	$\bar{X}=0.8$	258417	138	$\bar{X}=0.5$	62734	136	$\bar{X}=2.0$

Fig 4.1.2 MATERNAL MORTALITY RATIOS, KNH AND PMH, 1977-1986

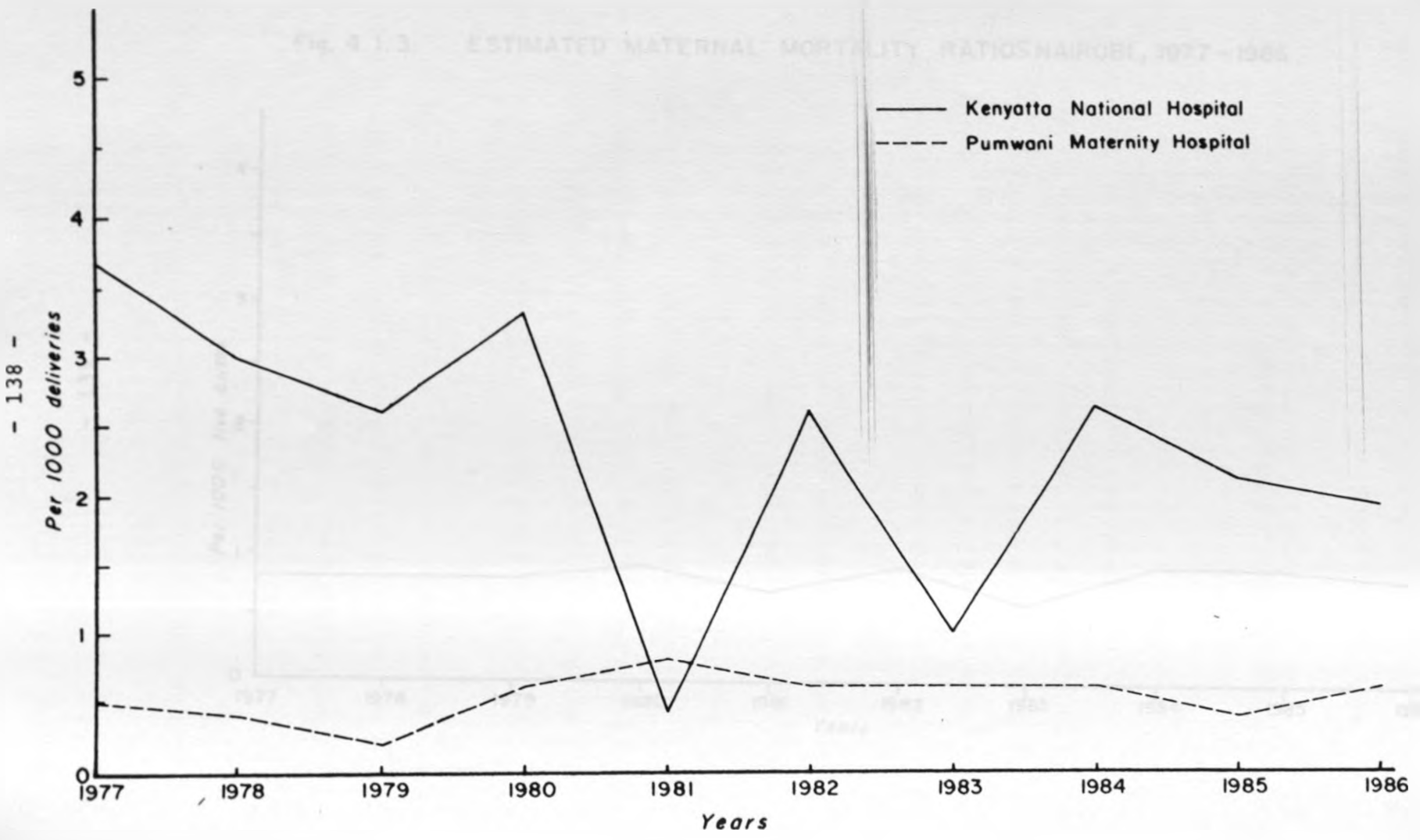
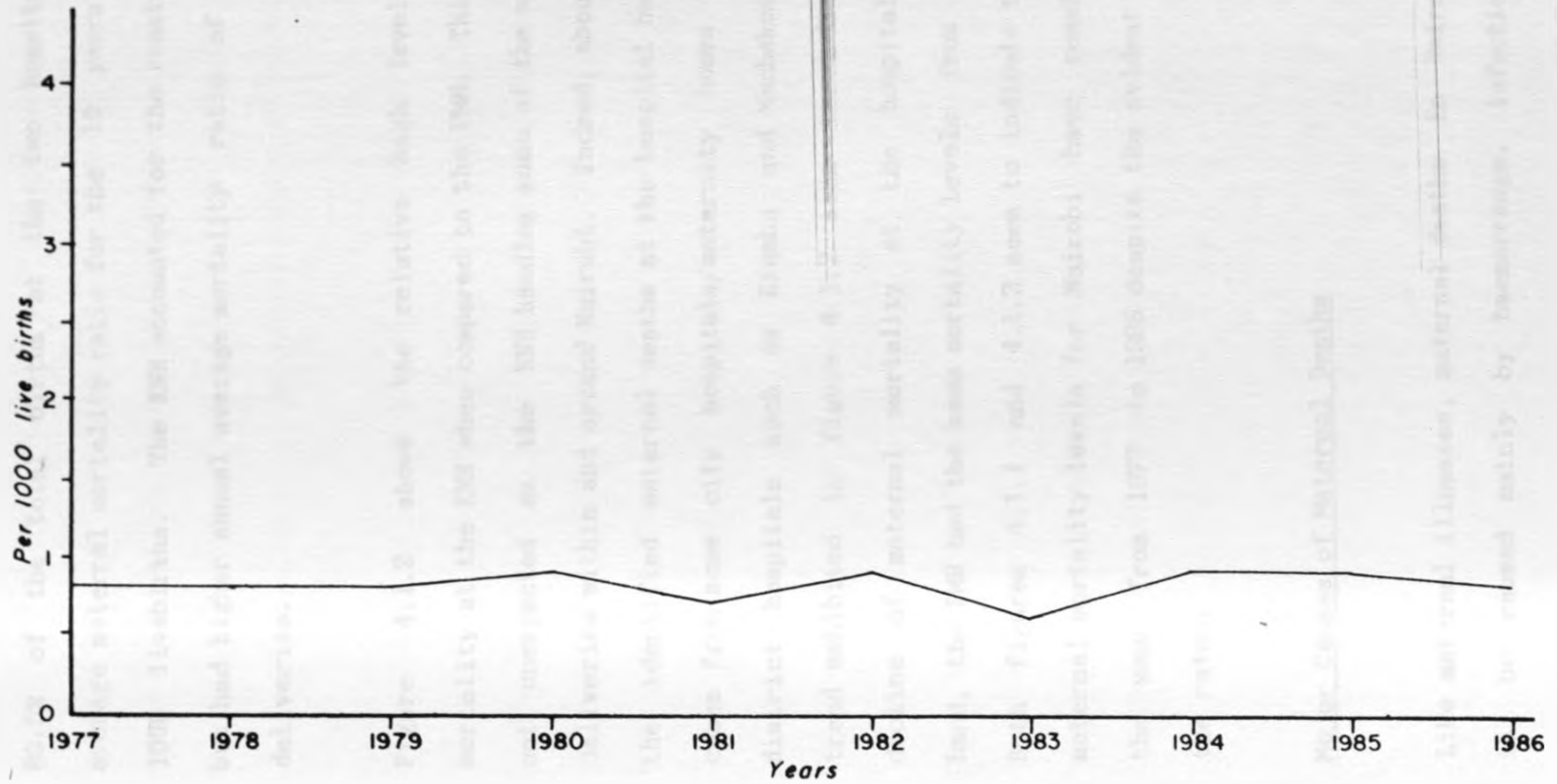


Fig. 4.1.3 ESTIMATED MATERNAL MORTALITY RATIOS NAIROBI, 1977-1986



From the above table it can be seen that while PMH contributed 80.5% of the total births at the two hospitals, the annual average maternal mortality ratio for the 10 years was 0.5 per 1000 livebirths. The KNH accounted for the remaining deliveries but had higher annual average mortality ratio of 2.0 per 1000 deliveries.

Figure 4.1.2 shows the relative high levels of maternal mortality at the KNH when compared to the PMH. This finding was not unexpected as the KNH handles some of the most complicated deliveries within and around Nairobi. Indeed, about 40% of all the identified maternal deaths at the hospital had been referred cases from some city hospitals/maternity homes or the nearby district hospitals such as Kiambu and Machakos. However, the trend exhibited in figure 4.1.2 seem to indicate a general decline of maternal mortality at the hospital. On the other hand, the PMH had the same mortality levels from 1977 to 1986. Both figures 4.1.1 and 4.1.3 seem to indicate that in general, maternal mortality levels for Nairobi have remained relatively the same from 1977 to 1986 despite the evident fluctuations in the rates.

4.2. Major Causes of Maternal Deaths

Like maternal illnesses, maternal deaths in Nairobi were found to be caused mainly by haemorrhage, infection (sepsis) of

childbirth and the puerperium, eclampsia, anaemia and ruptured uterus. Ruptured uterus was caused mainly by obstructed labour. It was also found that many of the deaths were preventable either medically, administratively or through appropriate behaviour on the part of the maternity patients (e.g. - by seeking early ante-natal care and hospital delivery).

Deaths which occurred at the two hospitals during pregnancy, delivery or the first six weeks of the puerperium were included in the study. It cannot be presumed that all such deaths were included especially for the KNH whose records on maternal deaths were rather poor. The hospital's annual reports hardly indicated the number of maternal deaths for most of the years. However, there was more certainty about the 138 deaths at the PMH whose records were more complete.

At the PMH, it was found that the major maternal killers, in a descending order, were postpartum haemorrhage, eclampsia, ruptured uterus, puerperal sepsis, anaemia, cardiac arrest during general anaesthesia and pulmonary embolism (Table 4.2.1).

Table 4.2.1 - Causes of Maternal Deaths, PMH, 1977-86

Case	Maternal Deaths	%
1. Primary postpartum haemorrhage	25	18.1
2. Severe pre-eclampsia = 5 and eclampsia = 16	21	15.2
3. Ruptured Uterus	20	14.2
4. Puerperal sepsis - post operative = 12 following SVD = 5	17	12.3
5. Anaemia	14	10.1
6. Cardiac Arrest under G.A.	8	5.8
7. Pulmonary embolism	7	5.1
8. Miscellaneous	16	11.6
9. Unknown*	10	7.3
<hr/>		
TOTAL	138	100.0

* Most women whose causes of death were unknown were those who died within 24 hours of admission before medical investigations were

carried out on them. Such cases were handed over to the police for postmortems which in most cases were never done. Some also 'just collapsed' after normal deliveries and no postmortem was done on most of such cases too.

Table 4.2.2. - Causes of Maternal deaths, KNH, 1977-86

Cause	Maternal Deaths	%
1. Puerperal sepsis - post operative = 9 following SVD = 23	32	23.5
2. Severe pre-eclampsia = 4 and eclampsia = 14	18	13.2
3. Postpartum haemorrhage	16	11.0
4. Anaemia	14	10.3
5. Raptured ectopic pregnancy	9	6.6
6. Raptured uterus	5	3.7
7. Postpartum renal failure	2	1.5
8. Miscellaneous	27	20.6
9. Unknown	13	9.6
TOTAL	136	100.0

The miscellaneous causes of maternal deaths at both hospitals included cerebral malaria, meningitis, pneumonia, amniotic fluid embolism, jaundice, congestion of lungs, gastro-intestinal haemorrhage, myocarditis, diabetes mellitus, essential hypertension, bleeding disorder, accidental deaths (resulting mainly from falls off labour bed), reaction to blood transfusion and liver failure.

When maternal deaths at the two hospitals were analysed together, the three leading causes of the deaths in Nairobi in general were found to be puerperal sepsis, postpartum haemorrhage and eclampsia. Table 4.2.3 gives the major causes of maternal deaths at the two hospitals considered together.

Table 4.2.3. - Causes of Maternal deaths, KNH + PMH, 1977-86

Cause	Maternal Deaths	%
1. Puerperal sepsis	49	17.9
2. Postpartum haemorrhage	41	14.6
3. Severe pre-eclampsia and eclampsia	39	14.2
4. Anaemia	28	10.2
5. Ruptured uterus	25	9.1
6. Ruptured ectopic pregnancy	9	3.3
7. Cardiac arrest under G.A.	8	2.9
8. Pulmonary embolism	7	2.6
9. Cerebral malaria	3	1.1
10. Postpartum renal failure	3	1.1
11. Miscellaneous	40	14.6
12. Unknown	23	8.4
TOTAL	274	100.0

Age and parity involving the 274 maternal deaths were analysed together and the results are shown in tables 4.2.4 and 4.2.5. It should be noted that a number of women (24.8%) had not stated their ages, or if they had, their files could not be traced. But of those whose ages were reported, the majority were found to be in the 20-24 year age-group (22.6%) followed by the 25-29 age-group. But this was expected as ages 20 to 29 years form the reproductive peak among Kenyan women. Thus, most women are exposed to maternal health risks during these ages.

Table 4.2.4: Age-distribution of the 274 dead mothers (1977 - 1986)

Ages	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL	%
Below 20	2	4	2	4	8	7	3	5	5	4	44	16.1
20-24	4	8	4	7	1	8	4	9	4	13	62	22.6
25-29	3	1	2	8	6	6	3	8	6	4	47	17.2
30-34	3	3	0	2	5	1	2	3	6	1	31	11.3
35-39	1	0	0	0	1	0	1	3	4	1	11	4.0
40+	0	1	0	0	0	0	2	2	2	4	11	4.0
Unknown	11	5	9	12	4	10	8	8	1	0	68	24.8
TOTAL	24	22	17	33	25	32	23	38	28	32	274	100.0

Table 4.2.5: Parity distribution

Previous												
Parity	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	TOTAL	%
0	7	7	3	6	7	8	6	8	7	8	67	24.4
1	1	2	0	4	4	4	1	1	3	7	27	9.9
2	3	2	2	3	2	2	3	5	4	3	29	10.6
3	2	1	0	2	1	4	1	1	3	5	20	7.3
4 ⁺	10	5	4	4	8	3	10	7	9	7	67	24.4
Unknown	1	5	8	14	3	11	2	16	2	2	64	23.4
TOTAL	24	22	17	33	25	32	23	38	28	32	274	100.0

From the parity table it is evident that most maternal deaths occurred at parities zero and 4⁺. This implies that most of the women died when they were having their first babies or their fourth or more babies. Very few deaths occurred to women at parities 1, 2 and 3.

4.2.1 Cause-specific analysis of Maternal Mortality

The women who had died from the major maternal conditions i.e. puerperal sepsis, postpartum haemorrhage, eclampsia, anaemia and ruptured uterus were studied in greater detail for age, parity, ante-natal care status and gestation at first ante-natal clinic visit.

(a) Puerperal Sepsis:

This was the major cause of the 274 maternal deaths, having claimed 49 lives which represented 17.9% of the total deaths. Of the 49 women 43% were found to have suffered from the infection post operatively - the majority of whom had delivered by caesarian section. The rest contracted the disease following normal delivery. Table 4.2.6 gives the age distribution of the 49 women.

Table 4.2.6. - Age-groups of women who died from p.sepsis

Age	Maternal Deaths	%	Total Maternal Deaths in Age-group	% in Age group due to all causes
Below 20	10	20.4	44	22.7
20 - 24	12	24.5	62	19.4
25 - 29	9	18.4	47	19.1
30 - 34	6	12.2	31	19.4
35 ⁺	4	8.2	22	18.2
Unknown	8	16.3	68	11.8
TOTAL	49	100.0	274	

The table shows that puerperal sepsis accounted for almost a quarter (22.7%) of all maternal deaths among the under 20.

Table 4.2.7 - Gives the parities of the women who died from puerperal sepsis.

Table 4.2.7: Parities of the Women who died from puerperal sepsis

Previous Parity	Maternal Deaths	%	Total Deaths Parity Group	% in Parity Group due to all cases
0	10	20.4	67	14.9
1	7	14.3	27	25.9
2	3	6.1	29	10.4
3	3	6.1	20	15.0
4+	15	30.6	67	22.4
Unknown	11	22.5	64	17.2
TOTAL	49	100.0	274	

The table shows that the majority of the women who died from puerperal sepsis had previous parities of either zero (20.4%) or 4 and more

children (30.6%). This finding compares favourably with morbidity findings concerning puerperal sepsis where it was shown that primiparous and grand multiparous women were at higher risk from the disease than those of the parities 1, 2 and 3. In mortalities due to this condition it was further found that 15% and 22% of all deaths occurring to primigravidas and grand multiparous women respectively were attributed to it.

(b) Postpartum Haemorrhage

Primary postpartum haemorrhage caused the deaths of 41 women, accounting for about 15% of all the deaths in this study. At Pumwani, it was found to be the leading cause of maternal deaths. Tables 4.2.8 and 4.2.9 give age and parity distributions of the mothers who died due to this condition. The condition accounted for 21% of deaths from all causes among women aged 30 years and above. The condition was also responsible for another 21% of deaths which occurred to mothers with 4 or more children. It was also found to cause minimal deaths among teenaged women and primigravidas.

Table 4.2.8: Age-distribution of deaths due to PPH

Age	Deaths	%	All Deaths	% of deaths from all causes in age group
< 20	3	7.3	44	6.8
20 - 24	10	24.4	62	16.1
25 - 29	7	17.1	47	14.9
30 - 34	8	19.5	31	25.8
> 35	3	7.3	22	13.6
Unknown	10	24.4	68	14.7
TOTAL	41	100.0	274	

Table 4.2.9: Parity distribution of deaths due to PPH

Previous Parity	Maternal Deaths	%	All Deaths in parity Group	% of deaths from all causes in parity Group
0	3	7.3	67	4.5
1	4	9.8	27	14.8
2	7	17.1	29	24.1
3	3	7.3	20	15.0
>4	14	34.2	67	20.9
Not stated	10	24.4	64	15.6
TOTAL	41	100.0	274	

(c) Eclampsia

The number of deaths from eclampsia was 39, representing 14.2% of the total maternal deaths. The 39 women were studied for age, parity, ante-natal care status and gestation at first ante-natal visit. Eclampsia is the end result of a disease process called pre-eclampsia (i.e pregnancy - induced hypertension) whose early detection and control depends on the ante-natal clinic attendance (or ANC care) of the expectant mother. It is a condition which is mostly experienced during the third trimester (last 3 months of pregnancy).

Tables 4.2.10, 4.2.11 and 4.2.12 respectively give the analyses by age, parity and gestation at first ante-natal clinic (ANC) visit.

Table 4.2.10 - Age groups of women who died from eclampsia

Age group	Deaths	%	All deaths in age group	% deaths in age group from all causes
Below 20	15	38.5	44	34.1
20-24	9	23.1	62	14.5
25-29	2	5.1	47	4.3
30-34	4	10.3	31	12.9
35+	2	5.1	47	4.3
Unknown	7	17.9	68	10.3
TOTAL	39	100.0	274	

From the above table, it is evident that the eclamptic condition was a major maternal killer among pregnant teenaged women. Of the 39

women who died from the condition, approximately 39% were less than 20 years old. Further more, of all the 44 deaths in the age group eclampsia was responsible for 34 %. Puerperal sepsis and postpartum haemorrhage were respectively responsible for 23% and 6.8% of the deaths in this age group.

Table 4.2.11: - Parities of the women who died from eclampsia

Previous Parity	Maternal Deaths	%	All deaths in group parity	% in Parity due to all causes
0	19	48.7	67	28.4
1	9	23.1	27	33.3
2	2	5.1	29	6.9
3	4	10.3	20	20.0
4+	3	7.7	67	4.5
Unknown	2	5.1	64	3.1
TOTAL	39	100.0	274	

From table 4.2.11, it is again clear that most of the women (49%) who died of eclampsia were primigravidas or previous zero parity. A significant proportion (23%) were expecting their second babies. For all the deaths in the Zero- Parity group eclampsia was found to have been responsible for the proportion - 28.4%

Table 4.2.12 - ANC attendance status of women who died from eclampsia.

Gestation at first ANC visit	Maternal deaths	%
Non(i.e no visit)	8	20.5
16 weeks or less	3	7.7
17-24 weeks	6	15.4
25+ weeks	15	38.5
Not stated	7	17.9
TOTAL	39	100.0

The above table shows that approximately 21% of the women had no histories of ante-natal clinic attendance while the majority of the - 39% - attended ante-natal clinic for the first time at 6 or more

months of gestation. It was also noted that for some of those who attended clinics at all, their attendances were not regular as they defaulted on subsequent appointments.

(d) Anaemia:

Although considered the primary cause of death in only 28 (10.2%) maternal deaths at the two hospitals, anaemia was also observed to be an important factor in many cases in the series. For instance, pre-existing anaemia was a complicating factor in many of the patients who died of puerperal sepsis. Of the 28 women, 14% suffered from postpartum anaemia while 79% died of anaemia of pregnancy.

The 28 women were studied for age, parity and ANC status, the latter condition being examined only for the women who died of anaemia of pregnancy. The ANC attendance status was important because detection and treatment of anaemia is also dependent on early and regular ANC attendance. Unlike for the anaemic women who were studied for morbidity, the causes of anaemia for the women who died from the condition were not given or reported.

Table 4.2.13 gives the age analysis of the 28 women who had died of anaemia.

Table 4.2.13 - Ages of women who died from anaemia

Age group	Maternal Deaths	%	All deaths in age group from all causes	% of total deaths in age group
Below 20	9	32.1	44	20.5
20 - 24	7	25.0	62	11.3
25 - 29	8	28.6	47	17.0
30 - 34	Nil	Nil	31	0.0
35 ⁺	1	3.6	22	4.6
Unknown	3	10.7	68	4.4
TOTAL	28	100.0	274	

Most of the women were less than 30 years of age. Anaemia contributed about 21% to total deaths among teenaged mothers. Table 4.2.14 shows the parities of the women who died from anaemia. It shows that 25% of the women were primigravidas while about 43% were expecting either their second or third babies.

Table 4.2.14 - Parities of women who died of anaemia

Previous Parity	Deaths	%	All deaths in parity group	% of all in deaths parity
0	7	25.0	67	10.4
1	6	21.4	27	22.2
2	6	21.4	29	20.7
3	2	7.1	20	10.0
4+	4	14.3	67	6.0
Not stated	3	10.7	64	4.7
TOTAL	28	100.0		

Deaths due to anaemia were minimal at parity 3 but rose again at parity 4 or more.

Table 4.2.15 gives the ANC attendance status of the women who died of anaemia of pregnancy.

Table 4.2.15 - ANC attendance status of women who died of anaemia of pregnancy.

Gestation at first ANC visit (weeks)	Maternal deaths	%
None	1	4.6
16 or less	2	9.2
17-24	7	31.8
25+	7	31.8
Not stated	5	22.7
TOTAL	22	

The table indicates that the majority of the women (32) started visiting ante-natal clinic in their fifth or sixth months of pregnancy. Only 4.6% of the women had no history of ANC attendance. About 23% did not report their ANC status.

(e) Ruptured Uterus

Ruptured uterus was found to be one of the major maternal killers at Pumwani Maternity Hospital, being third only after postpartum haemorrhage and eclampsia. It was responsible for 15% of the deaths at the hospital. Most of the women who died from the condition experienced excessive bleeding (postpartum haemorrhage) but they were classified separately because their haemorrhage was considered secondary to ruptured uterus. The major cause of ruptured uterus was also observed to be obstructed labour associated with malpresentation or cephalo pelvis disproportion (contracted pelvis) and late presentation to hospital

on the part of the women, having laboured for long at home. Tables 4.2.16., 4.2.17 and 4.2.18 respectively show age, parity and ante-natal clinic attendance status analyses of the women who died due to ruptured uterus. Once more ANC attendance status was found to be significant because malpresentation (e.g breech) and cephalo pelvis disproportion (i.e baby too big for mother to deliver normally) can be detected early during ANC attendances. Early detection means that ruptured uterus would be avoided through precautions in delivering such women using safer methods such as elective caesarian sections. Thus for deaths from ruptured uterus to be prevented, early diagnosis would be essential.

Table 4.2.16 - Ages of women who died from ruptured uterus

Age Group	Deaths	%	All deaths due to all causes in age group	% of total deaths in age group
Below 20	Nil	Nil	44	Nil
20 - 24	5	20.0	62	8.1
25 - 29	8	32.0	47	17.0
30 - 34	4	16.0	22	18.2
35+	4	16.0	22	18.2
Unknown	4	16.0	68	5.9
TOTAL	25	100.0	274	

Table 4.2.17 - Parities of women who died from ruptured uterus

Previous Parity	Deaths	%	All deaths due to all causes in parity group	% of total deaths in parity
0	2	8.0	67	3.0
1	3	12.0	27	11.1
2	4	16.0	29	13.8
3	3	12.0	20	15.0
4+	12	48.0	67	17.9
Unknown	1	4.0	64	1.6
TOTAL	25	100.0	274	

Table 4.2.18 - ANC attendance

Gestation at first ANC visit (weeks)	Deaths	%
None	Nil	Nil
16 or less	Nil	Nil
17 - 24	4	16.0
25+	14	56.0
Unknown	7	28.0
TOTAL	25	100.0

From the above tables, no teenaged women died of ruptured uterus while over 50% died from the condition at ages 20 - 29 years. The majority of the women (48%) were also found to be of parities 4 or more. The condition accounted for fewest deaths among women of parity zero. This finding was expected as the probability of ruptured uterus increases with the number of deliveries in a woman's reproductive lifespan (personal communication).

In this section, it has been shown that between 1977 - 1986, the major causes of maternal deaths in Nairobi were puerperal sepsis, post partum haemorrhage, eclampsia, anaemia and ruptured uterus. It was also noted that while most deaths occurred to nulliparous, grandmultiparous and to teenaged and middle aged women, quite a number of the deaths could have been avoided had ante-natal care been sought early and regularly by the women for the detection and control of some of the complications. In the next section an attempt is made to correlate maternal mortality to some selected demographic variables.

4.3 Demographic correlates of Maternal Mortality

In order to depict the distribution of Nairobi births on the basis of the mother's age groups and parities, the percent distribution of births by these variables at the KNH and PMH were used. Birth distributions according to mothers' age groups at the two hospitals are shown below in table 4.3.1.

Table 4.3.1. - Percent distribution of births according to maternal age groups, KNH and PMH

Maternal age	P e r c e n t	
	KNH	PMH
Below 20	16.6	20.9
20 - 24	37.5	36.8
25 - 29	25.2	20.5
30 - 34	12.0	7.5
35 - 39	4.9	3.1
40+	1.6	0.9
Unknown	2.2	10.3
TOTAL	100.0	100.0

The 400325 Nairobi births were then distributed according to mothers' age groups using the average distributions at the two hospitals. This is shown in table 4.3.2 below. This assumption was made on the basis that the two hospitals handled more than 80% of Nairobi births.

Table 4.3.2 - Distribution of Nairobi births by mothers' age groups

Maternal age group	%	Number of births
Below 20	18.8	75,261
20 - 24	37.1	148,521
25 - 29	22.9	91,674
30 - 34	9.8	39,232
35 - 39	4.0	16,013
40+	1.2	4,804
Unknown	6.2	24,820
TOTAL	100.0	400,325

The percent distribution of births according to mothers' parities at the PMH was found to be as shown in table 4.3.3. below.

Table 4.3.3. - Percent distribution of births by mothers' parities at the PMH

Previous Parity	%
0	30.6
1	14.2
2	16.9
3	14.8
4	8.6
5	7.3
6+	7.6
TOTAL	100.0

It should be noted that the reporting on mothers' parities at the PMH was complete. An assumption was then made that the above parity distribution of births applied for births at the KNH and all births in Nairobi. The age/parity distribution of births were necessary for the calculation of ratios to determine any relationship between the variables and maternal mortality.

The percent age/parity distributions of the 274 maternal deaths at the two hospitals were also used to distribute the estimated 325 maternal deaths which occurred in the whole of Nairobi during the 1977 - 1986 period. The distributions are shown in tables 4.3.4 and 4.3.5.

Table 4.3.4 - Maternal deaths in Nairobi by age groups

Maternal age group	%	Maternal deaths
Below 20	16.1	52
20 - 24	22.6	73
25 - 29	17.2	56
30 - 34	11.3	37
35 - 39	4.0	13
40+	4.0	13
Unknown	24.8	81
TOTAL	100.0	325

Table 4.3.5. - Maternal deaths in Nairobi by parities

Previous Parity	%	Maternal deaths
0	24.4	79
1	9.9	32
2	10.6	35
3	7.3	24
4	8.0	26
5	6.6	21
6+	9.9	32
Unknown	23.4	76
TOTAL	100.0	325

4.3.1 AGE

Table 4.3.6 and figures 4.3.2. and 4.3.3. give maternal mortality ratios by age groups of mothers. Maternal mortality was found to exhibit a classic J - shaped relationship with maternal age (figures 4.3.1., 4.3.2. and 4.3.3.). From the figures, it is evident that mortality rates tend to be higher among women aged 15-19 years, reach a minimum during ages 20-29 and then climb sharply again reaching a peak at ages 40 and above. This finding is in agreement with that of Perkins (1969)

who studied 18000 deliveries in Bangkok, Thailand and found a J - shaped gradient by age in complicated deliveries. However, studies done in other developing countries - e.g. by Koenig, et.al. (1988) in Matlab, Bangladesh - found a U - shaped curve with the minimum level stretching from age 20 to 34 years and starting to rise again at age 35 years and above.

In this study the gradients indicate a rise beginning at age 30 years, perhaps due to age mis-reporting (e.g. heaping at age 30) and omissions. The other plausible explanation could be due to the fact that conditions which favour delivery and maternal health in communities such as Matlab apply favourably to women aged upto 34 years

Table 4.3.6 - Maternal Mortality by age in Nairobi, KNH and PMH, 1977 - 1986

Age	Estimated Births in age group	Maternal deaths in age group	Maternal Mortality Ratio	% Maternal deaths
Nairobi				
20	75261	52	0.7	16.1
20-24	178521	73	0.5	22.6
25-29	91674	56	0.6	17.2
30-34	39232	37	0.9	11.3
35-39	16013	13	0.8	4.0
40+	4804	13	2.7	4.0
Not stated	24820	81		24.8
KNH				
20	10414	18	1.7	13.2
20-24	23525	32	1.4	23.5
25-29	15809	24	1.5	17.6
30-34	7528	14	1.9	10.3
35-39	3074	6	2.0	4.4
40+	1004	6	6.0	4.4
Not stated	1380	36		26.5

Table 4.3.6. Cont.

Age	Estimated Births in age group	Maternal deaths in age group	Maternal Mortality Ratio	% Maternal deaths	
FMH	20	54009	26	0.5	18.8
	20-24	95098	30	0.3	21.7
	25-29	52975	23	0.4	16.7
	30-34	19381	17	0.9	12.3
	35-39	8011	5	0.6	3.6
	40 ⁺	2326	5	2.2	3.6
	Not stated	26617	32		23.2
KNH and FMH together	20	60376	44	0.7	16.1
	20-24	119147	62	0.5	22.6
	25-29	73544	47	0.6	17.2
	30-34	31473	31	1.0	11.3
	35-39	12846	11	0.9	4.0
	40 ⁺	3854	11	2.9	4.0
	Not stated	19911	68		24.8
TOTAL					100.0

Fig 4 3.1 MATERNAL MORTALITY BY MOTHERS' AGES, NAIROBI, 1977-1986

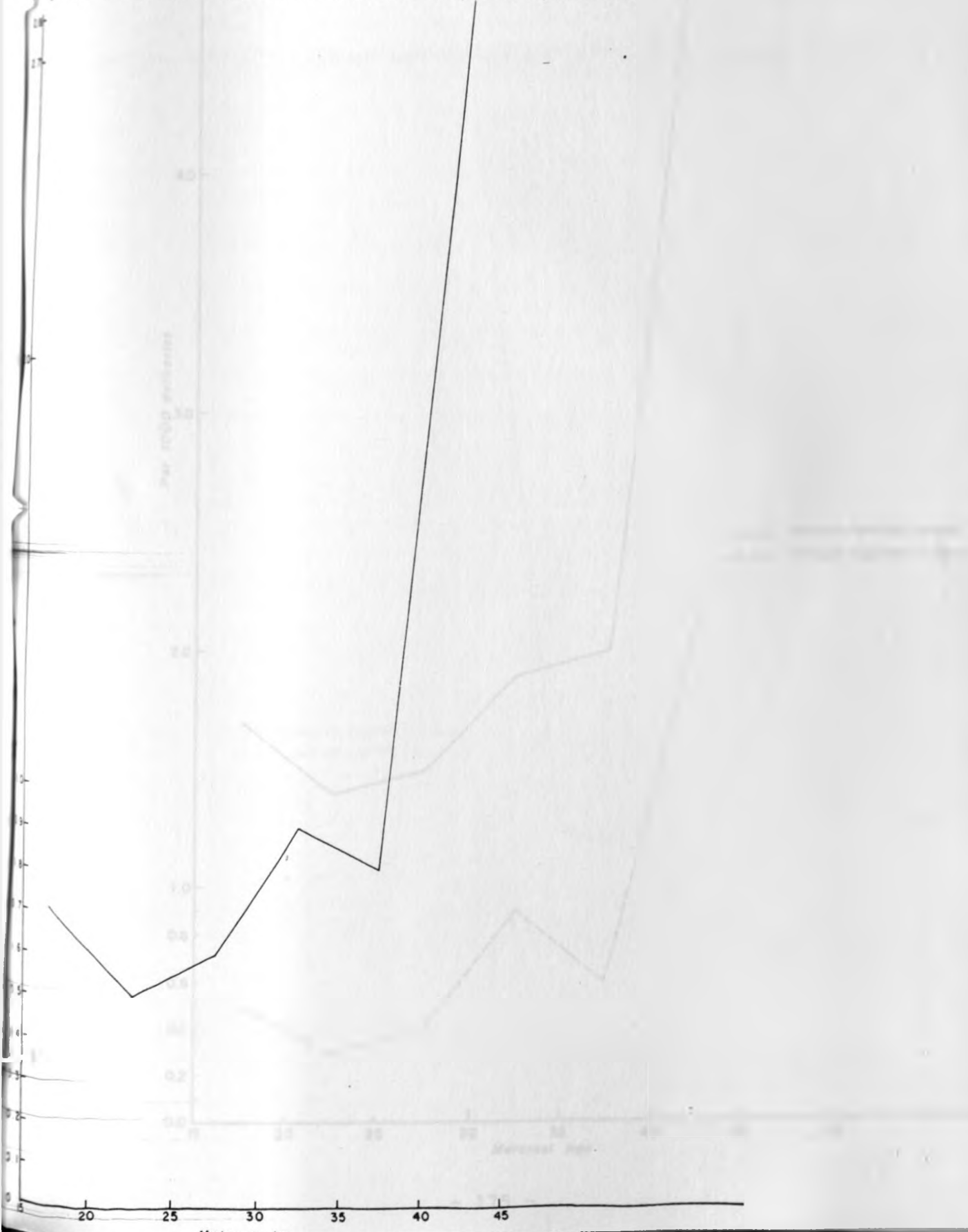


Fig. 4.3.2 MATERNAL MORTALITY BY AGE, KNH AND PMH COMPARED

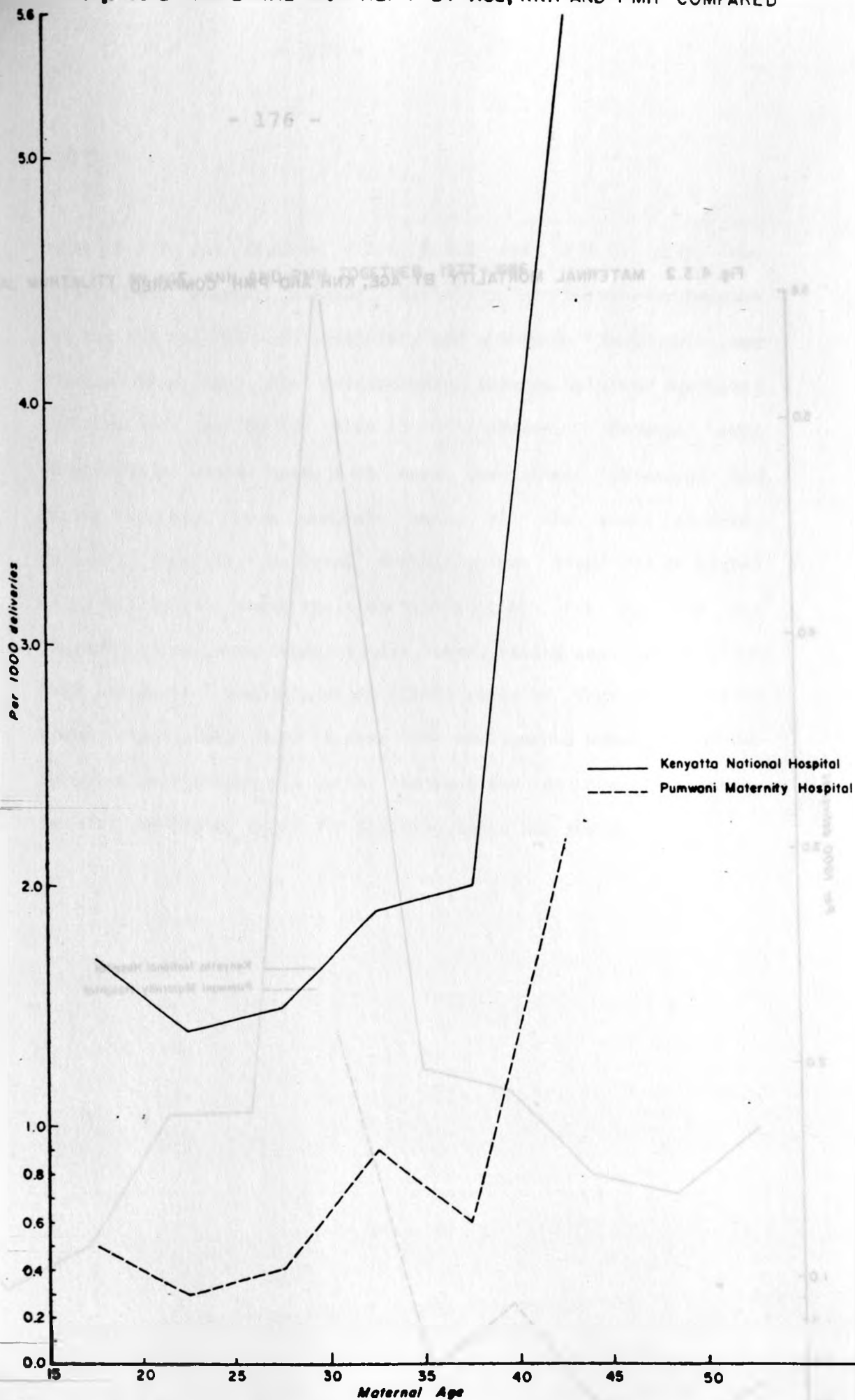
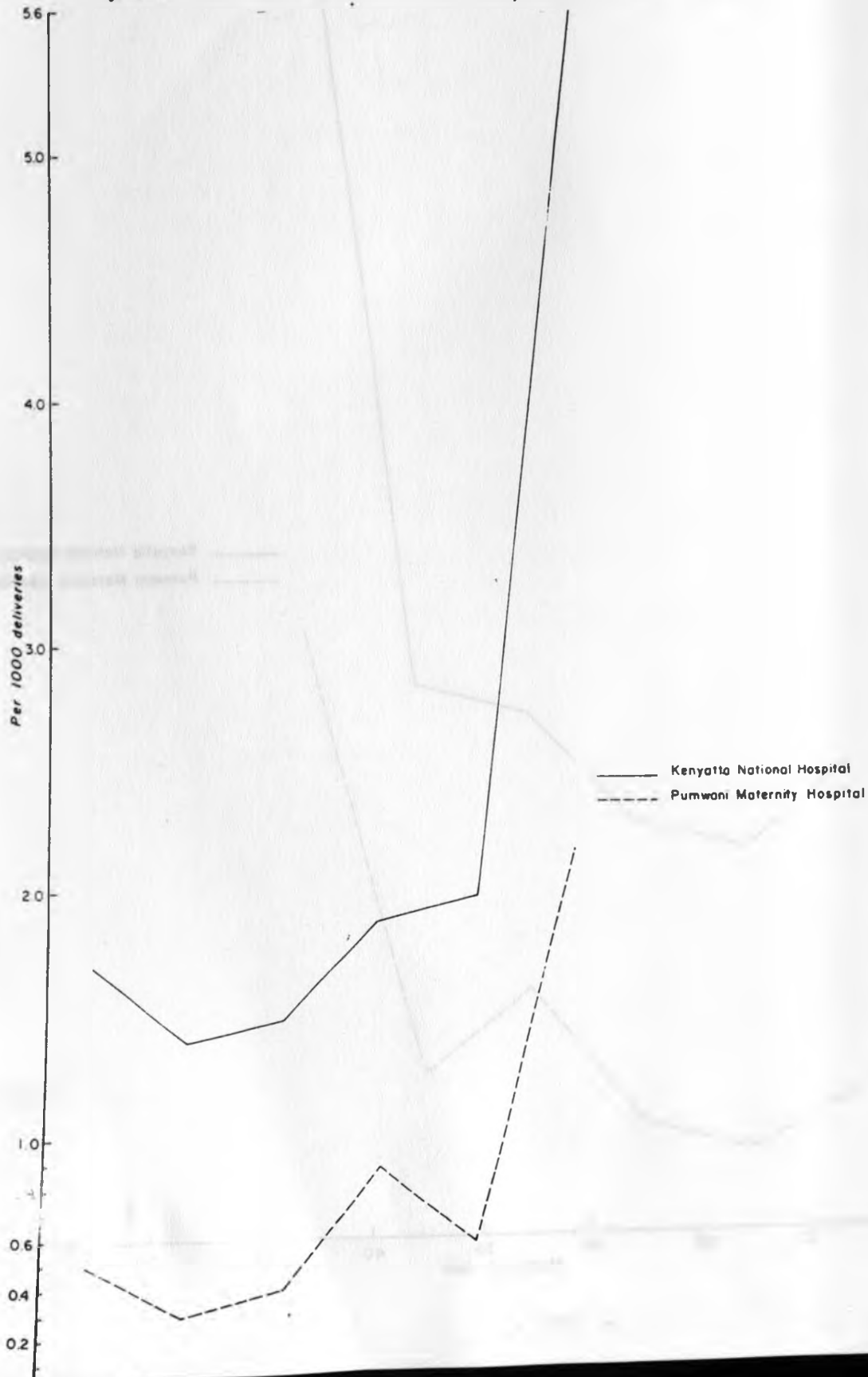


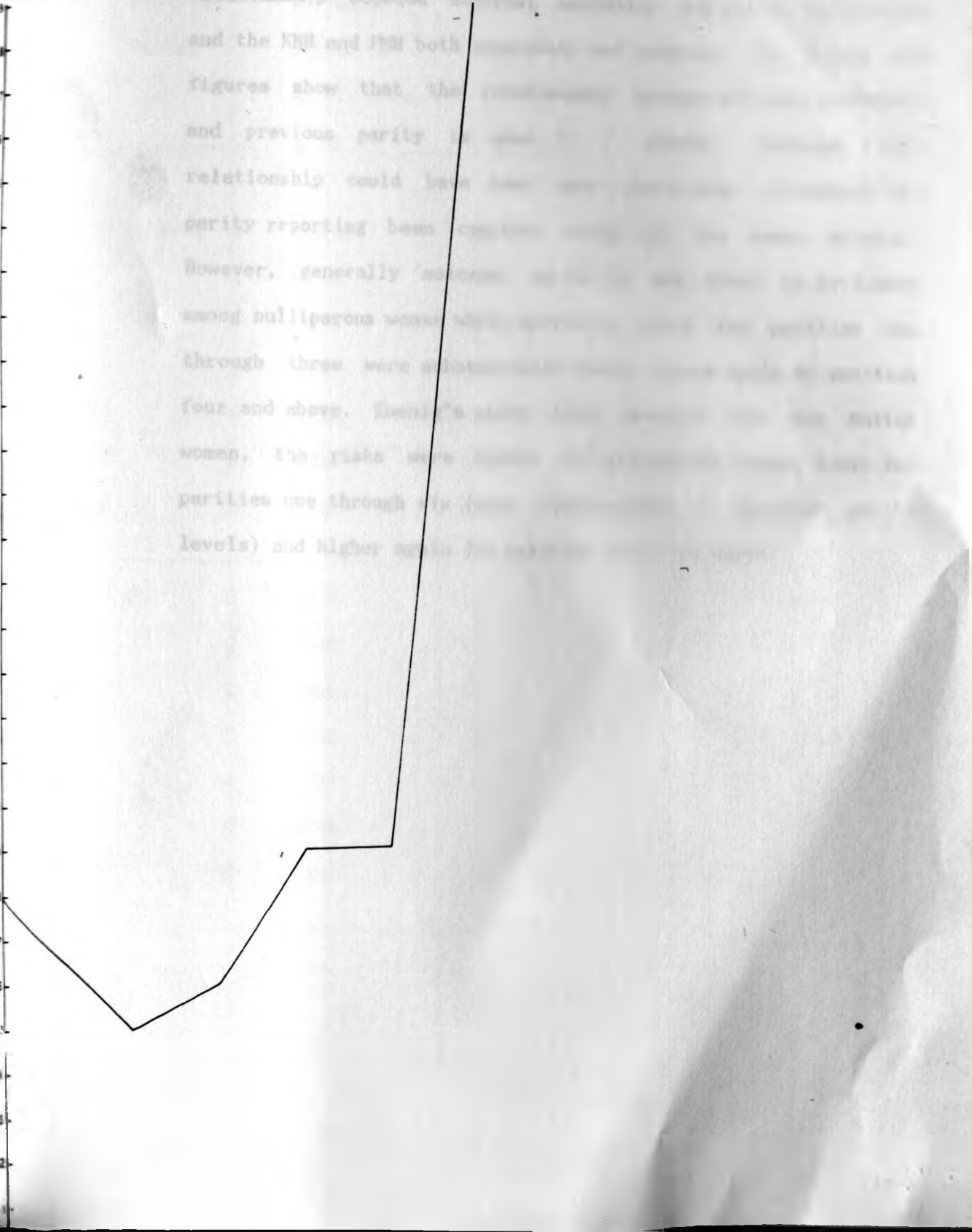
Fig 4.3.2 MATERNAL MORTALITY BY AGE, KNH AND PMH COMPARED



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Table 4.3.1 and Figure 4.3.1, 4.3.2

Fig 4.3.3 MATERNAL MORTALITY BY AGE, KNH AND PMH TOGETHER, 1977-1986



and the KNH and PMH both... figures show that the... and previous parity... relationship could have... parity reporting been... However, generally... among nulliparous women... through three were... four and above. For... women, the risks were... parities one through six... levels) and higher ages...

4.3.2 PARITY

Table 4.3.7 and figures 4.3.4 4.3.5 and 4.3.6 give the relationship between maternal mortality and parity for Nairobi and the KNH and PMH both separately and combined. The table and figures show that the relationship between maternal mortality and previous parity is also J - shaped. Perhaps this relationship could have been more curvilinear (U-shaped) had parity reporting been complete among all the women studied. However, generally maternal mortality was found to be higher among nulliparous women while mortality risks for parities one through three were substantially lower, rising again at parities four and above. Koenig's study (1988) revealed that for Matlab women, the risks were higher for nulliparous women, lower for parities one through six (with fluctuations at specific parity levels) and higher again for parities seven and above.

Table 4.3.7 - Maternal Mortality by parity 1977 - 1986

Previous Parity	Estimated Births in parity group	Maternal deaths	Maternal Mortality Ratio	% Maternal deaths	
Naiorbi	0	122499	79	0.7	24.4
	1	56846	32	0.6	9.9
	2	67655	35	0.5	10.6
	3	59248	24	0.4	7.3
	4	34428	26	0.8	8.0
	5	29224	21	0.7	6.6
	6 ⁺	30425	32	1.1	9.9
KNH	0	19197	26	1.4	19.1
	1	8908	11	1.2	8.1
	2	10602	13	1.2	9.6
	3	9285	4	0.4	2.9
	4	5395	9	1.7	6.6
	5	4579	3	0.7	2.2
	6 ⁺	4768	13	2.7	9.6

Table 4.3.7 Cont.

PMH	0	79076	41	0.5	29.7
	1	36695	16	0.4	11.6
	2	43672	16	0.4	11.6
	3	38246	16	0.4	11.6
	4	22224	13	0.6	9.4
	5	18864	15	0.8	10.9
	6 ⁺	19640	14	0.7	10.1

KNH +

PMH	0	98272	67	0.7	24.4
Combined	1	45603	27	0.6	9.9
	2	54275	29	0.5	10.6
	3	47530	20	0.4	7.3
	4	27619	22	0.8	8.0
	5	23444	18	0.8	6.6
	6 ⁺	24408	27	1.1	9.9

Fig. 4.3.4 MATERNAL MORTALITY BY PARITY, NAIROBI, 1977-1986

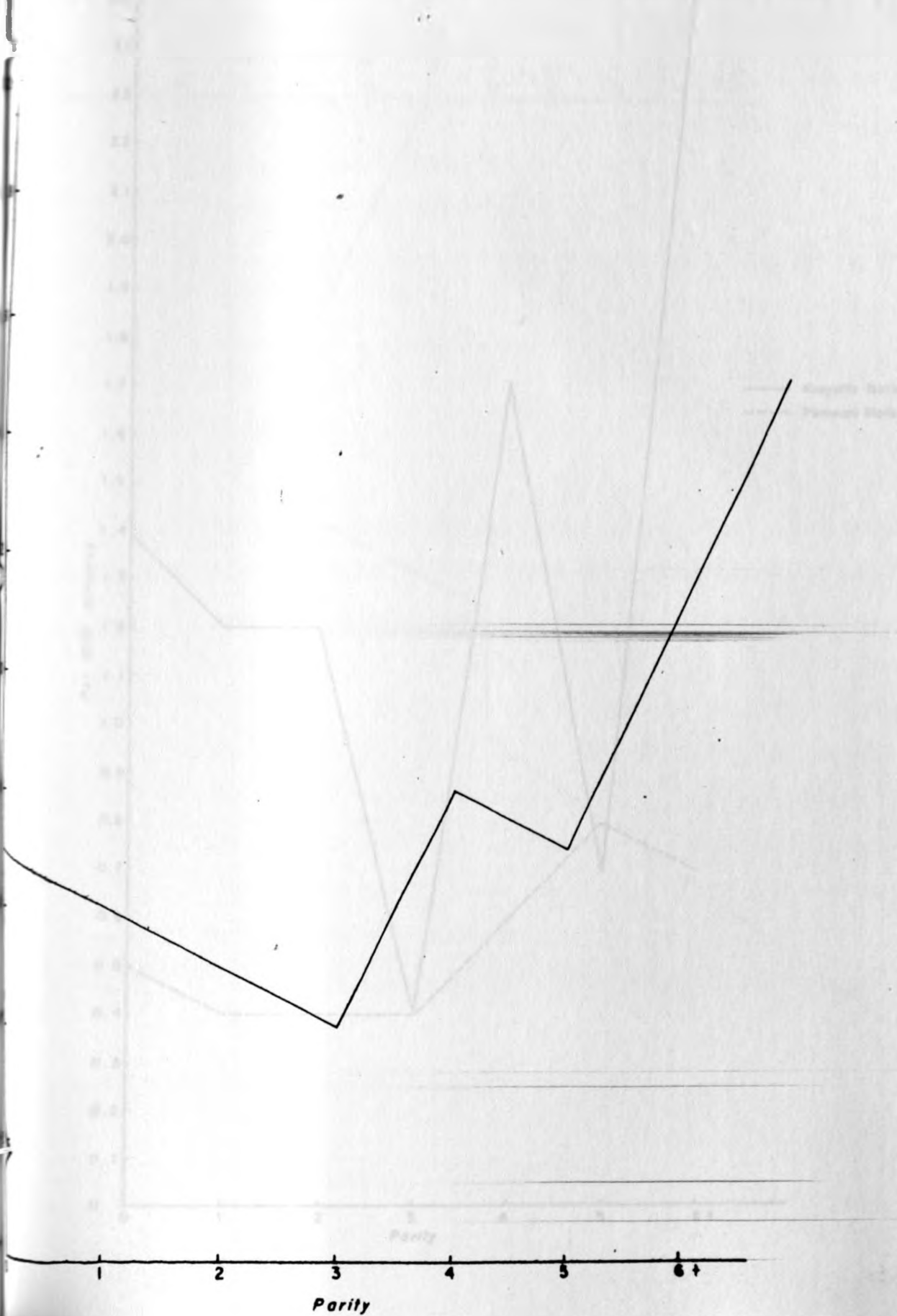


Fig 4.3.5 MATERNAL MORTALITY BY PARITY, KNH AND PMH COMPARED, 1977-1986

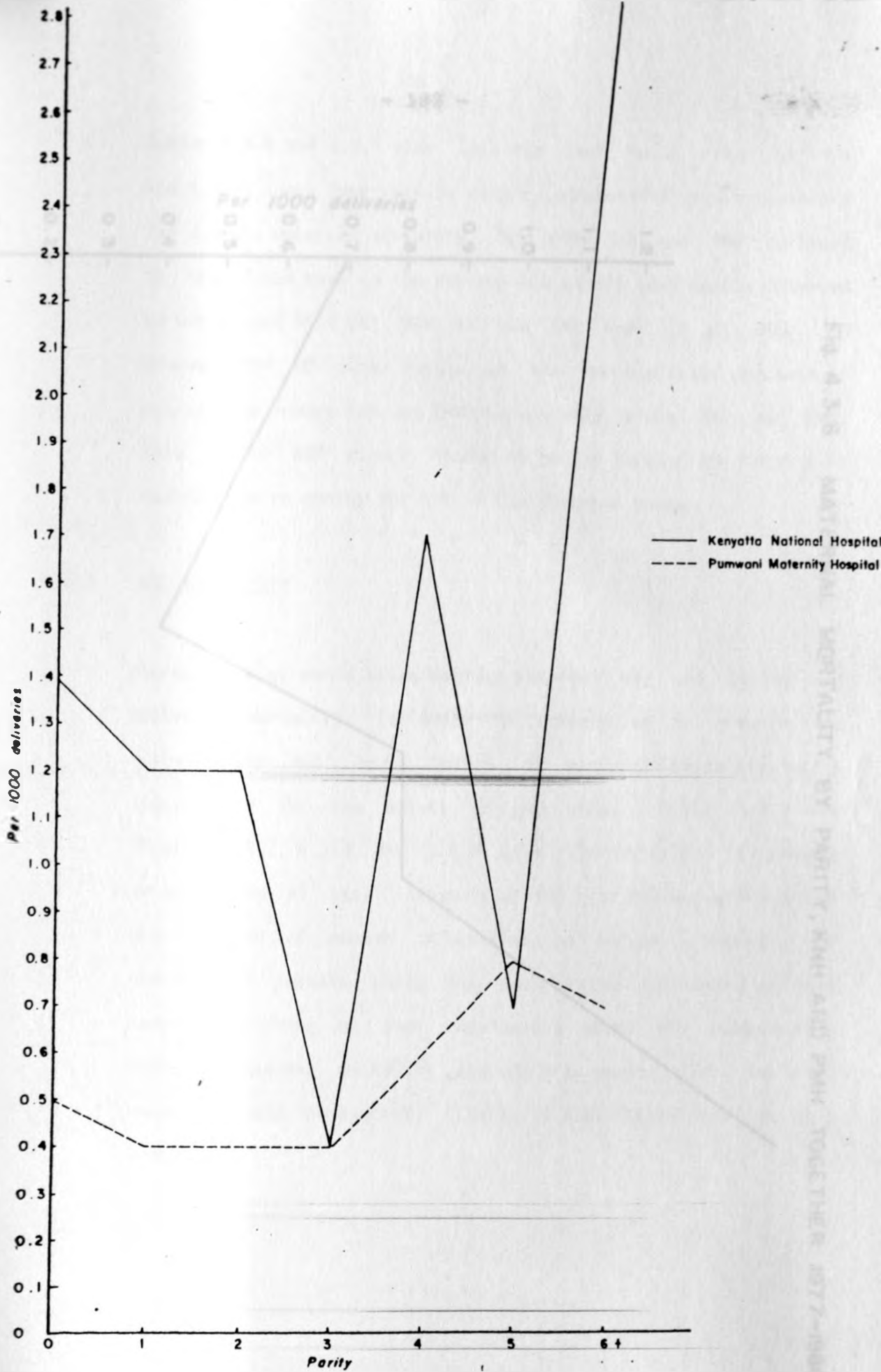
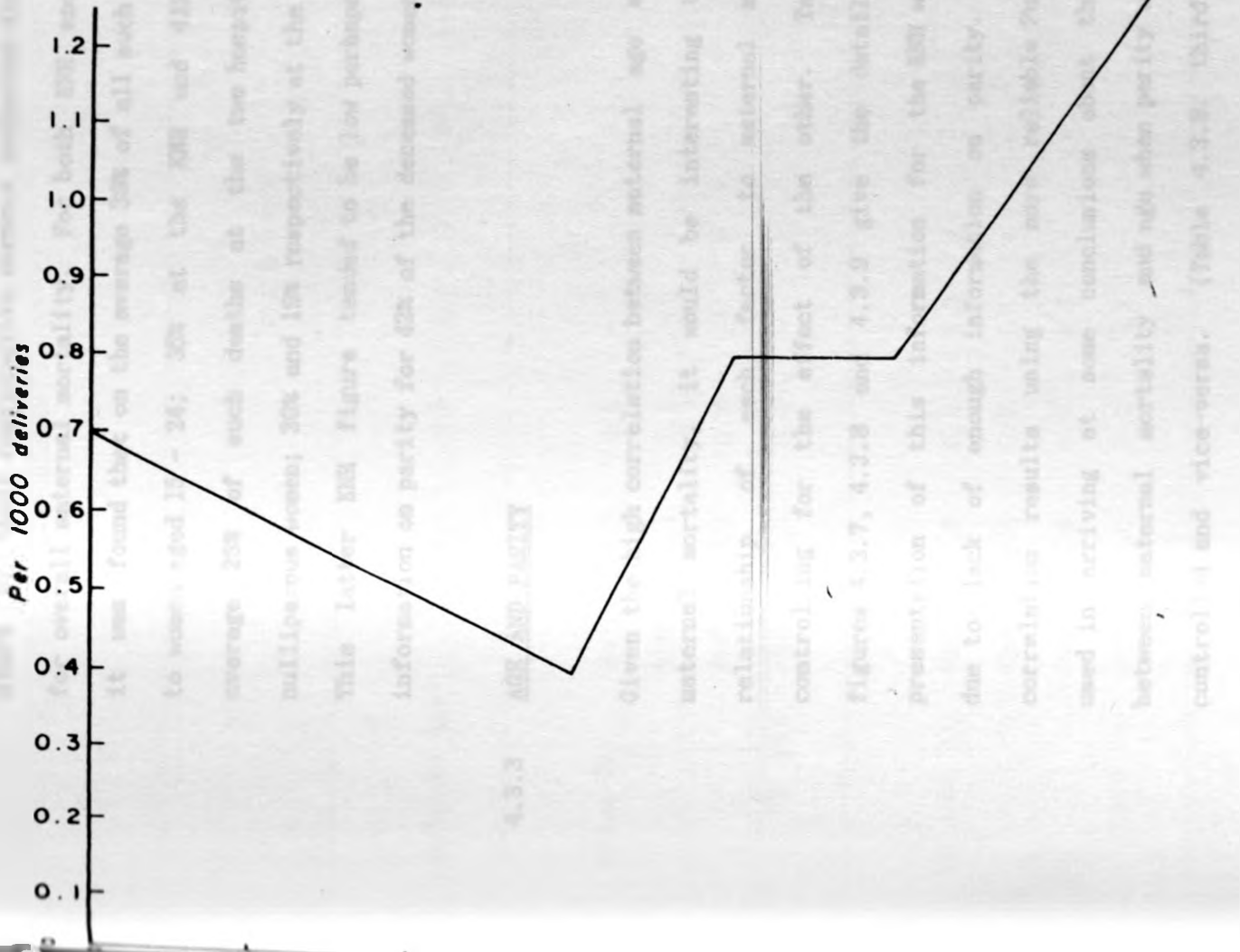


Fig. 4.3.6 MATERNAL MORTALITY BY PARITY, KNH AND PMH TOGETHER 1977-1986



4.3.3 AGE AND PARITY

Given the high correlation between maternal age and parity, maternal mortality, it would be interesting to examine the relationship of parity to maternal mortality, controlling for the effect of the other. Table 4.3.4, Figures 4.3.7, 4.3.8 and 4.3.9 give the details. A comparison of this information for the KNH was not possible due to lack of enough information on parity. However, correlation results using the more reliable PNH data used in arriving at some conclusions about the relationship between maternal mortality and age when parity is controlled and vice-versa. (Table 4.3.5; third row in column)

Tables 4.3.6 and 4.3.7 also indicate that young women at the start of their reproductive careers accounted disproportionately for overall maternal mortality. For both KNH and PMH combined it was found that on the average 39% of all such deaths occurred to women aged 15 - 24; 35% at the KNH and 41% at PMH. An average 25% of such deaths at the two hospitals occurred to nulliparous women; 30% and 19% respectively at the PMH and KNH. This latter KNH figure tended to be low perhaps due to lack of information on parity for 42% of the deceased women.

4.3.3 AGE AND PARITY

Given the high correlation between maternal age and parity and maternal mortality, it would be interesting to examine the relationship of each factor to maternal mortality while controlling for the effect of the other. Table 4.3.8 and figures 4.3.7, 4.3.8 and 4.3.9 give the details. A graphic presentation of this information for the KNH was not possible due to lack of enough information on parity. However, the correlation results using the more reliable Pumwani data were used in arriving at some conclusions about the relationship between maternal mortality and age when parity effect was being controlled and vice-versa. (Table 4.3.8. third row in each column).

Table 4.3.8 - Maternal Mortality by age and parity, Nairobi, KNH and PMH, 1977 - 1986. The figures are ratios per 1000 births

		P A R I T Y					
Maternal Age		0	1-3	4	5	6+	All Parities
Below 20	Nairobi	0.7	0.4	-	-	-	0.6
	KNH	1.4	1.1	-	-	-	1.4
	PMH	0.5	0.3	-	-	-	0.5
	KNH + PMH	0.7	0.4	-	-	-	0.7
20 - 24	Nairobi	0.5	0.3	0.3	-	-	0.5
	KNH	1.4	0.7	-	-	-	0.9
	PMH	0.4	0.3	0.4	-	-	0.3
	KNH + PMH	0.6	0.4	0.3	-	-	0.4

Table 4.3.8. Cont.

		P A R I T Y					
Maternal Age		0	1-3	4	5	6+	All Parities
25 - 29	Nairobi	0.6	0.5	0.5	0.8	0.8	0.7
	KNH	-	1.3	1.5	1.5	1.2	1.3
	PMH	1.0	0.4	0.4	0.7	0.6	0.4
	KNH + PMH	0.8	0.5	0.6	0.9	0.7	0.6
30 - 34	Nairobi	-	2.1	1.8	0.2	0.6	1.2
	KNH	-	2.7	2.8	-	1.7	1.7
	PMH	-	1.9	1.6	0.2	0.4	0.9
	KNH + PMH	-	2.1	1.8	0.2	0.7	1.0
40+	Nairobi	-	-	2.5	-	2.5	3.6
	KNH	-	-	-	-	5.3	5.3
	PMH	-	-	-	1.9	1.9	1.7
	KNH + PMH	-	-	3.1	-	2.5	2.4

Table 4.3.8 Cont.

		P A R I T Y					
Maternal Age		0	1-3	4	5	6+	All Parities
All Ages	Nairobi	0.7	0.5	0.8	0.7	1.1	0.8
	KNH	1.4	1.0	1.7	0.7	2.7	2.2
	PMH	0.5	0.4	0.6	0.8	0.7	0.5
	KNH + PMH	0.6	0.5	0.8	0.7	1.1	0.7

The table shows that, with few exceptions, at each parity level, maternal mortality risks increased with age. For example, among nulliparous women, the results indicate that mortality ratio for women aged 25 - 29 was two times as high as for women aged 15 - 19 years (1.0 against 0.5 per 1000 births at PMH). But the findings also indicate that at all parities, zero to, four (within the capability of being attained by age 24) mortality risks were lowest for women aged 20-24 years, rising at each parity level systematically with age and reaching a peak among women aged 30 years and above.

Fig. 4.3.7: MATERNAL MORTALITY BY AGE AND PARITY, NAIROBI, 1977-86

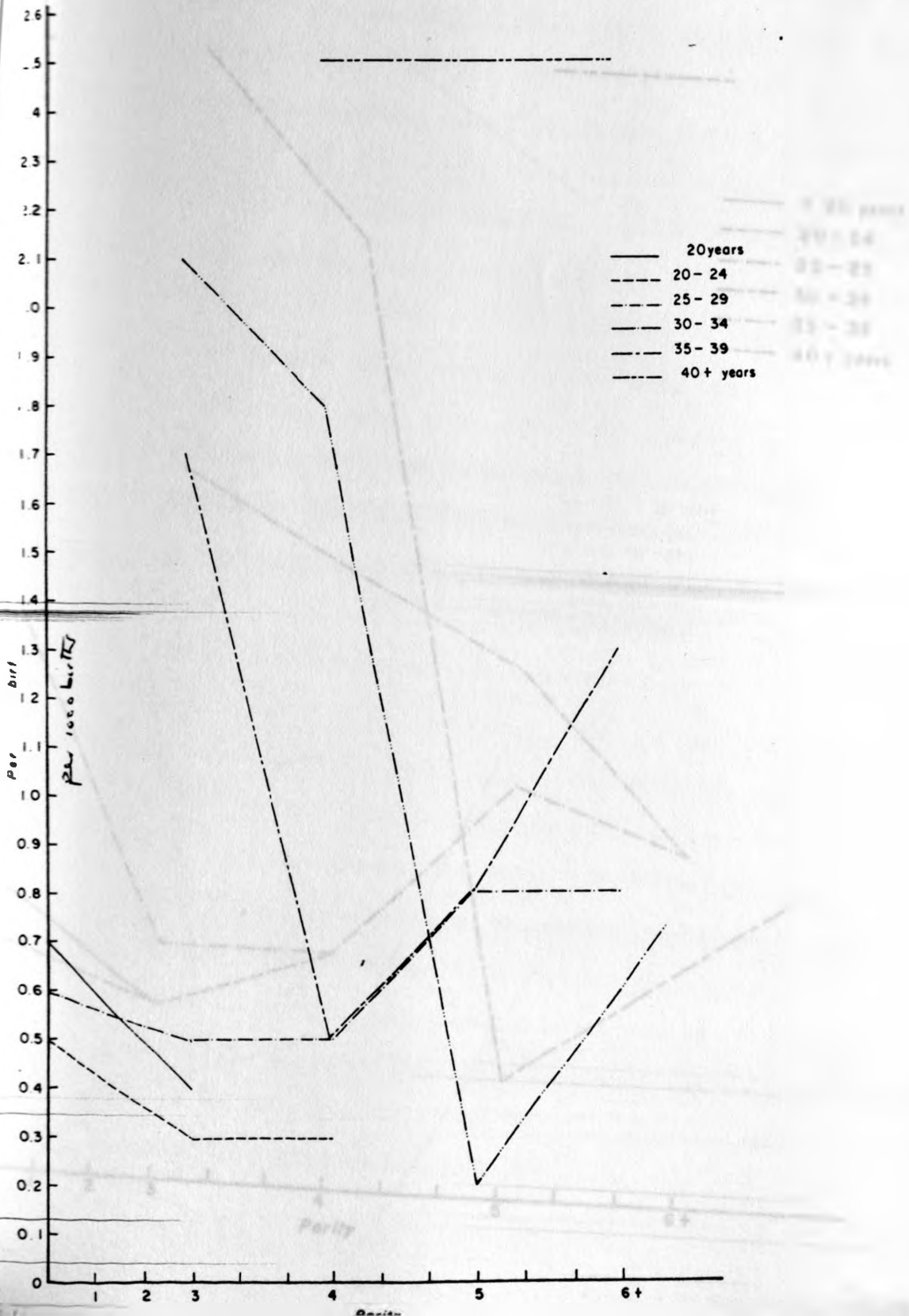


Fig 4.3.8 MATERNAL MORTALITY BY AGE AND PARITY, PMH, 1977-1986

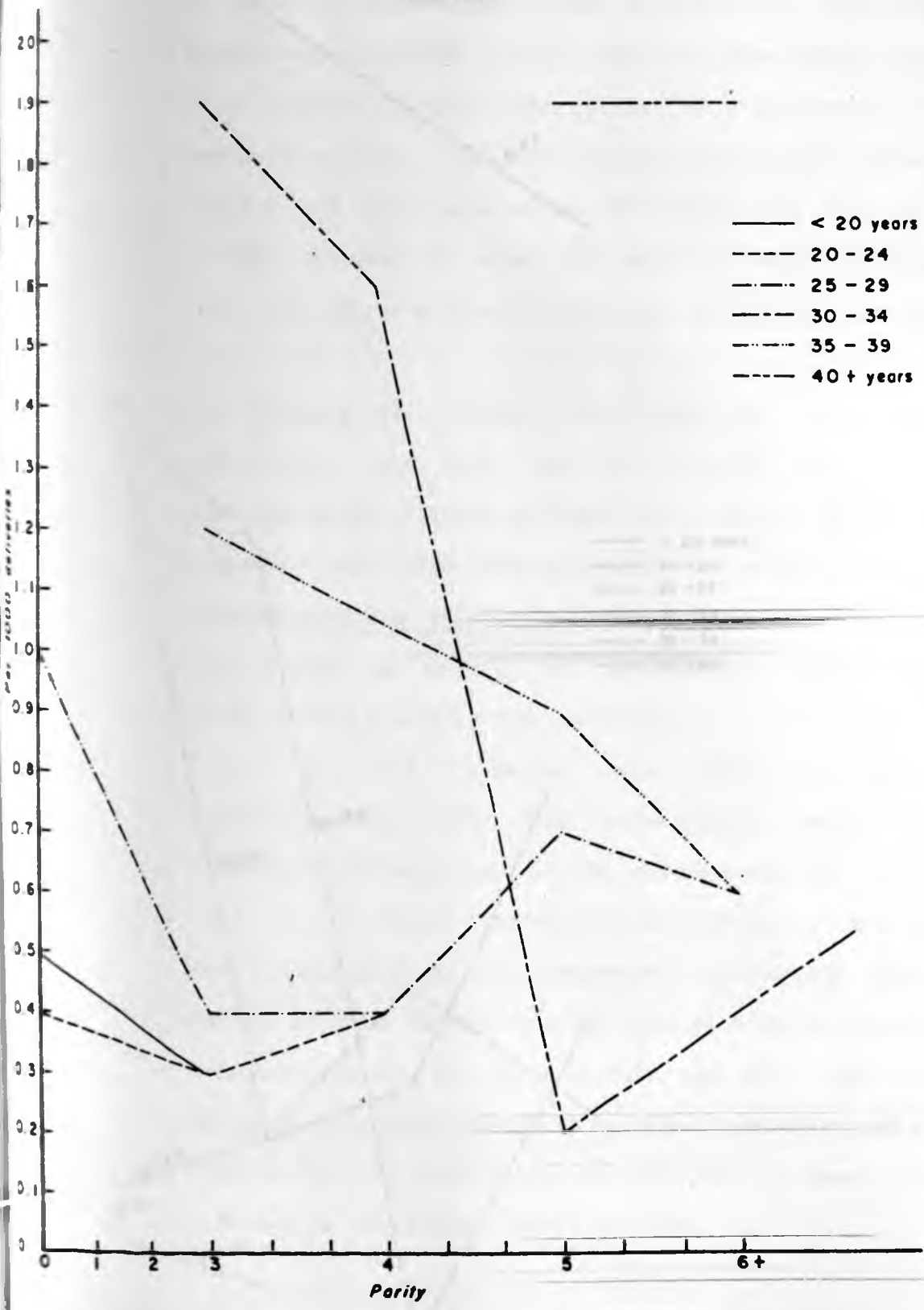
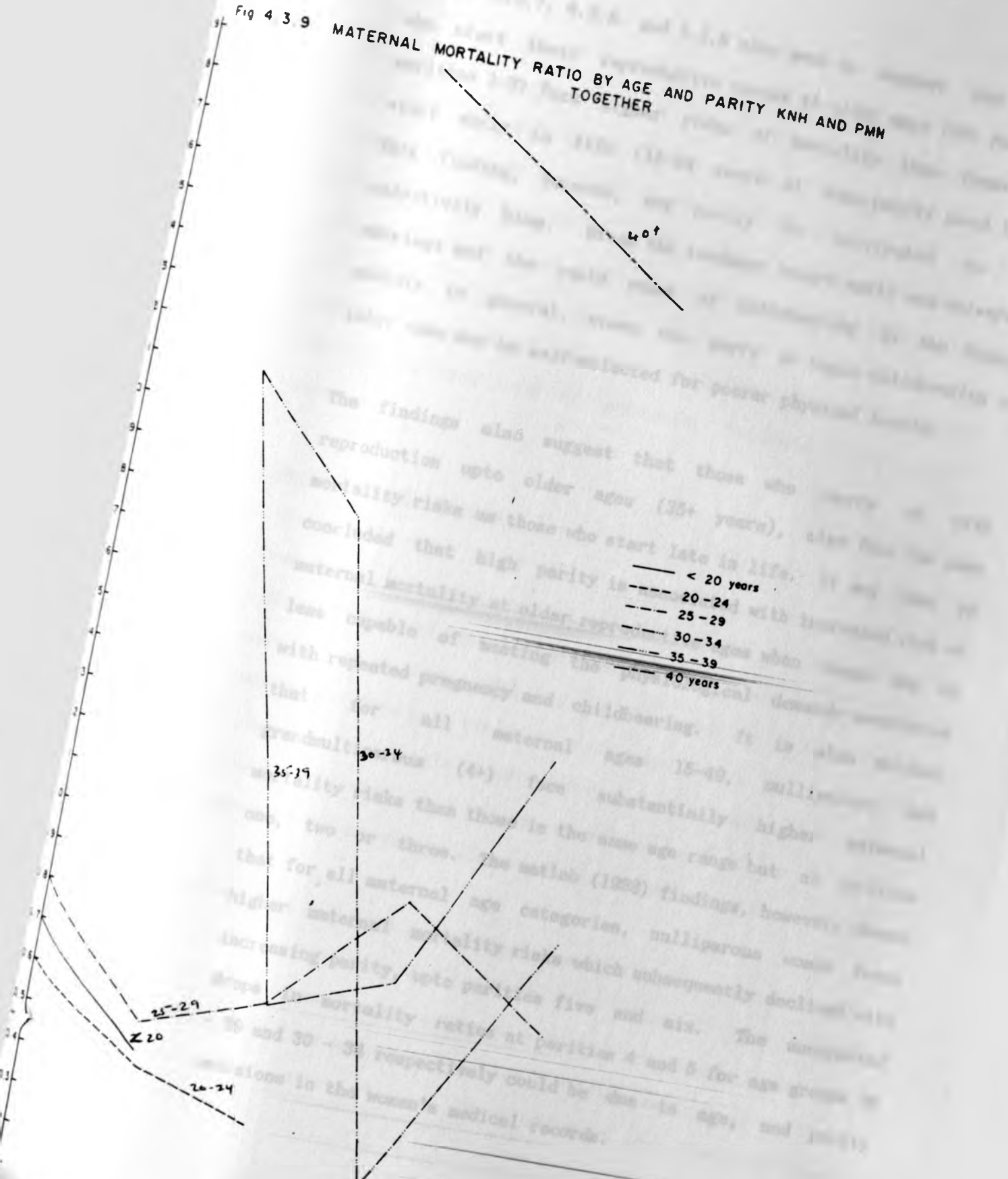


Fig 4 3 9 MATERNAL MORTALITY RATIO BY AGE AND PARITY KNH AND PMM TOGETHER



The findings also suggest that those who start late in life, also have the same reproduction upto older ages (35+ years), also have the same mortality risks as those who start late in life. It may be concluded that high parity is associated with increased maternal mortality at older ages when women are less capable of meeting the physical demands associated with repeated pregnancy and childbearing. It is also noted that for all maternal ages 15-40, nulliparous women have a mortality risk that is substantially higher than that of women in the same age range but at parity one, two or three. The earlier (1953) findings, however, show that for all maternal age categories, nulliparous women have higher maternal mortality risk which subsequently declined with increasing parity upto parity five and six. The increased mortality ratio at parity 4 and 5 for age groups 20-24 and 25-29 respectively could be due to age, and parity variations in the women's medical records.

Figures 4.3.7, 4.3.8. and 4.3.9 also seem to suggest that women who start their reproductive career at older ages (30+ years at parities 1-3) face higher risks of mortality than those who start early in life (15-24 years at same parity level 1-3). This finding, however, may partly be attributed to the selectivity bias. Given the tendency toward early and universal marriage and the rapid onset of childbearing in the Kenyan society in general, women who marry or begin childbearing at later ages may be self-selected for poorer physical health.

The findings also suggest that those who carry on with reproduction upto older ages (35+ years), also face the same mortality risks as those who start late in life. It may thus be concluded that high parity is associated with increased risk of maternal mortality at older reproductive ages when women may be less capable of meeting the physiological demands associated with repeated pregnancy and childbearing. It is also evident that for all maternal ages 15-49, nulliparous and grandmultiparous (4+) face substantially higher maternal mortality risks than those in the same age range but at parities one, two or three. The matlab (1988) findings, however, showed that for all maternal age categories, nulliparous women faced higher maternal mortality risks which subsequently declined with increasing parity, upto parities five and six. The unexpected drops in mortality ratios at parities 4 and 5 for age groups 35 - 39 and 30 - 34 respectively could be due to age, and parity omissions in the women's medical records.

4.4. Other factors

The direct contribution of socio-economic, socio-cultural, environmental and administrative factors to maternal mortality could not be analysed statistically given the lack of enough information. However, in the analysis of the 274 maternal deaths, it was found that the above mentioned factors also played an important role in the deaths of some of the women. Within the socio-economic and socio-cultural series, other factors included lack of awareness, inexperience and personal factors.

4.4.1 Socio-Economic Factors

Even though the women's medical records had no or very little information about their educational status, it was observed that most of them (over 70%) had no education or only primary education. This was evidenced by their status as unemployed housewives or single women most of whom resided in low-income areas of Nairobi. Most of such women could be said to be less aware of the importance of ante-natal care and hospital delivery.

There was also the aspect of age and parity; the young (under 20 years) inexperienced primigravidas were found to have mostly died of anaemia and eclampsia. These are usually conditions whose detection and control greatly depend on early and regular ante-natal clinic visits. Many of them also suffered from

puerperal sepsis partly due to lack of education and awareness about the importance of post-natal hygiene for the mother since they hardly visited ante-natal clinic where they could get educated on such matters. Older high parity women (16% and 48% respectively) also died of ruptured uterus perhaps partly due to the misconceived idea that practice makes perfect even in childbirth especially when their previous pregnancies and deliveries had been uneventful. They assumed safety for any subsequent pregnancies and deliveries.

Socio-economic status of a family also determines its dietary habits. One major cause of anaemia of pregnancy was found to be poor diet or poor eating habits. Low income among families who cannot afford a balanced diet for the entire family at any given time predisposes a pregnant member of such a family to greater risks of becoming anaemic. Because of little education or lack of it, such women are also ignorant of the importance of rich diet during and after pregnancy. Indeed lack of awareness was considered a possible major contributory factor in the deaths of most of the women who died of ruptured uterus, anaemia and eclampsia.

Socio-economic status of a family will also determine whether an expectant woman delivers in a public or private hospital. Public hospitals - which are much cheaper than private ones - are at times known to give substandard care and management of patients due to lack of certain essential services and

facilities like drugs, overcrowding of patients and lack of commitment and discipline among the personnel themselves. At least 5% of the patients considered in this study did not get maximum treatment when it was most required due to one or a combination of the above mentioned reasons.

Finally, socio-economic status of a family also determines how soon or late a pregnant woman can get to hospital. Public transport are not always available even in Nairobi. Under such circumstances, the Socio-economic status of a family will determine whether to call for an ambulance, taxi or arrange for other private means of transport. Due to lack of quick means of transport at least 2% of the maternal deaths in this study occurred partly due to late presentation at the hospital.

4.4.2 Socio-Cultural Factors

There were some socio-cultural factors which partly contributed to the deaths of some women in this study. Some high parity women continued to have more children even when their physiological conditions were already jeopardized by pregnancy and delivery thereby putting their lives in increased danger. Such women wanted, perhaps, to live upto societal expectations of attaining large families even at the expense of their own lives.

Socio-cultural factors also appeared to have played a role in the maternity - related deaths among the young single

nulliparous women. Because of fear of reproof by family for having gone against socio-cultural norms and expectations, such women tried to conceal their pregnancies from the public by being evasive and avoiding ante-natal clinics. They also starved themselves due to anxiety and depression. It is thus not surprising that almost one-half of them died of anaemia and eclampsia - two conditions whose detection and control greatly depend on early and regular ante-natal clinic visits.

4.4.3 Environmental Factors:

Approximately 3% of the women in this study died of malaria or malaria - induced anaemia. Most of such women were reported to have recently travelled from the usually known malaria zones of Western or Coastal regions of Kenya. There were also those who died from sickle-cell anaemia which is an inherited disease and all such women were found to be from the Western region of Kenya - i.e. Luo, Luhya and Kisii.

Some deaths from puerperal sepsis could also partly be attributed to the residential or delivery environments of the women involved - i.e. overcrowded, unsanitary residential estates or overcrowded hospitals where maternity patients were forced to share beds thereby risking intra-hospital infection.

4.4.4. Medical Health Care and Administrative Factors:

Lack of discipline and commitment on the part of some hospital personnel also contributed to the deaths of some mothers. There were examples of gross negligence and irresponsible behaviour on the part of some departments especially the routine laboratory staff. Lack of commitment on the part of some medical staff was also exemplified in the deaths of at least 2% of the women while lack of essential services, facilities and items like drugs and stored blood was considered a contributory factor in the deaths of another 2%. As Ngoka (1987) observes, there is definite need for better blood transfusion services in addition to well trained and highly disciplined doctors, nurses and midwives as these form the backbone of any efficient obstetric service. Some deaths under general anaesthesia could be attributed to lack of skilled anaesthetic staff especially at the PMH.

In this chapter the incidence of maternal mortality for Nairobi was found to be approximately 15 per 100,000 women aged 15-49 years and 0.8 per 1000 deliveries. But in general, maternal mortality levels for the city remained relatively the same from 1977 to 1986. Maternal mortality at the KNH was found to be significantly higher than at the PMH even though the former delivered fewer mothers than the latter. However, it was shown that this type of mortality at the KNH generally fell from 3.7 per 1000 births in 1977 to 1.9 per 1000 births in 1986. As for PMH, the trend was that of general uniformity of maternal mortality levels throughout 1977 to 1986.

It has also been shown that puerperal sepsis, postpartum haemorrhage, eclampsia and severe pre-eclampsia were the leading causes of maternal deaths which corresponds to the results of Makhokha and Ngoka at the KNH and PMH respectively. This finding also corresponds to other studies done in other developing countries e.g. Kasonde (1978); WHO (1985); Assadi and Assadi (1986); Ties (1987) and Winikoff and Sullivan (1987).

The findings also show a high correlation between maternal age, parity and maternal mortality. It has been shown that high maternal age, primigravidity (or nulliparity) and grandmultiparity positively influence maternal mortality. These results are in agreement with others found elsewhere e.g. Koenig (1988); Perkin (1969); Nortman (1974), and Berry (1977). In this regard, it can be concluded that childbirth appears to be safest between ages 20 to 30 years and at parities one, two and three. However, the study also found evidence of poor ante-natal clinic attendance especially among the mothers who had died of eclampsia, anaemia and ruptured uterus. The majority of the women attended ante-natal clinics for the first time after 28 weeks of gestation and even the subsequent visits were found to be irregular and inadequate for most of them.

From the foregoing analysis, it may then be concluded that high maternal age, primigravidity, grand-multiparity, low maternal age (teenage), lack of adequate ante-natal and post-natal care,

lack of certain services - e.g. drugs and stored blood for transfusion - and lack of discipline among some of the medical personnel contributed to increased maternal mortality in Nairobi during 1977 - 1986 period.

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

The object of this study was to determine the influence of some demographic, socio-economic and environmental factors on maternal morbidity and mortality in Nairobi. At the beginning of the study, the contention was that most works that have been done on the subject of maternal morbidity/mortality by Kenyan physicians have tended to concentrate on direct obstetric complications. The point of departure for this study was therefore the acknowledgement that there are certain non-medical factors that directly or indirectly affect obstetric complications. Such factors were said to include age, parity, marital status, income, residence and genetic predispositions of the women involved.

The study was therefore designed to determine whether there was any relationship between obstetric complications and the above listed factors which in turn helped to raise the levels of maternal morbidity and mortality in Nairobi. In this regard the study also aimed at investigating the existence of patterns in maternal morbidity and mortality as well as establishing the levels and trend of this type of mortality at the two hospitals and in Nairobi within the 1977 - 1986 period.

The summary, findings and conclusions drawn from the findings are outlined in the sections below. Also outlined are recommendations and areas for further research for the achievement of improved reproductive health for Kenyan women.

5.2

Summary

This thesis started with an 'Abstract', which, essentially, was a run-through what the study was all about. Chapter one was mainly an introductory chapter whose major concern was to introduce the subject of study. Justification for the study, choice of the study area and period and justification for the use of only the KNH and PMH data was given in the chapter. Why maternal morbidity and mortality should be considered a problem in Kenya today and what works have been done on the subject in the country were also explained. The objectives of the study were also spelt out in the chapter.

A brief background information on Nairobi was given in order to highlight its general demographic profile. Section 1.5 contained the review of literature on maternal morbidity and mortality especially as it relates to demographic, socio-economic and environmental factors. In the literature review, it became evident that most studies on the subject have been done in the developed countries of North America and Europe and a significant number have also been carried out in

some Asian countries. It was also stated that in Africa, most studies on maternal morbidity and mortality have been done by obstetricians/gynaecologists and these have mostly been restricted to hospitals and, naturally, concerned mainly with direct obstetric causes. It was also shown that the now acknowledged relationship between maternal morbidity/mortality and demographic and socio-economic factors have not been thoroughly investigated in the country. Thus, no rates for maternal mortality exist for either the whole country or regions.

The theoretical framework for the study was formulated in section 1.6. In the framework, various factors - i.e. demographic, socio-economic, environmental, medical and health care, socio-cultural and personal and administrative - were identified as significant in the analysis of maternal morbidity and mortality. The said factors have always been found to influence the general levels of morbidity and mortality in any society. From the theoretical framework three operational hypotheses were formulated as outlined in section 1.7. The constraints that this study was faced with were spelt out in section 1.8.

In Chapter two, sources and use of data were discussed. In the introductory section, it was statistically shown why maternity information from only the KNH and PMH in relation to all Nairobi deliveries was significant. Table 2.1.1. shows that on the average, the two hospitals handled more than 80% of all Nairobi births during the 1977 - 86 period.

In Section 2.2., a detailed discussion of the various sources of data for this study was presented, highlighting at the same time their weaknesses and advantages. The sources discussed included the disease index cards, statistics registers, mortality lists, in-patient files, annual reports and returns, census data and statistical abstracts.

The actual process of data collection and some of the main obstacles encountered during the exercise were discussed in section 2.3. The number of maternal admissions at the KNH in relation to total patient admissions at the hospital was given in this section. A breakdown of admissions by major maternal (obstetric) complications at the hospital was also presented. Distribution of births by mothers' age-groups and parities for both the KNH and PMH was given in this section. At the same time, the number of maternal deaths and death rates for both hospitals were also tabulated.

In section 2.4 use of data and methodology was discussed. It was in this section that the yearly estimations of Nairobi female population aged 15-49 years were done using the calculated intercensal (1969 - 1979) growth rate for this particular population. An attempt was also made to estimate the number of maternal deaths in Nairobi during the period under study. It was further pointed out here that the study would use descriptive statistics thereby making much use of frequency tables, percentages, rates and graphs as the major tools of analysis - in order to arrive at some conclusions.

In Chapter three maternal morbidity, using data from the KNH only was discussed. The major causes of maternal morbidity were examined and presented according to mothers age-groups and parities (where possible). Yearly admissions and deaths by these major causes were also tabulated in this particular Chapter. Residences and place of delivery of women who had suffered from puerperal infection were also analysed to determine the relationship between environment and this type of infection.

Section 3.3 discussed the issue of abortion as a major reproductive problem and a cause of maternal morbidity and mortality in Nairobi. Samples of the various categories of abortion patients were considered and presented on yearly basis and according to their ages, parities, ~~marital and employment~~ statuses. The main object of analysing abortion patients was to gain an insight into the characteristics of women who got involved in it.

In Chapter four, maternal mortality was analysed using data from the KNH and PMH with a view to establishing the levels, patterns, trend and the major causes of this type of mortality at the hospitals and Nairobi in general. Proportions, rates and ratios were calculated and graphic presentations given in order to achieve this objective.

5.3 Findings and Conclusions

5.3.1 Findings

One of the objectives of this study was to investigate the existence of patterns, levels and trends of maternal morbidity and mortality by major causes at the KNH and PMH.

A. Morbidity

The graph on figure 3.1.1. of table 3.1.1. shows that patterns do exist when maternal age is related to maternal complications during delivery. The complications were observed to rise with maternal age.

The major causes of maternal morbidity were found to be postpartum haemorrhage (PPH), puerperal sepsis, hypertension and anaemia. Specifically, in figure 3.2.3, a J-shaped curve was observed when morbidity from PPH was related to age. On the other hand, puerperal sepsis was found to exhibit a U-shaped curve with maternal age; i.e. high among teenaged women, low between ages 20 - 34 years and high again from 35 years and above (Figure 3.2.5). Most were also primiparous and grandmultiparous. Furthermore, most of the puerperal sepsis patients at the KNH were found to have delivered at home or at PMH and other City Commission maternity units. The majority of

the women studied under this morbidity cause were also observed to belong to low-income families and lived in low-income residential estates with inadequate water supply and sanitation.

Maternal morbidity from anaemia was caused mainly by malaria, nutritional, iron/folic acid deficiencies, postpartum haemorrhage, frequent pregnancies and deliveries and sickle-cell disease or trait. The risk of anaemia was observed to be significantly high among teenaged women. The condition was lowest at exact parity 4 and at 40 years and above.

Pregnant cardiac and diabetic women were observed to die less during pregnancy than the otherwise normal pregnant women. They also spaced their births and tended to opt for tubal ligation (TL) once they achieved their required parities. The rate of diabetes also tended to rise with age and parity (Tables 3.2.15 and 3.2.16).

Abortion was observed to be a major cause of maternal morbidity at the KNH with an average annual admission of 4,100 patients during the 1977 - 1986 period. It accounted for 37% of all maternal admissions and between 6 - 13% of total patient admissions at the KNH during the same period. It was also observed that nulliparous and primiparous, single, unemployed young women (less than 25 years old) and students were greatly involved. However, there were hints of increasing involvement in abortion by married grand multiparous women.

Table 3.2.2. shows that maternal morbidity was high at the KNH with an average ratio of 301 maternal complications per 1000 deliveries annually for the years 1977 - 1986. Figures 3.2.2. and 3.2.4 give the trend of yearly admissions of PPH and puerperal sepsis patients at the KNH respectively between 1977 - 1986. While the number of patients fluctuated at specific years, the trend exhibited by the graphs is that of general increase especially for PPH admissions which shows a sharp rise in the number of PPH patients in 1986 from 1977.

B. Mortality

In the analysis of maternal mortality, the main objective was to determine the relationship between this variable and age and parity of mother and also to determine its levels and trend at the two hospitals (KNH and PMH) during the ten years under study.

Approximately 325 maternal deaths were estimated to have occurred in Nairobi during the year 1977 - 1986 out of which 274 were enumerated at the KNH and PMH. As the graphs in figures 4.3.1, 4.3.2 and 4.3.3 show, maternal mortality exhibits a J-shaped pattern with maternal age. Figures 4.3.4, 4.3.5 and 4.3.6 also show the same pattern when maternal mortality is related with parity of mother. Figures 4.3.7, 4.3.8 and 4.3.9 give the relationship of age to maternal mortality while controlling for the effect of parity and vice-versa. What was evidenced by these graphs was that at each parity level, maternal mortality risks increased with age.

Furthermore, at all parities, zero to four - and within the capability of being attained by age 24 - mortality risks were lowest for women aged 20-24 years, rising at each parity level systematically with age and reaching a peak among women aged 30 years and above.

Figure 4.1.1. gives the trend and levels of maternal mortality in Nairobi during the ten-years. While this type of mortality fluctuated between 11.5 and 19.4 per 100,000 women aged 15-49 years, it is also evident that through-out the period it remained generally on the same level.

Figure 4.1.2 also shows that even though the KNH handled fewer births than PMH, the former experienced higher rates of maternal mortality than the latter. However, ~~despite the high rates~~ at the KNH (an average of 3.0 deaths per 1000 deliveries) the trend exhibited was that of general decline. On the other hand, the PMH maintained almost the same level of mortality throughout the period.

The major causes of maternal deaths were found to be puerperal sepsis, postpartum haemorrhage, eclampsia and toxæmia, anaemia and ruptured uterus. Puerperal sepsis accounted for almost one-quarter of all maternal deaths to teenaged women and for the same proportion of all deaths to the grand multiparous women. On the other hand, PPH was responsible for 39% of all maternal deaths occurring to women aged 30 years and above and for 21% of deaths among women with four or more children.

Eclampsia was observed to be responsible for the highest proportion of deaths among teenaged women (34%). Of the women who died from this cause, almost one-half were teenaged and nulliparous. Eclampsia was also responsible for the highest proportion of deaths among the nulliparous and primiparous women. Ante-natal clinic attendance among those who died from this complication was observed to be quite poor.

Anaemia, was observed to be responsible for a significant proportion of deaths at ages 25 years and above and at parities 3 and more. There was also poor ante-natal clinic attendance among the women who died from this condition. Ruptured uterus was found to be a major maternal killer at PMH and, like anaemia, accounted for a significant proportion of deaths at ages 25 years and above and at parities 3 and above.

5.3.2 Conclusions

This study had set out to:

Firstly, investigate patterns, levels and trends of maternal morbidity and mortality by major causes at the KNH and PMH. This has been fulfilled for such patterns have been proven to exist with some demographic variables - i.e. age and parity. Levels and trends of the phenomenon have also been determined and certain causes of maternal mortality have been established to be on the increase rather than declined during the ten years under study.

Secondly, determine the relationship between maternal morbidity/mortality and age, parity, occupation and residence of mother. This too has been fulfilled as it was established that generally, maternal morbidity/mortality rises with age and parity. It was also observed that certain specific causes (e.g. eclampsia and anaemia) affected mostly teenaged women, and, that some (e.g. puerperal sepsis and anaemia) also affected mostly those in low income groups and from malaria endemic zones of the country.

Thirdly, determine the relationship between abortion and marital status, occupational status, age and parity of the women involved. This too was achieved and it was established that most women in abortion were either nulliparous or primiparous ~~young~~ (under 25 years), single, unemployed women. It was also found that most of the women did not practise any modern methods of contraception and thus used abortion as a family planning method.

And, fourthly, to determine the relationship between maternal mortality and ante-natal care. This was established for specific causes - i.e. eclampsia and anaemia whose control depends on early detection and identification. Women who died of these two conditions had histories of poor ante-natal clinic visits.

5.4 Recommendations and further Research

5.4.1 Recommendations:

This study has shown that maternal morbidity and mortality are high. Yet such high rates can and must be reduced not only for Nairobi, but for the whole country. The study has also shown that there are still too many pregnancies among the morbidity and mortality risk group (e.g. in too young, too old and women with too many children). Such risky pregnancies should be avoided if morbidities and mortalities among women of reproductive ages have to be cut down. This can be done first and most importantly through awareness. For such an awareness to be achieved, this study makes the following recommendation:

- (i) Family members, birth attendants, health workers and policy makers should be educated to understand the risks pregnant women face and strive to cooperate in order to minimize those risks and make motherhood safe for women. This calls also for improvements in health education and obstetric care and the need to educate the women themselves about the benefits of maternal care.

- (ii) Traditional birth attendants (TBA's) whose role is now recognized by the government should be integrated in the Maternal and Child Health (MCH) services so that they can provide the necessary health education and primary health care. Together with other health workers, they must be educated to have good knowledge of high risk pregnancy factors to use to refer women with such factors for timely appropriate action.

- (iii) The government should aim to achieve regular and frequent ante-natal clinic attendances to the level of 100% and strive to achieve 100% hospital deliveries. But this can only be achieved through proper and rational distribution and organization of MCH services throughout the country. It also calls for manpower (service providers) that are adequate both in quality and quantity. There is therefore need for adequate training programmes at different levels. At the same time, the maximum usage of the services can only be achieved through full acceptance and participation of the service consumers (women) and through administrative support.
- (iv) Ideally, safe motherhood begins before pregnancy with adequate nutrition and health care for women and girls. Iron supplements and information about nutrition and health care must be part and parcel of pre-natal care. The most important benefit of pre-natal care however, would be the screening of women at high risk because of age, parity, size, health or previous pregnancy complications and their early referral to a doctor or hospital. It should be noted that maternal deaths from causes such as haemorrhage, infection or toxæmia can often be prevented if women at high risk are identified early enough to receive the care they need.
- (v) Doctors and midwives can also improve maternal care by reviewing maternal deaths in the hospitals and clinics of operation and by discussing ways of preventing future deaths, in a cooperative atmosphere devoid of blame. Senior staff should manage emergencies rather than delegate

responsibility to junior staff.

(vi) Women should be made to understand the safety of concentrating their births in the 20-34 years age range. High risk pregnancies - i.e pregnancies among teenagers, 35-49 years old and grand multiparous women should be avoided by making available effective contraceptives. Contraception reduces not only the number of pregnancies, but also the number of high risk pregnancies. One of the best ways to prevent abortion would be by adequate family planning services.

(vii) Last but not least, accurate assessment of the magnitude of maternal morbidity and mortality is extremely difficult due to lack of data. To understand the extent of maternal mortality, there is

need for further researches in this area. This calls for population - based studies at both national and regional levels to establish the levels, patterns and trends of maternal mortality. Demographic surveys, which often include questions on orphanhood or widowhood to estimate adult mortality could also be designed to include simple questions on the timing and causes of death among women. In this connection, the analysis and interpretation of maternal mortality data from health facilities and vital registration systems can be improved if a variety of other data sources are used. For example, coverage of deliveries in hospitals and at home and all causes of death among women of reproductive age might yield more realistic picture of the magnitude of maternal mortality in a region or district.

Data bases need to be more complete and accurate. This calls for the recording of all the important demographic and socio-economic variables about maternity patients in hospitals and other health/maternity units. An accurate assessment of the magnitude of maternal morbidity and mortality would facilitate a better understanding of the basic problems of maternity care and assist in the planning of future maternity services for the country.

5.4.2. Areas for Further Research

1. There is need for surveys/researches in the area of contribution of maternal mortality to the general female mortality among women of childbearing ages. In other words, there is need for reliable information on maternal deaths so as to determine the importance of maternal deaths as a proportion of deaths among women of reproductive ages.

2. Beyond immediate loss of life, maternal mortality also exerts a devastating effect on the family. Frequently, as some studies have shown (e.g. Potts, 1986 and Koenig et. al. 1988) infant and maternal deaths occur simultaneously. It has therefore been argued that prevention of maternal deaths can in many cases also save the life of one or several children (Chen. et.al. 1974). The relationship between infant/child survival and maternal mortality is also a very important area that needs further research in Kenya.

3. More research is needed to improve the amount and quality of information on the relationship between reproductive patterns and maternal health; to assess whether and how women of different regional and socio-economic backgrounds are differentially affected, and to separate the effects that are social and economic from those relating to medical care and technology and from those due to demographic factors of age, parity and inter-birth interval.

4. The degree to which maternal health risks are caused by demographic factors rather than the lack of services has not been extensively studied. Such issues need further study in order to concentrate efforts, especially where there are scarce resources for MCH services, on those teenage and grand multiparous groups having the greatest risks during pregnancy and delivery.

5. Induced abortion has been found to be a fairly common termination of pregnancy conceived among teenaged and single nulliparous and primiparous women. The issue of induced abortion in young nulliparous women who have their planned productive life ahead of them has always been a hotly debated one, loaded with moral arguments. The expressed concerns have been focused on possible negative effects of abortion on future reproductive ability. There is probably no disagreement that induced abortion, performed outside the usual service network and at a less than acceptable standard carries a high risk of infection and haemorrhage with associated increased risk of mortality and subsequent infertility. But neither the extent to which legally induced abortion affects future fertility, nor whether the risk of infertility is greater if abortion is performed in a teenager is yet clear. This is another area that needs further research in medical demography.

APPENDIX 'A'

REPUBLIC OF KENYA MINISTRY OF HEALTH MOH 268

TITLE						
DISEASE INDEX CODE NUMBER					YEAR	
HOSP. NO.	AGE	SEX	CODE	OCCUPATION	I.P. DAYS	RESULT A/D

GPK (L)

613 Classified

- 1. Completed by school board on 10/10/1910
- 2. Completed by school board on 10/10/1910
- 3. Completed by school board on 10/10/1910
- 4. Completed by school board on 10/10/1910
- 5. Completed by school board on 10/10/1910
- 6. Completed by school board on 10/10/1910
- 7. Completed by school board on 10/10/1910
- 8. Completed by school board on 10/10/1910
- 9. Completed by school board on 10/10/1910
- 10. Completed by school board on 10/10/1910

614 Miscellaneous

The above is a list of the miscellaneous items in the collection.

615 Single items

The following are single items in the collection:

1. Single item 10/10/1910

XI. COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE PUERPERIUM

PREGNANCY WITH ABORTIVE OUTCOME (630-639)

630 Hydatidiform mole

Trophoblastic disease NOS

Vesicular mole

Excludes: chorionepithelioma (181)

631 Other abnormal product of conception

Blighted ovum

Mole:

NOS

carneous

fleshy

Excludes: with mention of conditions in 630 (630)

632 Missed abortion

Early fetal death with retention of dead fetus

Retained products of conception, not following spontaneous or induced abortion or delivery

Excludes: failed induced abortion (638)
missed delivery (656.4)
with abnormal product of conception (630, 631)

633 Ectopic pregnancy

Includes: ruptured ectopic pregnancy

633.0 Abdominal pregnancy

633.1 Tubal pregnancy

Fallopian pregnancy

Rupture of (fallopian) tube due to pregnancy

Tubal abortion

633.2 Ovarian pregnancy

633.8 Other ectopic pregnancy

Pregnancy:

cervical

combined

uterine

Pregnancy:

intraabdominal

mesometric

mural

 TABULAR LIST

633.9 Unspecified

The following fourth-digit subdivisions are for use with categories 634-638:

- .0 Complicated by genital tract and pelvic infection [any condition listed in 639.0]
- .1 Complicated by delayed or excessive haemorrhage [any condition listed in 639.1]
- .2 Complicated by damage to pelvic organs and tissues [any condition listed in 639.2]
- .3 Complicated by renal failure [any condition listed in 639.3]
- .4 Complicated by metabolic disorder [any condition listed in 639.4]
- .5 Complicated by shock [any condition listed in 639.5]
- .6 Complicated by embolism [any condition listed in 639.6]
- .7 With other specified complications [any condition listed in 639.8]
- .8 With unspecified complications
- .9 Without mention of complication

634 Spontaneous abortion

[See above for fourth-digit subdivisions]

Includes: spontaneous abortion (complete) (incomplete)

635 Legally induced abortion

[See above for fourth-digit subdivisions]

Includes: abortion:
 legal
 therapeutic
 termination of pregnancy:
 legal
 therapeutic

Excludes: menstrual extraction or regulation (V25.3)

636 Illegally induced abortion

[See above for fourth-digit subdivisions]

Includes: abortion (complete) (incomplete):
 criminal
 illegal

637 Unspecified abortion

[See above for fourth-digit subdivisions]

6.38 Failed attempted abortion

[See page 356 for fourth-digit subdivisions]

Includes: failure of attempted induction of (legal) abortion

Excludes: incomplete abortion (634-637)

6.39 Complications following abortion and ectopic and molar pregnancies

Note: This category is provided for use when it is required to classify separately the complications listed at fourth-digit level in categories 634-638; for example:

- a) when the complication itself was responsible for an episode of medical care, the abortion, ectopic or molar pregnancy itself having been dealt with at a previous episode
- b) when these conditions are immediate complications of ectopic or molar pregnancies classifiable to 630-633 where they cannot be identified at fourth-digit level.

6.39.0 Genital tract and pelvic infection

- Endometritis
- Parametritis
- Pelvic peritonitis
- Salpingitis
- Salpingo-oophoritis
- Sepsis NOS
- Septicaemia NOS

} following conditions classifiable to 630-638

Excludes: urinary tract infection (639.8)

6.39.1 Delayed or excessive haemorrhage

- Afibrinogenemia
- Defibrination syndrome
- Intravascular haemolysis

} following conditions classifiable to 630-638

6.39.2 Damage to pelvic organs and tissues

- Laceration, perforation or tear of:
- bladder
 - bowel
 - broad ligament
 - cervix
 - periurethral tissue
 - uterus

} following conditions classifiable to 630-638

6.39.3 Renal failure

(Oliguria)

Renal:

failure (acute)

} following conditions classifiable to 630-638

639.4 Metabolic disorders

Electrolyte imbalance following conditions classifiable to 630-638

639.5 Shock

Circulatory collapse } following conditions
Shock (postoperative) (septic) } classifiable to 630-638

639.6 Embolism

Embolism: } following conditions classifiable to 630-638
NOS
air
amniotic fluid
blood-clot
pulmonary
pyaemic
septic
soap

639.8 Other specified complications

Cardiac arrest or failure } following conditions classifiable to 630-638
Cerebral anoxia }

639.9 Unspecified complications following conditions classifiable to 630-638

COMPLICATIONS MAINLY RELATED TO PREGNANCY (640-648)

Includes: the listed conditions even if they arose or were present during labour, delivery or the puerperium

640 Haemorrhage in early pregnancy

Includes: haemorrhage before completion of 22 weeks' gestation

640.0 Threatened abortion

640.8 Other

640.9 Unspecified

641 Antepartum haemorrhage, abruptio placentae, and placenta praevia

641.0 Placenta praevia without haemorrhage

Low implantation of placenta without haemorrhage

Placenta praevia noted:

during pregnancy

before labour and delivered by caesarean section, without mention of haemorrhage

641.1 *Haemorrhage from placenta praevia*

Low-lying placenta

Placenta praevia:

marginal

partial

total

NOS or with haemorrhage (intrapartum)

Excludes: haemorrhage from vasa praevia (663.5)

641.2 *Premature separation of placenta*

Ablatio placentae

Abruptio placentae

Accidental antepartum haemorrhage

Premature separation of normally implanted placenta

641.3 *Antepartum haemorrhage associated with coagulation defect*

Antepartum or intrapartum haemorrhage associated with:

afibrinogenemia

hypofibrinogenemia

hyperfibrinolysis

641.8 *Other antepartum haemorrhage*

Antepartum or intrapartum haemorrhage associated with:

trauma

uterine leiomyoma

641.9 *Unspecified antepartum haemorrhage*

Haemorrhage:

antepartum NOS

intrapartum NOS

of pregnancy NOS

642 *Hypertension complicating pregnancy, childbirth and the puerperium*

642.0 *Benign essential hypertension complicating pregnancy, childbirth and the puerperium*

Hypertension:

benign essential

chronic NOS

essential

pre-existing NOS

specified as complicating, or as a reason for obstetric care during, pregnancy, childbirth or the puerperium

642.1 *Hypertension secondary to renal disease, complicating pregnancy, childbirth and the puerperium*

Hypertension secondary to renal disease, specified as complicating, or as a reason for obstetric care during, pregnancy, childbirth or the puerperium

642.2 *Other pre-existing hypertension complicating pregnancy, childbirth and the puerperium*

Malignant hypertension
Hypertensive:
heart disease
heart and renal disease
renal disease

specified as complicating, or as a reason for obstetric care during, pregnancy, childbirth or the puerperium

642.3 *Transient hypertension of pregnancy*

Transient hypertension, so described, in pregnancy, childbirth or the puerperium

642.4 *Mild or unspecified pre-eclampsia*

Hypertension in pregnancy, childbirth or the puerperium, not specified as pre-existing, with either albuminuria or oedema, or both; mild or unspecified

Pre-eclampsia:

NOS
mild

Toxaemia (pre-eclamptic):

NOS
mild

Excludes: albuminuria in pregnancy, without mention of hypertension (646.2)

oedema in pregnancy, without mention of hypertension (646.1)

642.5 *Severe pre-eclampsia*

Hypertension in pregnancy, childbirth or the puerperium, not specified as pre-existing, with either albuminuria or oedema, or both; specified as severe

Pre-eclampsia, severe

Toxaemia (pre-eclamptic), severe

642.6 *Eclampsia*

Toxaemia:

eclamptic
with convulsions

642.7 *Pre-eclampsia or eclampsia superimposed on pre-existing hypertension*

Conditions in 642.4-642.6, with conditions in 642.0-642.2

642.9 *Unspecified hypertension complicating pregnancy, childbirth and the puerperium*

Hypertension NOS, without mention of albuminuria or oedema, complicating pregnancy, childbirth or the puerperium

643 *Excessive vomiting in pregnancy*

643.0 *Mild hyperemesis gravidarum*

Hyperemesis gravidarum, mild or unspecified, starting before the end of the 22nd week

643.1 *Hyperemesis gravidarum with metabolic disturbance*

Hyperemesis gravidarum, starting before the end of the 22nd week, with metabolic disturbance such as:
carbohydrate depletion
dehydration
electrolyte imbalance

643.2 *Late vomiting of pregnancy*

Excessive vomiting starting after 22 completed weeks of gestation

643.8 *Other vomiting complicating pregnancy*

Vomiting due to organic disease or other cause, specified as complicating pregnancy, or as a reason for obstetric care during pregnancy
Use additional code, if desired, to identify cause

643.9 *Unspecified vomiting of pregnancy*

Vomiting as a reason for care during pregnancy, length of gestation unspecified

644 **Early or threatened labour**

644.0 *Threatened labour*

False labour

644.1 *Early onset of delivery*

Onset (spontaneous) of delivery before 37 weeks gestation

645 **Prolonged pregnancy**

Post-dates

Post-term

646 **Other complications of pregnancy, not elsewhere classified**

646.0 *Papyraceous fetus*

646.1 *Oedema or excessive weight gain in pregnancy, without mention of hypertension*

Gestational oedema

Excludes: with mention of hypertension (642.-)

646.2 *Unspecified renal disease in pregnancy, without mention of hypertension*

Albuminuria
Nephropathy NOS
Renal disease NOS } in pregnancy, without mention of hypertension

Gestational proteinuria

Excludes: with mention of hypertension (642.-)

646.3 Habitual aborter

Excludes: with current abortion (634.-)
without current pregnancy (629.9)

646.4 Peripheral neuritis in pregnancy**646.5 Asymptomatic bacteriuria in pregnancy****646.6 Infections of genitourinary tract in pregnancy**

Conditions in 590, 595, 597, 599.0, 614-616 complicating pregnancy or labour

Excludes: major puerperal infection (670)

646.7 Liver disorders in pregnancy

Excludes: hepatorenal syndrome following delivery (674.8)

646.8 Other specified complications of pregnancy

Fatigue during pregnancy Herpes gestationis

646.9 Unspecified complication of pregnancy**647 Infective and parasitic conditions in the mother classifiable elsewhere but complicating pregnancy, childbirth and the puerperium**

Includes: the listed conditions when complicating the pregnant state, aggravated by the pregnancy, or when a main reason for obstetric care

Excludes: when the reason for the mother's medical care is that the condition is known or suspected to have affected the fetus (655.-)

647.0 Syphilis

Conditions in 090-097

647.1 Gonorrhoea

Conditions in 098

647.2 Other venereal diseases

Conditions in 099

647.3 Tuberculosis

Conditions in 010-018

647.4 Malaria

Conditions in 084

647.5 Rubella

Conditions in 056

647.6 *Other viral diseases*

Conditions in 050-079, except 056

647.8 *Other specified infective and parasitic diseases***647.9 *Unspecified infection or infestation*****648 *Other current conditions in the mother classifiable elsewhere but complicating pregnancy, childbirth and the puerperium*****Includes:** the listed conditions when complicating the pregnant state, aggravated by the pregnancy or when a main reason for obstetric care**Excludes:** when the main reason for the mother's medical care is that the condition is known or suspected to have affected the fetus (655.-)**648.0 *Diabetes mellitus***

Conditions in 250

648.1 *Thyroid dysfunction*

Conditions in 240-246

648.2 *Anaemia*

Conditions in 280-285

648.3 *Drug dependence*

Conditions in 304.-

648.4 *Mental disorders*

Conditions in 290-303, 305-316, 317-319

648.5 *Congenital cardiovascular disorders*

Conditions in 745-747

648.6 *Other cardiovascular diseases*

Conditions in 390-398, 410-459

Excludes: cerebral haemorrhage in the puerperium (674.0)
venous complications (671.-)**648.7 *Bone and joint disorders of back, pelvis and lower limbs***

Conditions in 720-724 and those classifiable to 711-719 or 725-728 specified as affecting the lower limbs

648.8 *Abnormal glucose tolerance*

Conditions in 790.2

648.9 *Other*

Nutritional deficiencies (conditions in 260-269)

**NORMAL DELIVERY, AND OTHER INDICATIONS FOR CARE IN
PREGNANCY, LABOUR AND DELIVERY (650-659)**

650 Delivery in a completely normal case

Delivery without abnormality or complication classifiable elsewhere in categories 630-676, and with spontaneous cephalic delivery, without mention of manipulation or instrumentation

Excludes: delivery by vacuum extractor, forceps, caesarean section or breech extraction, without specified complication (669.5-669.7)

breech delivery (assisted) (spontaneous) NOS (652.2)

651 Multiple gestation

651.0 *Twin pregnancy*

651.1 *Triplet pregnancy*

651.2 *Quadruplet pregnancy*

651.8 *Other*

651.9 *Unspecified*

652 Malposition and malpresentation of fetus

Excludes: with obstructed labour (660.0)

652.0 *Unstable lie*

652.1 *Breech or other malpresentation successfully converted to cephalic presentation*

Cephalic version NOS

652.2 *Breech presentation without mention of version*

652.3 *Transverse or oblique presentation*

Oblique lie Transverse lie

Excludes: transverse arrest of fetal head (660.3)

652.4 *Face or brow presentation*

Mentum presentation

652.5 *High head at term*

Failure of head to enter pelvic brim

652.6 *Multiple gestation with malpresentation of one fetus or more*

652.7 *Prolapsed arm*

652.8 *Other*

652.9 *Unspecified*

653 **Disproportion**

Excludes: with obstructed labour (660.1)

653.0 *Major abnormality of bony pelvis, not further specified*

Pelvic deformity NOS

653.1 *Generally contracted pelvis*

Contracted pelvis NOS

653.2 *Inlet contraction of pelvis*

Inlet contraction (pelvis)

653.3 *Outlet contraction of pelvis*

Outlet contraction (pelvis)

653.4 *Fetopelvic disproportion*

Disproportion of mixed maternal and fetal origin, with normally formed fetus

Cephalopelvic disproportion NOS

653.5 *Unusually large fetus causing disproportion*

Disproportion of fetal origin with normally formed fetus

Fetal disproportion NOS

Excludes: when the reason for medical care was concern for the fetus (656.6)

653.6 *Hydrocephalic fetus causing disproportion*

Excludes: when the reason for medical care was concern for the fetus (655.0)

653.7 *Other fetal abnormality causing disproportion*

Conjoined twins

Fetal:

ascites

hydrops

Fetal:

myelomeningocele

sacral teratoma

tumour

653.8 *Disproportion of other origin*

653.9 *Unspecified*

654 **Abnormality of organs and soft tissues of pelvis**

Includes: the listed conditions during pregnancy, childbirth or the puerperium

Excludes: with obstructed labour (660.2)

654.0 Congenital abnormalities of uterus

Double uterus

Uterus bicornis

654.1 Tumours of body of uterus

Uterine fibroids

654.2 Uterine scar from previous surgery

Previous caesarean section NOS

654.3 Retroverted and incarcerated gravid uterus**654.4 Other abnormalities in shape or position of gravid uterus and of neighbouring structures**

Cystocele

Prolapse of gravid uterus

Pelvic floor repair

Rectocele

Pendulous abdomen

Rigid pelvic floor

654.5 Cervical incompetence

Shirodkar suture with or without mention of cervical incompetence

654.6 Other congenital or acquired abnormality of cervix

Polyp of cervix

Tumour of cervix

Previous surgery to cervix

654.7 Congenital or acquired abnormality of vagina

Previous surgery to vagina

Stricture of vagina

Septate vagina

Tumour of vagina

Stenosis of vagina (acquired)
(congenital)**654.8 Congenital or acquired abnormality of vulva**

Fibrosis of perineum

Rigid perineum

Persistent hymen

Tumour of vulva

Previous surgery to perineum or
vulva

Excludes: varicose veins of vulva (671.1)

654.9 Unspecified**655 Known or suspected fetal abnormality affecting management of mother**

Includes: the listed conditions in the fetus as a reason for observation, or obstetrical care to the mother, or for termination of pregnancy

655.0 *Central nervous system malformation in fetus*

Fetal or suspected fetal:

anencephaly
hydrocephalus
spina bifida

655.1 *Chromosomal abnormality in fetus*655.2 *Hereditary disease in family possibly affecting fetus*655.3 *Suspected damage to fetus from viral disease in the mother*

Suspected damage to fetus from maternal rubella

655.4 *Suspected damage to fetus from other disease in the mother*

Suspected damage to fetus from maternal:

alcohol addiction
listeriosis
toxoplasmosis

655.5 *Suspected damage to fetus from drugs*

Excludes: fetal distress in labour and delivery due to drug administration (656.3)

655.6 *Suspected damage to fetus from radiation*655.8 *Other known or suspected fetal abnormality, not elsewhere classified*

Suspected damage to fetus from intrauterine contraceptive device

655.9 *Unspecified*656 *Other fetal and placental problems affecting management of mother*656.0 *Fetal-maternal haemorrhage*

Leakage (microscopic) of fetal blood into maternal circulation

656.1 *Rhesus isoimmunization*

Anti-D [Rh] antibodies
Rh incompatibility

656.2 *Isoimmunization from other and unspecified blood-group incompatibility*

ABO isoimmunization

656.3 *Fetal distress*

Abnormal fetal:
acid-base balance
heart-rate or rhythm

Fetal:
acidemia
bradycardia
Meconium in liquor

656.4 *Intrauterine death*

656.5 *Poor fetal growth*

"Light-for-dates"

"Placental insufficiency"

"Small-for-dates"

656.6 *Excessive fetal growth*

"Large-for-dates"

656.7 *Other placental conditions*

Abnormal placenta

Placental infarct

656.8 *Other*

656.9 *Unspecified*

657 *Polyhydramnios*

Hydramnios

658 *Other problems associated with amniotic cavity and membranes*

Excludes: amniotic fluid embolism (673.1)

658.0 *Oligohydramnios*

Oligohydramnios without mention of rupture of membranes

658.1 *Premature rupture of membranes*

658.2 *Delayed delivery after spontaneous or unspecified rupture of membranes*

658.3 *Delayed delivery after artificial rupture of membranes*

658.4 *Infection of amniotic cavity*

Amnionitis

Membranitis

Chorioamnionitis

Placentalitis

658.8 *Other*

658.9 *Unspecified*

659 *Other indications for care or intervention related to labour and delivery and not elsewhere classified*

659.0 *Failed mechanical induction*

Failure of induction of labour by surgical or other instrumental methods

659.1 *Failed medical or unspecified induction*

Failed induction NOS

Failure of induction of labour by medical methods, such as oxytocic drugs

659.2 *Maternal pyrexia during labour, unspecified*

659.3 *Generalized infection during labour*

Septicaemia during labour

659.4 *Grand multiparity*

Excludes: supervision only, in pregnancy (V23.3)
without current pregnancy (V61.5)

659.5 *Elderly primigravida*

659.8 *Other*

659.9 *Unspecified*

COMPLICATIONS OCCURRING MAINLY IN THE COURSE OF
LABOUR AND DELIVERY (660-669)

660 **Obstructed labour**

660.0 *Obstruction caused by malposition of fetus at onset of labour*

Any condition in 652.- causing obstruction during labour

Use additional code from 652.-, if desired, to identify condition

660.1 *Obstruction by bony pelvis*

Any condition in 653.- causing obstruction during labour

Use additional code from 653.-, if desired, to identify condition

660.2 *Obstruction by abnormal pelvic soft tissues*

Any condition in 654.- causing obstruction during labour

Prolapse of anterior lip of cervix

Use additional code from 654.-, if desired, to identify condition

660.3 *Deep transverse arrest and persistent occipitoposterior or occipito-anterior position*

660.4 *Shoulder dystocia*

Impacted shoulders

660.5 *Locked twins*

660.6 *Failed trial of labour, unspecified*

Failed trial of labour, without mention of condition or suspected condition, and with subsequent delivery by caesarean section

660.7 *Failed forceps or ventouse, unspecified*

Application of ventouse or forceps, without mention of condition, with subsequent delivery by forceps or caesarean section *or* *directly*

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660.8 *Other*

660.9 *Unspecified*

Dystocia:

NOS

fetal NOS

maternal NOS

661 *Abnormality of forces of labour*

661.0 *Primary uterine inertia*

Failure of cervical dilatation

Hypotonic uterine dysfunction, primary

661.1 *Secondary uterine inertia*

Arrested active phase of labour

Hypotonic uterine dysfunction, secondary

661.2 *Other and unspecified uterine inertia*

Atony of uterus

Desultory labour

Irregular labour

Poor contractions

661.3 *Precipitate labour*

661.4 *Hypertonic, incoordinate, or prolonged uterine contractions*

Cervical spasm

Contraction ring (dystocia)

Dyscoordinate labour

Hour-glass contraction of uterus

Hypertonic uterine dysfunction

Incoordinate uterine action

Retraction ring (pathological)

(Bandl's)

Tetanic contractions

Uterine dystocia NOS

Uterine spasm

661.9 *Unspecified*

662 *Long labour*

662.0 *Prolonged first stage*

662.1 *Prolonged labour, unspecified*

662.2 *Prolonged second stage*

662.3 *Delayed delivery of second twin, triplet, etc.*

663 *Umbilical cord complications*

663.0 *Prolapse of cord*

Presentation of cord

663.1 *Cord around neck, with compression*

Cord tightly around neck

663.2 Other and unspecified cord entanglement, with compression

Entanglement of cords of twins in mono-amniotic sac
Knot in cord

663.3 Other and unspecified cord entanglement, without mention of compression**663.4 Short cord****663.5 Vasa praevia****663.6 Vascular lesions of cord**

Bruising of cord

Thrombosis of vessels of cord

Haematoma of cord

663.8 Other**663.9 Unspecified****664 Trauma to perineum and vulva during delivery****664.0 First-degree perineal laceration**

Perineal laceration, rupture or tear (involving):

fourchette

hymen

labia

skin

slight

vagina

vulva

664.1 Second-degree perineal laceration

Perineal laceration, rupture or tear (following episiotomy) involving:

pelvic floor

perineal muscles

vaginal muscles

Excludes: involving anal sphincter (664.2)

664.2 Third-degree perineal laceration

Perineal laceration, rupture or tear (following episiotomy) involving:

anal sphincter

rectovaginal septum

sphincter NOS

Excludes: with anal or rectal mucosa (664.3)

664.3 Fourth-degree perineal laceration

Perineal laceration, rupture or tear as in 664.2 and involving also:

anal mucosa

rectal mucosa

664.4 Unspecified perineal laceration

Central laceration

664.5 Vulval and perineal haematoma**664.8 Other****664.9 Unspecified****665 Other obstetrical trauma**

Includes: damage from instruments

665.0 Rupture of uterus before onset of labour**665.1 Rupture of uterus during and after labour**

Rupture of uterus NOS

665.2 Inversion of uterus**665.3 Laceration of cervix****665.4 High vaginal laceration**

Laceration of vaginal wall without mention of perineal laceration

665.5 Other injury to pelvic organs

Injury to:

bladder

urethra

665.6 Damage to pelvic joints and ligaments

Avulsion of inner symphyseal cartilage

Damage to coccyx

Separation of symphysis (pubis)

665.7 Pelvic haematoma

Haematoma of vagina

665.8 Other**665.9 Unspecified****666 Postpartum haemorrhage****666.0 Third-stage haemorrhage**

Haemorrhage associated with retained, trapped or adherent placenta

Retained placenta NOS

666.1 Other immediate postpartum haemorrhage

Haemorrhage following delivery of placenta

Postpartum haemorrhage (atonic) NOS

666.2 *Delayed and secondary postpartum haemorrhage*

Haemorrhage associated with retained portions of placenta or membranes
 Postpartum haemorrhage specified as delayed or secondary
 Retained products of conception, NOS, following delivery

666.3 *Postpartum coagulation defects*

Postpartum:
 afibrinogenemia
 fibrinolysis

667 *Retained placenta or membranes, without haemorrhage***667.0** *Retained placenta without haemorrhage*

Placenta accreta	}	without haemorrhage
Retained placenta:		
NOS		
total		

667.1 *Retained portions of placenta or membranes, without haemorrhage*
 Retained products of conception following delivery, without haemorrhage**668** *Complications of the administration of anaesthetic or other sedation in labour and delivery*

Includes: complications arising from the administration of a general or local anaesthetic, analgesic or other sedation in labour and delivery

668.0 *Pulmonary complications*

Inhalation of stomach contents or secretions
 Mendelson's syndrome
 Pressure collapse of lung

668.1 *Cardiac complications*

Cardiac:
 arrest
 failure

668.2 *Central nervous system complications*

Cerebral anoxia

668.8 *Other***668.9** *Unspecified***669** *Other complications of labour and delivery, not elsewhere classified***669.0** *Maternal distress*

669.1 *Shock during or following labour and delivery*

Obstetric shock

669.2 *Maternal hypotension syndrome*

669.3 *Acute renal failure following labour and delivery*

669.4 *Other complications of obstetrical surgery and procedures*

Cardiac:

 arrest

 failure

Cerebral anoxia

} following caesarean or other obstetrical surgery or procedure, including delivery NOS

Excludes: complications of obstetrical surgical wounds (674.3)

669.5 *Forceps or ventouse delivery without mention of indication*

Delivery by vacuum extractor, without mention of indication

669.6 *Breech extraction, without mention of indication*

Excludes: breech delivery NOS (652.2)

669.7 *Caesarean delivery, without mention of indication*

669.8 *Other*

669.9 *Unspecified*

METHOD OF DELIVERY

If a full classification of surgical and other procedures is not being used to identify the method of delivery, the following classification is recommended:

- .0 Normal, spontaneous vertex vaginal delivery, occipitoanterior
- .1 Cephalic vaginal delivery with abnormal presentation of head at delivery, without instruments, with or without manipulation
- .2 Forceps, low application, without manipulation
Forceps delivery NOS
- .3 Other forceps delivery
Forceps with manipulation
 High forceps
 Mid forceps
- .4 Vacuum extraction
 Ventouse
- .5 Breech delivery, spontaneous, assisted or unspecified
 Partial breech extraction

PREGNANCY, CHILD BIRTH, PUERPERIUM

- .6 Breech extraction
Breech extraction:
 NOS
 total
 Version with breech extraction
- .7 Elective caesarean section
Caesarean section before, or at onset of, labour
- .8 Other and unspecified caesarean section
- .9 Other and unspecified method of delivery
Application of weight to leg in breech delivery
Destructive operation to facilitate delivery
Other surgical or instrumental delivery

COMPLICATIONS OF THE PUERPERIUM (670-676)

Note: Categories 671 and 673-676 include the listed conditions even if they occur during pregnancy or childbirth.

670 Major puerperal infection

Puerperal: endometritis fever pelvic cellulitis	Puerperal: pelvic sepsis peritonitis
----------------------------------------------------------	--------------------------------------------

Excludes: infection following abortion (639.0)
 minor genital tract infection following delivery (646.6)
 urinary tract infection following delivery (646.6)

671 Venous complications in pregnancy and the puerperium

671.0 *Varicose veins of legs*

Varicose veins NOS

671.1 *Varicose veins of vulva and perineum*

671.2 *Superficial thrombophlebitis*

Thrombophlebitis (superficial)

671.3 *Deep phlebothrombosis, antepartum*

Deep-vein thrombosis, antepartum

671.4 *Deep phlebothrombosis, postpartum*

Deep-vein thrombosis, postpartum

Pelvic thrombophlebitis, postpartum

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671.5 *Other phlebitis and thrombosis*

Cerebral venous thrombosis

671.8 *Other*

Haemorrhoids

671.9 *Unspecified*

Phlebitis NOS

Thrombosis NOS

672 *Pyrexia of unknown origin during the puerperium*

Puerperal pyrexia NOS

673 *Obstetrical pulmonary embolism*

Includes: pulmonary emboli in pregnancy, childbirth or the puerperium,
or specified as puerperal

Excludes: embolism following abortion (639.6)

673.0 *Obstetrical air embolism*

673.1 *Amniotic fluid embolism*

673.2 *Obstetrical blood-clot embolism*

Puerperal pulmonary embolism NOS

673.3 *Obstetrical pyaemic and septic embolism*

673.8 *Other*

Fat embolism

674 *Other and unspecified complications of the puerperium, not elsewhere classified*

674.0 *Cerebrovascular disorders in the puerperium*

Any condition in 430-434, 436-437 occurring during pregnancy, childbirth
or the puerperium, or specified as puerperal

674.1 *Disruption of caesarean wound*

674.2 *Disruption of perineal wound*

Breakdown of perineum

Secondary perineal tear

Disruption of wound of:

episiotomy

perineal laceration

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676.4 *Failure of lactation*

Agalactia

676.5 *Suppressed lactation*

676.6 *Galactorrhoea*

Excludes: galactorrhoea not associated with childbirth (611.6)

676.8 *Other disorders of lactation*

Galactocele

676.9 *Unspecified disorder of lactation*

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