PERINATAL MORTALITY AND ITS DETERMINANTS IN ASEMBO LOCATION, SIAYA DISTRICT - KENYA

B Y

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D E C L A R A T I O N

I CERTIFY THAT THIS DISSERTATION IS MY ORIGINAL WORK AND HAS NOT BEEN PRESENTED FOR A DEGREE IN ANY OTHER UNIVERSITY.

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"THE LIPS OF THE WISE DISPERSE KNOWLEDGE"

The true physician is an educator. He recognizes his responsibility, not only to the sick who are under his direct care but also to the community in which he lives. He stands a guardian of both physical and moral health. It is his endeavor not only to teach right methods for the treatment of the sick, but to encourage right habits of living, and to spread knowledge of right principles.

Education in health principles was never more needed than now. It demands attention of all who have at heart the well-being of their fellow men. By right instruction one can do much to correct evils that are working untold harm. The only hope of better things is in the education of the people in right principles. Unhealthy conditions should be changed, wrong habits corrected, then nature is to be assisted in her effort to expel impurities and to re-establish right conditions in the system.

By: E.G. White.

D E D I C A T I O N :

To my late Father, my mother in her struggle for us, my elder brother, and to Kibibi and Leila.

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LIST OF CONTENTS

CHAPTER 3: Page

CHAPTER 4:

CHAPTER 5:

L I S T O F M A P S :

LIST OF PLATES

LIST OF TABLES

Page

Page

Page

LIST OF FIGURES:

LIST OF APPENDICES:

G L O S S A R Y :

ANC	=	Antenatal Care.
CHW	=	Community health worker.
CHWs	=	Community health workers.
COTULEP	=	Clinical officer in-charge of tuberculosis and leprosy.
DC	=	District Commissioner.
DDC	=	District Development Committee.
DO	=	District Officer.
EDD	=	Expected date of delivery.
GDP	=	Gross domestic product.
KANU	=	Kenya African National Union.
KAP	=	Knowledge, attitude and practice.
KNH	=	Kenyatta National Hospital.
LMP	=	Last monthly period.
MCH	=	Maternal and Child health.
MCH/FP	=	Maternal and child health and family planning.
MOD	=	Month of delivery.
PHC	=	Primary health care.
P.I	=	Principal Investigator.
PMR	=	Perinatal mortality rate.
S.R.H.P.	=	Saradidi rural health project.
WHO	=	World Health Organization.

S U M M A R Y

The study was carried out from September 1987 to May 1988 in three sub-locations of Asembo Location, Siaya District, Kenya. The object of the study was to determine the perinatal mortality rate of the area and determinants of perinatal problems.

The study was a descriptive, prospective study of recruited pregnant women who met inclusion criteria. After recruitment, the study cases were followed up until they delivered, then a specially prepared questionnaire was administered to those who had had a delivery. A total of 431 pregnant women were recruited, and only 426 women had delivered by the end of the study period. The perinatal mortality rate found after analysis was 55.7 per 1000 births. This rate was lower than the national average of 1987 estimated at 85.2 per 1000 births. Some of the factors found to be significantly related to perinatal mortality were antenatal care attendance, place of delivery, length of active labour, complications during labour, number of infants born from a single pregnancy, maternal and paternal education, paternal occupation, age at first pregnancy, maternal age, smoking in pregnancy, parity, use of malaria chemoprophylaxis and knowledge, attitudes and practices of the mother regarding MCH Services.

It was concluded from this study that both medical and non-medical measures could be applied together, if any success is to be achieved in

lowering PMR. This is because of some factors would need purely medical and clinical interventions while others would need non-medical measures.

Recommendations made were not specific, but included broad areas such as health education in respect to timing and targeting, community participation, intersectoral collaboration, good information system with emphasis on data management and diserminaiton and effective Surveillance System. Other areas recommended were man-power development and training of personnel relevant to rural areas. Areas of further research were mentioned with emphasis to appropriate technologies that can be easily adapted for use in rural areas.

CHAPTER 1

INTRODUCTION

1.1 Problem Statement:

Very little is available in the way of documented statistics on perinatal deaths in the rural areas of Kenya. Although available data is from selected groups and not typical of the general population, it may indicate trends within the country. Population data on perinatal mortality in most communities are not available. Accurate perinatal data collected from different communities would help to identify the shortcoming of maternal and child health (MCH) service delivery in the community concerned. During her childhood, the investigator noticed that there were many infants that were dying in the perinatal period in this community. The past observations and experiences led to the investigation of perinatal mortality rate (PMR) and its determinants.

Foetal wastage received comparatively little attention, until quite recently because the maternity and child welfare services were preoccupied with the problem of maternal and infant mortality. The dangers of sepsis have greatly been reduced due to advances in treatment, therefore, maternal mortality rate has fallen considerably. Similarly infant mortality used to be dominated by deaths from infection, usually after the neonatal period. Now neonatal mortality due to causes other than infections have relatively increased.

Such trends have caused attention to be focussed increasingly on death of unborn or newly born babies and led naturally to the concept of perinatal mortality. This concept depends on the fact that most infant who die during the early neonatal period do so as the direct or indirect consequence of factors that were present before or during birth.

The perinatal mortality rate, as used in this dissertation is defined as the number of foetal deaths occuring at 28 weeks or more of gestation (still-births) and death of live born infants occuring in the first week after birth (early neonatal deaths) per 1000 live and still births (total births) (31).

While it is true that perinatal mortality issue cannot be isolated from any of the health matters, it is equally true that it can, and ought to be looked at dispassionately if its true significance to national and international progress in improvement of health is not to be lost. With more realistic planning of both human settlements and the services for health, many perinatal problems could be minimized and much human suffering alleviated.

In many developing countries, data on perinatal events are lacking. Statistics tend to lump together infant mortality rates with those of perinatal period. Marked disparities in perinatal statistics exist between nations, between areas within the same nation and between areas of a given district, therefore, the actual perinatal mortality rate is not known, especially so, for rural areas (32). The scanty data that exists is mostly hospital based and there is lack of

comprehensive data from the community (5). These are not representative of the general population due to selective nature of the hospital patients.

Most deaths occuring in the perinatal period are caused by complications of pregnancy and child-birth and are as such preventable. The developed world has reached perinatal mortality rate of about 20 per 1000 and below (70), whereas most developing countries are in the range of 50 per 1000 births and above (2,56,70,89,108). Perinatal mortality is therefore a problem that can no longer be ignored, but first there is need for reliable baseline data so that future trends and intervention programmes can be evaluated.

1.2 Literature Review (Background)

Perinatal mortality represent one of the major health problems today, both in developed and developing countries. It is an expression of the extent of pregnancy wastage as well as the quality and quantity of health care to the mother and newborn infant (100).

Many factors are known to be associated with perinatal mortality and morbility. These are socio-economic status, age, height, gravity and parity of the the mother (14,87,90,98,100,106,108).

Other factors include previous reproductive history, health status, nutrition of the mother, genetic factors, the quality and quantity of prenatal, intrapartum and neonatal care, birth weight and gestational age of the infant (1,26,39,42,45,94,95,100,104).

Perinatal deaths account for the largest proportion of the persistent and tragically high rate of infant mortality. They are closely linked with the poor health and nutritional status of the mother and with the complications of pregnancy and childbirth, in particular those due to unregulated fertility. They are also associated with low birth weight, which is both an indicator of the health of the mother before and during pregnancy and a means of predicting the immediate health of the child and its development in the long term (104).

It has been shown that more than 50% of the neonatal deaths occur in perinatal period (13). The perinatal period is one of the most vulnerable periods of life. In many developing countries, the true extent of perinatal problems is not known due to under-reporting and lack of services (50,71). It is therefore difficult to plan and provide services that will reduce perinatal problems in the absence of reliable data (3). Large numbers of pregnancy wastage continue to occur in many countries of Africa (2). With a fall in maternal mortality, perinatal mortality has assumed more importance in the evaluation of pregnancy outcome (107).

About 4-5 per 1000 newborn infants with congenital anomalies die in the perinatal period (97) and this varies from place to place. The deaths are caused by complications of pregnancy and childbirth and some can therefore be prevented (97). More than 5 million infants in the world die before reaching their 7th day and about 80% of these are in developing countries (15).

About 20% of the women in rural areas of Kenya deliver in health facilities and it is not clear whether the remaining 80% are better or worse with regards to perinatal mortality (98). 80% of deliveries occur in rural areas (16) therefore perinatal mortality rates in these areas could actually be higher than what is being shown by hospital based studies. In most rural areas the reporting of neonatal death is not usually done due to cultural problems , even when the law requires it. Sometimes it is avoided to minimize the administrative procedures of death registration and acquisition of certificate for disposal. Trained personnel and resources are scarce in rural areas of Kenya, therefore, it is better to concentrate the available resources on most specific and effective services, to do this, one needs reliable data.

An important purpose of public health programmes in most developing countries is to lower maternal and childhood morbidity and mortality. Action programmes to this end must be based on valid data, both to reveal critical areas for action and to provide a proper basis for evaluation.

Preconceptional factors and conditions arising during pregnancy,

parturition or early neonatal period may influence perinatal mortality, the health of the newborn and even development of the child. Improved health care relevant to the perinatal period can promote better health throughout the world (108).

Standards of maternity care have improved, therefore, maternal deaths can no longer be used as a sensitive index of the quality of maternal and child health care, but perinatal mortality rate is still a reliable and sensitive index (108). It is appropriate since pregnancy care is being aimed at improving the prospects for the foetus, good foetal care implies good maternal care. Perinantal problems are clearly complex with many inter-relating factors, some specific to certain countries, with more risks in developing countries. Accurate knowledge of the extent of the problem is essential before priorities can be assigned, plans made and methods for implementation recommended.

A WHO Expert Committee (108) reviewed the statistical information available from different parts of the world and realised the need for much more information, and for standardized data and made suggestions for improving perinatal reporting. It is becoming increasingly possible to predict, prior to birth, which infants will be at high risk during the first week of life. These risk factors differ from area to area and while others become underlying factors in different regions, they are associated factors in other regions (108).

Little is known about the fate of pregnant women in rural Kenya who deliver at home. One of the major facts underlying

perinatal events is that women who have had one unfavourable outcome of pregnancy are prone to have a continuing repetitive unfavourable pattern (100). Thus, the identification of high risk women and providing them with special care is essential.

Pregnancy outcomes have long been used in some countries to measure the quality of medical care for mothers and infants and to evaluate overall health and social programmes (107). Lack of reliable data cannot allow this to happen in rural areas, where interventions used are models using statistics and experiences from other regions or urban centres. Most hospitals in Kenya are referral and therefore deal with selected patients who are already at high risk. They also enjoy the use of modern technologies and therefore have specialised care for neonates in the perinatal period. Most studies done in hospital examine live-births then calculate perinatal deaths from these records without considering the still births, thus perinatal mortality rates are not true figures in the absence of still-births. They do not consider births occuring outside hospitals and also deaths that occur after early discharge from hospital.

Study done in Tanzania (19) gave perinatal mortality rate at 37.9 per 1000 births, but the author suggested that, it was an underestimate due to early discharge of patients, because more deaths could have occured at home. A study done in Nairobi on early PMR (63) found out that the mortality in 24 hours after birth was 35.6 per 1000 births, and still birth rate of 23.3%, this was an urban study done in 1981. The still-birth rate in

this study was nearly twice that of England and Wales in 1970 (63,108). It also found that early PMR was 45 per 1000 births among teanage mothers, therefore maternal age appears to be associated with perinatal mortality. From the first 'Nairobi birth Survey' Study (61), the author recommended that a perinatál study should be done in rural community.

According to study done between 1976-1977 by Johnstone (46) to tal PMR at Kenyatta National Hospital was about 100 per 1000 births. This high rate was attributed to high risk nature of cases which are selectively booked for delivery. Prematurity was the leadig cause of perinatal loss and most of these were unbooked patients. The study found out that malaria was the most common maternal disease causing perinatal death. Study done in Addis-Ababa in 1974-1975 (91), the rate of perinatal deaths due to pre-eclampsia was 1.3 per 1000 births. Women aged 20-24 years had the greatest frequency of the perinatal losses as did those who were primiparous. The frequency of the deaths increased with mothers pre-pregnancy body weights and lack of prenatal care.

In 1971 Usher (101) reported that only 10-15% of neonatal deaths and 5% of perinatal deaths took place after the first week. Since these late neonatal deaths did not appear to significantly alter the perinatal mortality statistics, it was recommended that the early neonatal period be used for mortality survey in Quebec.

The question of whether or not there is an increased maternal and perinatal risk in normal women who begin their reproductive lives comparatively late has not been conclusively determined. The foetus also appears to be the victim of maternal age and primiparity, exhibiting an increase in congenital malformations, unexplained foetal death and increased breech presentation and a decrease in the mean birth weight with higher incidence of prematurity (55,82). Large epidemiological studies also indicate that perinatal mortality associated with primiparous deliveries rises after 30 years of age. The perinatal mortality is as high or higher in the para-3 under 20 years and para-5 over 35 years (55). This confirms the importance of both age and parity in relation to higher perinatal mortality rates.

Low birth-weight (defined as 2500g or less) is the most important factor having an immediate association with perinatal mortality (14). An estimate made following a world survey of maternity services led to conclusion that probably more than half the pregnant women in the world receive neither trained antenatal supervision nor skilled or even unskilled help in labour (14). The physical and mental health of the future mother, her history of immunization and infectious diseases, her education, the social and cultural conditions in which she has been brought up, her attitudes and behaviour patterns including those related to reproduction and family life, influence perinatal mortality. A favourable environment with good living

conditions is a prerequisite for successful child-bearing. Where environmental conditions are poor, perinatal death rates are higher, birth-weights are lower and premature labour is more common (69).

There is a linear relationship between perinatal mortality rate and socio-economic group of father and maternal grandfather (14,33). There is also an association between extra-marital pregnancies and perinatal mortality (73). Haemoglobinopathies such as sickle-cell anaemia are of great importance in some areas and puts a pregnant women at a higher risk with regards to perinatal mortality (14,68).

A study done in Machakos (97) showed that perinatal mortality rate was 46.4 per 1000 total births. By antenatal screening and isolating 13% of pregnant women at risk, the causes of perinatal deaths could have been identified in 41%. This means that 59% could have been anticipated but timely obstetric intervention among these women might have lowered the perinantal mortality by about 10 per 1000 total births. A study done in 1975 (64) at maternity unit of KNH showed that PMR of 33.3 per 1000 live births occured in the first 24 hours of life, and 96.4% of all neonatal deaths in the first week of life.

A study in Washington (30) during an economic recession found out that during a period of increased unemployment and increased medical aid eligibility, more women residents of low income

census tracts, received delayed perinatal care or none at all and delivered proportionately more infants of low birth-weight. The incidence of maternal anaemia also increased. Those of high income tracts experienced a small increase in proportion receiving delayed or no prenatal care, but had no change in the incidence of low birth-weight infants. Maternal education has been shown to be associated with child or infant survival (36). Educated mothers are likely to use modern services and ignore the traditional ideas about illness, so as to adopt alternative maternal and child health services.

In the Machakos project (98,99) a study on the outcome of pregnancy showed that maternal age of less than 25 years and over 34 years, a history of previous perinatal death and breech delivery were associated with higher perinatal mortality. Parity, marital status, birth interval and maternal height were not associated with a difference in outcome of pregnancy. The still birth rate among the infants born in hospital was 4.4% compared with 2.4% among those born at home. Half of all perinantal deaths were caused by either prematurity or birth-trauma.

A study done in Saudi Arabia in 1967 (74), deaths were classified on basis of clinical evidence, as autopsy results were not available. Associated medical and obstetrical conditions in the mother were considered, as well as perinatal mortality in relation to pregnancy order, maternal age, place of

delivery, place of residence and amount of prenatal care. When causes of death in infancy were categorized, anoxia in the perinatal period and infections were leading causes of death. The controllable maternal conditions associated with perinatal deaths all indicate need for more extended preventive clinic care.

A study investigated perinatal deaths occuring among women who were members of a religious group. These women received no prenatal care and gave birth at home without trained attendants. Members of the religious group had a perinatal mortality rate three times higher than the state wide rates (48). These findings suggest that women who avoid obstetric care have increased risk of perinatal death. Literature review revealed that just as many human beings die during the first few weeks of life as during the following 30 years of life (107). Moreover , if foetal distress or anoxia occurs during perinatal period, the growing child suffers from sequelae that are heavy burden on the family. The major importance of public health programme is to reduce perinatal mortality and disabilities associated with distress in utero or during delivery. Improvements in the collection and presentation of National vital statistics could allow analysis which could help to distinguish effects of the primary prevention of the causes of such deaths, from the secondary preventive measures which improved medical care can offer (3). Locally produced hospital reports have not been an adequate substitute, both because they

take no account of biases due to selective referrals to hospitals for medical or geographical reasons, and again because they are based on such small numbers of events (23).

In Netherlands 34-35% of all deliveries still take place at home, but with considerable regional differences. In a study examining the relationship between the perinatal mortality rate and percentage of hospital deliveries in the provinces, no relationship could be demonstrated between regional percentage of hospital deliveries and the regional perinatal mortality rates (93). The proportion of hospital delivery appeared not to be a major factor in determining the regional PMR in the current system of obstetric care in the Netherlands.

The outcome of pregnancies in Jamaican women with homozygous sickle cell (SS) disease over a period was reviewed (75). Overall, the spontaneous abortion rate was 118 per 1000 pregnancies, the still birth rate was 128 per 1000 births, and perinantal mortality of 171 per 1000 births. Another factor contributing to the poor obstetric performance was probably an increased survival and pregnancy rate in high risk patients. There is also evidence of geographical variability, the poorer outcome of pregnancy in West Africa often reflecting the greater prevalence of infections especially malaria, and more frequent severe anaemia (75).

Good planning and management depend on the availability of

reliable, accurate and timely information about the health situation. Information support is aimed at providing health planners and managers with the information they need to manage their programmes effectively and decide whether or not the situation is improving and how much of any improvement is due to their intervention (112). Low birth weight and preterm delivery are major contributory causes of both perinatal and infant mortality (73). They are a direct consequence of poor maternal health and nutrition and are also closely related to the unfavourable social status of women. Twenty million low-birth weight infants are born each year, but there is a sharp difference between developed and developing countries (106). In some parts of Asia they constitute almost half the total number of infants born, while in parts of Europe the proportion is one in 17 (106).

Mean birth weight in developing countries are noticeably lower than in affluent societies. It is often assumed that this difference is due to maternal malnutrition, and maternal energy supplementation, especially during the last tremester of pregnancy (11). An infant's chance of survival in perinatal period is influenced by a large number of genetic, social and environmental factors which may determine adequacy of foetal growth and nutrition, risk of malformation, infection and preterm birth, and quality of level of utilization of obstetric and neonatal-care services. A woman of low socio-economic status is more likely to develop pre-eclamptic toxaemia, to be

reliable, accurate and timely information about the health situation. Information support is aimed at providing health planners and managers with the information they need to manage their programmes effectively and decide whether or not the situation is improving and how much of any improvement is due to their intervention (112). Low birth weight and preterm delivery are major contributory causes of both perinatal and infant mortality (73). They are a direct consequence of poor maternal health and nutrition and are also closely related to the unfavourable social status of women. Twenty million low-birth weight infants are born each year, but there is a sharp difference between developed and developing countries (106). In some parts of Asia they constitute almost half the total number of infants born, while in parts of Europe the proportion is one in 17 (106).

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unsure of her menstrual dates, to have inadequate antenatal care (109). In such conditions, the infant may die from asphyxia or a multiplicity of other problems. In this case there is no single cause which can adequately express the full sequence of events. In such a complex situation the tendency is to search for a more comprehensive means of collecting and analysing perinatal data in the hope that eventually some analysis will allow complete definition of the causes and nature of perinatal mortality. Premature rupture of the foetal membranes is one of the most common underlying causes of preterm delivery and perinatal death (69). Perinatal mortality seems related less to expenditure on formal health services than to the total way of living (GDP). Standards of living and nutrition are very important factors, and any impact attributed to changes in obstetric services must be seen against this background (19). The observation that maternal death is much less frequent compared to perinatal death in populations with low overall levels of mortality suggests that maternal mortality declines much more rapidly than perinatal mortality if general mortality declines (8). The major reason is probably that general maternal health, which only changes slowly over time, is a very important determinant of perinatal death, but to a much lesser extent of maternal death.

Perinatal epidemiologists no longer speak much of prematurity. WHO recommends that infants born before 37 completed weeks of gestation should be designated "preterm" and those of birth-weight" less than 2500g, "low birthweight" (76). Both definitions have drawbacks - the former because menstrual dates are often unkown or unreliable, the latter because it does not separate preterm from small-for-gestational age infants. Whatever the classification, there is no dispute about their high mortality and morbidity. In the United Kingdon they account for over two-thirds of first week deaths (76).

According to WHO estimates, 22 million babies born every year are of low birth weight (96). Of these, 21 million are born in developing countries. Data on births and deaths among Aboriginal Australians gave cause for anxiety (56). PMR for Aborigines in 1977 were 52 per 1000 births in Queensland and 77.5 per 1000 in the Northern Territory. Their white counterparts had PMR of about 20 per 1000 births.

The prevention of perinatal deaths can be considered from two points of view: first, the nature of the pregnancy and the birth, and quality of maternal and paediatric care available. Secondly, the previous history of the mother, which caused her to become the kind of physical and social being she is.

These two points are inter-dependent, the kind of services needed in any community depends largely upon the quality of the mothers who use it. The babies of ill-grown and generally unhealthy mothers are exposed to much higher risks of perinatal

death, and require a much higher standard of care, than those of mothers who are healthy and in good physical condition (14). The Mother's genetic potential depends very largely upon her environment during pregnancy itself, but also the more remote environment during her growing years. The interaction of the past with the present goes beyond anatomical and physiological considerations, for the nature of upbringing helps to determine her behaviour as an adult.

In most developing countries, the most important casues of death are diseases and conditions which have been either completely eradicated, or brought under adequate control in the more developed countries. The highest load of both mortality and morbidity falls on infants and young children, and women in the fertile age group (81). Pregnancy and parturition carry known risks to mother and infants. However, the actual absolute risks can be so altered by social and other environmental factors as to make studies of such risks very difficult (80) It is now generally accepted that the availability and accessibility of competent medical care, adequate social security systems, education (especially of women) and good jobs, all work together to reduce the risks. When pregnancies occur at frequent intervals the mothers are unable to make up for the deficiency and many of them are nutritionally depleted by the time they have their fifth and subsequent children, a situation which may lead to the so called maternal depletion syndrome.

As Florence Nightingale commented in her notes in 1871 (16).

"It must be admitted at the very outset of this enquiry that midwifery statistics are in unsatisfactory condition. But, with all their defects, midwifery statistics point to one truth, namely, that there is a large amount of preventable mortality in midwifery practice, and that as a general rule, the mortality is far, far greater in lying-in hospitals than among women lying-in at home" This point should be established, because if it is a true observation, then it could perhaps explain why some women attend antenatal clinics but deliver at home, even booked in hospitals.

:3 Justification

In view of the fact that marked disparities in perinatal mortality statistics exist, and that there are regional differences, a study in a rural community with its peculiar problems is needed. Most studies that have been done are hospital based and are selective. Lack of reliable and readily available data on perinatal events in the community makes the study justified.

Community based study is necessary to determine most sensitive and specific criteria for selection of programmes in order to obtain maximum coverage at minimum costs. It has been shown that more than 50% of neonatal deaths occur in perinatal period (13). If the actual rate is known and its determinants are known, then sensitive and specific target oriented intervention programmes can be developed.

There is need for perinatal mortality data so that planning for maternal and child health services in rural areas can be targetted, so that they no longer become models of urban programmes. Also man-power development and resource allocation can be done appropriately. There is need for baseline data and surveillance systems so that future trends can be assessed and intervetnion programmes evaluated.

Identification of high risk women and providing them with special care is essential. Perinatal mortality reduction can be achieved through lowering the number of still-births and neonatal deaths within the first week of life. To do this, determinants of still-births and neonatal deaths have to be known first, before any meaningful intervention is initiated and implemented. It may therefore be more fruitful for the poorer nations to concentrate on facilities for perinatal supervision and care during child-birth than on high technology of intensive care especially in rural areas (24).

In the absence of more precise data and sharper insights into perinatal events, the action programmes may be inappropriate and ineffective. This study tries to fill this information gap, so that planners can establish relevant, sensitive and effective control programmes. The intent should be not only to fill serious data gaps in perinatal mortality, but also to ensure continuity and consequently, reliability and usefulness of data.

CHAPTER 2

STUDY OBJECTIVES:

2:1. General Objective (Purpose)

The aim of the study is to determine the perinatal mortality rate in the study area and its determinants among pregnant women in the area experiencing perinatal loss. The study will also provide baseline information which could be used for planning, implementation and evaluation of MCH services in the area. It is also hoped that the findings will stimulate and generate areas of further research.

2:2. Specific Objectives:

2.2.1 To determine perinatal mortality rate and its determinants in a rural community of Asembo Location.

2.2.2 To determine the outcome of pregnancies and perinatal events in relations to:

2.2.2.1 Maternal age

2.2.2.2 Parity and birth interval

2.2.2.3 Clinic attendance

2.2.2.4 Who conducted delivery

2.2.2.5 Place of birth

2.2.2.6 Malaria chemprophylaxis

2.2.2.7 Maternal education

2.2.2.8 Marital Status

2.2.2.9 Birth weight

2.2.2.10 Family size

2.2.2.11 Occupation of both father and mother.

2.2.3. To determine the effects of past obstetric events, antepartum and intrapartum factors on perinatal outcome.

2.2.4. To determine the knowledge, attitude and practices of existing maternal and child health services and its influence on perinatal mortality.

CHAPTER 3

MATERIAL AND METHODS

3:1 Study Area

The study was done in Asembo location of Siaya district. Siaya district was established in 1966 following the split up of old Central Nyanza district into Kisumu and Siaya districts.

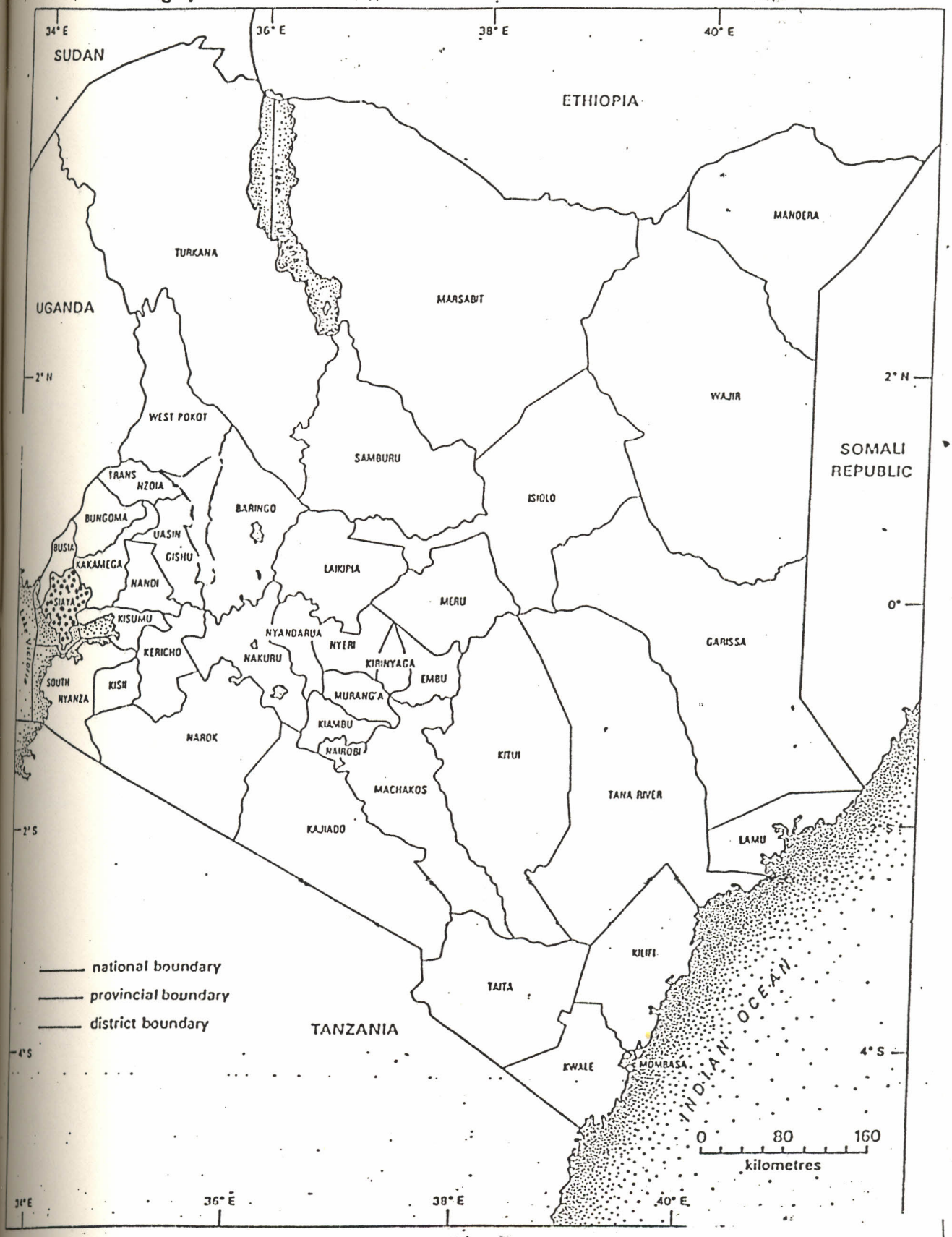
The district is one of the four districts of Nyanza Province of the Republic of Kenya. It extends, from latitude 0°-13' South to 0°-18' North and also from longitude 33°-58' East to 34°-33' (see map 1). Asembo location lies between East and South-East of the district, bordering on Lake Victoria. It is 40 miles West of Kisumu town.

The area comprises of three locations namely Asembo East, West and Central. The area is 3720 feet above sea-level and has surface area of about 200 sq.km. excluding area under water. It has rainfall in March to May and October to November. The climate is hot and humid, favouring malaria transmission most of the year, therefore malaria endeminicity is very high.

The communication network is poor and there is one road through the location. The road is seasonal and most people in the area are within 4-6 miles of this major road, where some public

MAP OF KENYA

MAP NO. 1



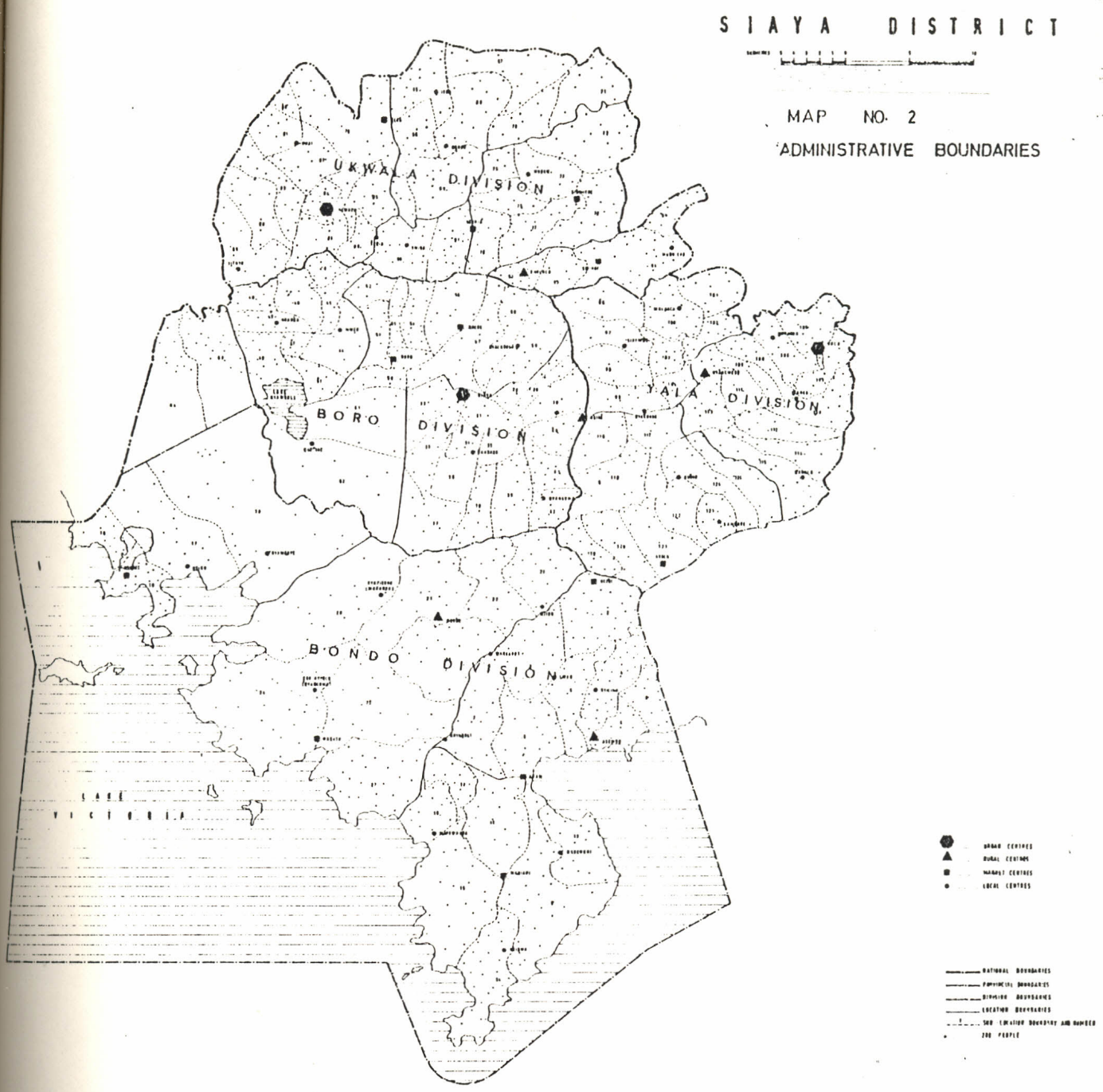
transport is available. The means of transport is generally scarce and irregular. The rural access roads are largely non-existent and where they exist, maintenance is poor, therefore rendering them out of use.

3:1.1. Administrative Profile

Asembo location is in Rarieda division, recently split from Bondo division. It is one of the five divisions forming Siaya District (see map 2). The location has its divisional headquarter at Kamito, a centre situated at Asembo Bay. The district headquarter is located in Siaya urban centre. The district is headed by District Commissioner (D.C.). Each division is administered by a District Officer (D.O.). Location and sub-locations are headed by chiefs and assistant chiefs respectively. Most villages are administered by village elders known as "Jodong Gweng" or "Milango".

Asembo area has three chiefs and each has his own assistant chiefs. Asembo central has the chief's camp situated at Saradidi Market or a place popularly known as Oyude. The village elders are responsible for administration of villages. The villages are made up of several homesteads, and each homestead could have one or several households.

The chiefs and the assistants normally use a 'baraza' to communicated information to the people of the location. As a result of the Government of Kenya policy of District Focus for


SIAYA DISTRICT
MAP NO. 2
ADMINISTRATIVE BOUNDARIES
UKWALA DIVISION
BORO DIVISION
YALA DIVISION
BONDO DIVISION
LAKE VICTORIA

Rural Development, the District Development Committee (DDC) is the official government organ charged with the responsibility of approving and co-ordinating all development activities. To assist with administration also are the party officials and at locational level the K.A.N.U. youth-wingers are actively involved, especially in matters concerning security.

3.1.2. Demographic Profile

The Luo tribe forms almost exclusively the major ethnic compossition of the people. According to recent census done by Saradidi Rural Health Project, Asembo location has a population of 60,000 people (82). The surface area is about 200 sq. km. giving a population density of 300 people per sq. km. According to population structure Siaya District, the percentage of adult males is slightly lower than that of females (65). This could be due to out-migration by adult males in search of gainful employment. In the location about 11% of the population are salaried or self-employed (have regular cash-income) (47). Dependancy ratio is high, but those who are capable of being employed are unemployed. There is large proportion of adult females and children in the location. According to the district information and statistical profile (88) the literacy level in the district is 52%. The male literacy rate is 30% while that of female is 22%. The crude birth rate for the district is 52.7 per 1000, crude death rate is 21.6 per 1000. Life expectancy is 55 years and IMR is 147 per 1000.

3.1.3. Geographic Profile

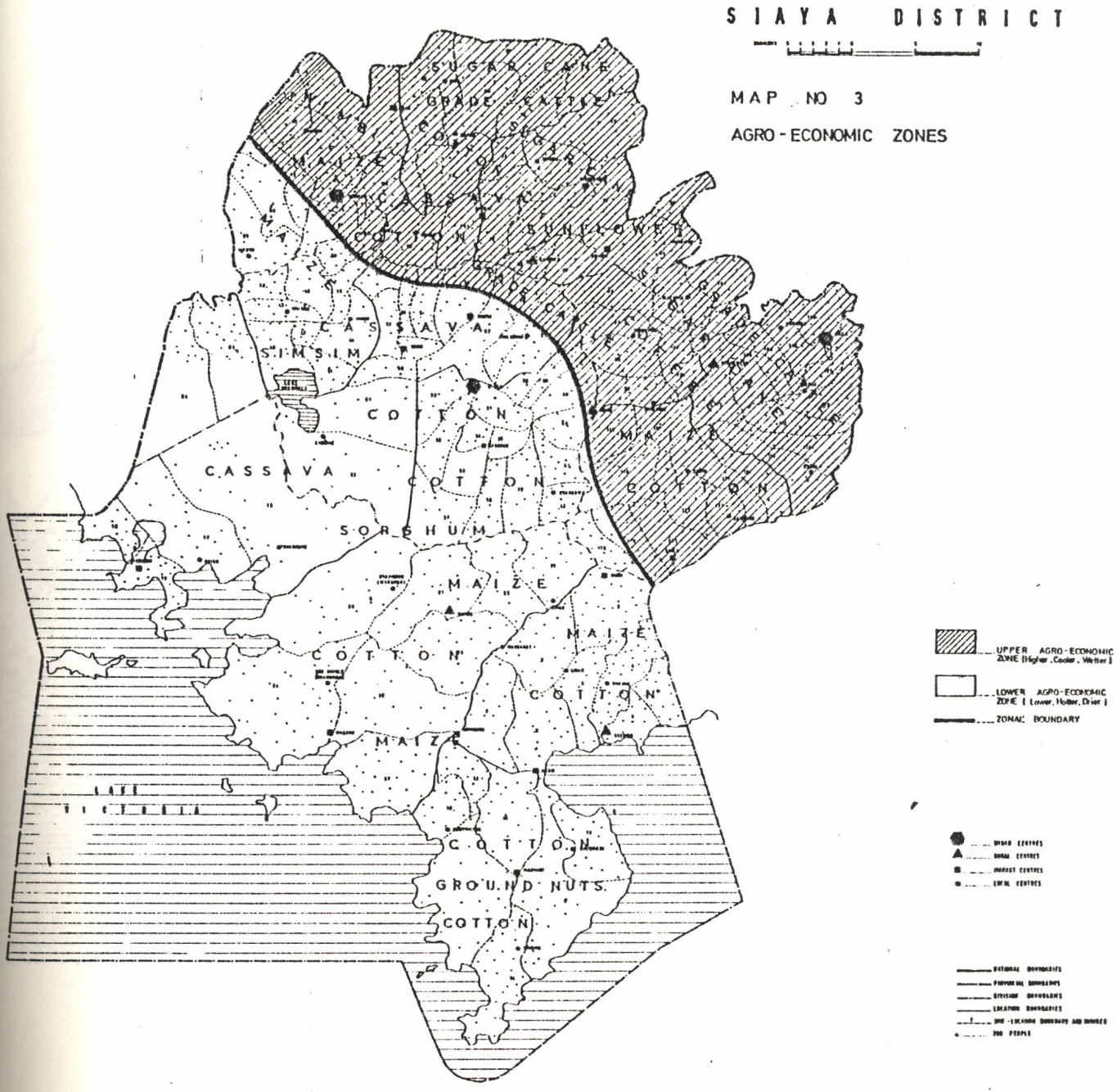
The surface are is 200 sq. km and a height of about 3720 feet above sea-level. Asembo location borders Lake Victoria and has numerous lake-shore swamps. The soil ranges from Black cotton type to sandy murramish clays.

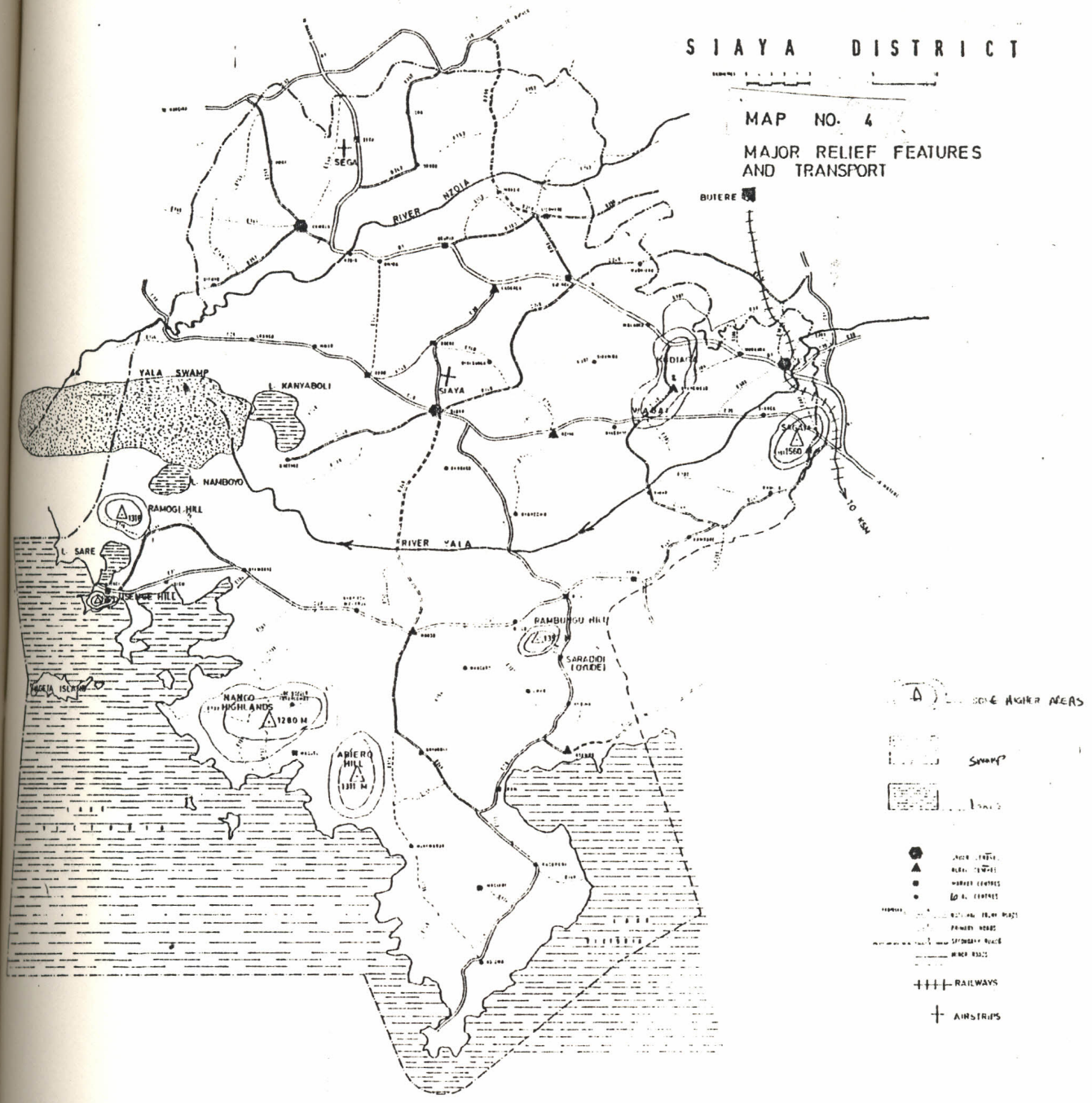
The rainfall is mainly convectional type and it is lower than the rest of the district. The district has an average annual rainfall of 1450mm. Former Bondo division which Asembo locatio used to be under administratively, receives an average 935mm of rainfall per year. The rainfall is received mostly in the March to May long rainy season while the September to October short rainy season is unreliable and unpredictable.

Siaya district is on the Equator and temperature maxima remain high. The lower warmer areas of former Bondo and Boro divisions have temperature as high as between 30°C-36°C. The area has shrubland type of vegatation, in some areas, it is typical shrubland savana with scattered Acacia trees and low bush vegetation.

3. 1.4. Socio-Economic Profile

There are only small scale farmers in the location. The farming is especially for subsistence, however, cotton is grown for cash, but delay in payments to the farmers have discouraged them from cotton farming. In the lower Agro-Economic Zone,


SIAYA DISTRICT
MAP NO 3
AGRO-ECONOMIC ZONES
SUGAR CANE
GRADE CATTLE
MAIZE
COTTON
SUNFLOWER
CASSAVA
SIMSIM
COTTON
CASSAVA
COTTON
SORGHUM
MAIZE
COTTON
MAIZE
COTTON
MAIZE
COTTON
GROUND NUTS
COTTON
MAIZE
COTTON
UPPER AGRO-ECONOMIC ZONE (Higher, Cooler, Wetter)
LOWER AGRO-ECONOMIC ZONE (Lower, Hotter, Drier)
ZONAL BOUNDARY


SIAYA DISTRICT
MAP NO. 4
MAJOR RELIEF FEATURES AND TRANSPORT
SEGA
RIVER NZOIA
BUTERE
YALA SWAMP
L. KANYABOLI
SIAYA
L. NAMBOYO
RAMOGI HILL
RIVER YALA
L. SARE
RUSINGA ISLAND
NANGO HIGHLANDS
1280 M
ARIERO HILL
1311 M
RAMBUNGU HILL
SARADIDI (ORADEI)
10 KM
SWAMP
RAILWAYS
AIRSTRIPS

where Asembo location falls, the farm holdings range from 2-12 hectares in size per family (see Map 3). The farmers grow maize, sorgum, cassava and beans as food crops. Almost every family keeps cattle for milk and as a form of investment.

Due to comparatively harsher conditions in the drier lake shore areas, human settlements have long been restricted to isolated units, either as lake-shore fishing villages or as small scale subsitence farmers. The communication network is very poor and roads are seasonal. Where they are present, they are impassible during rainy seasons (see Map 4). This poor communication system has not favoured other enterprises, though some people have undertaken small scale businesses and projects such as carpentry, repair works and running small 'kiosks'.

3.1.5. Health Profile

The infant and childhood mortality rate in Siaya district has been the highest in Kenya.

Table 1: Childhood Mortality Versus Maternal Education

Children dying in the first two years of life	Number per 1000
In all mothers together	211
In mothers with no education	237
In mothers with at least primary education	190
In mothers with some secondary school education	123

SOURCE: SIAYA DISTRICT 5TH HEALTH DEVELOPMENT PLAN (1984-1988)

To reduce this high mortality rate, more emphasis is placed on preventive medicine through MCH/FP clinics. More efforts are being put on preventive services especially among mothers between 15-49 years of age and children 0-5 years of age.

Asembo location has the following health infrastructure. These facilities offer mainly clinic-based curative services, except S.R.H.P. which provide mobile clinics to the community and offer integrated MCH/FP services.

3:1.5.1. Health Facilities

a) Hospital:

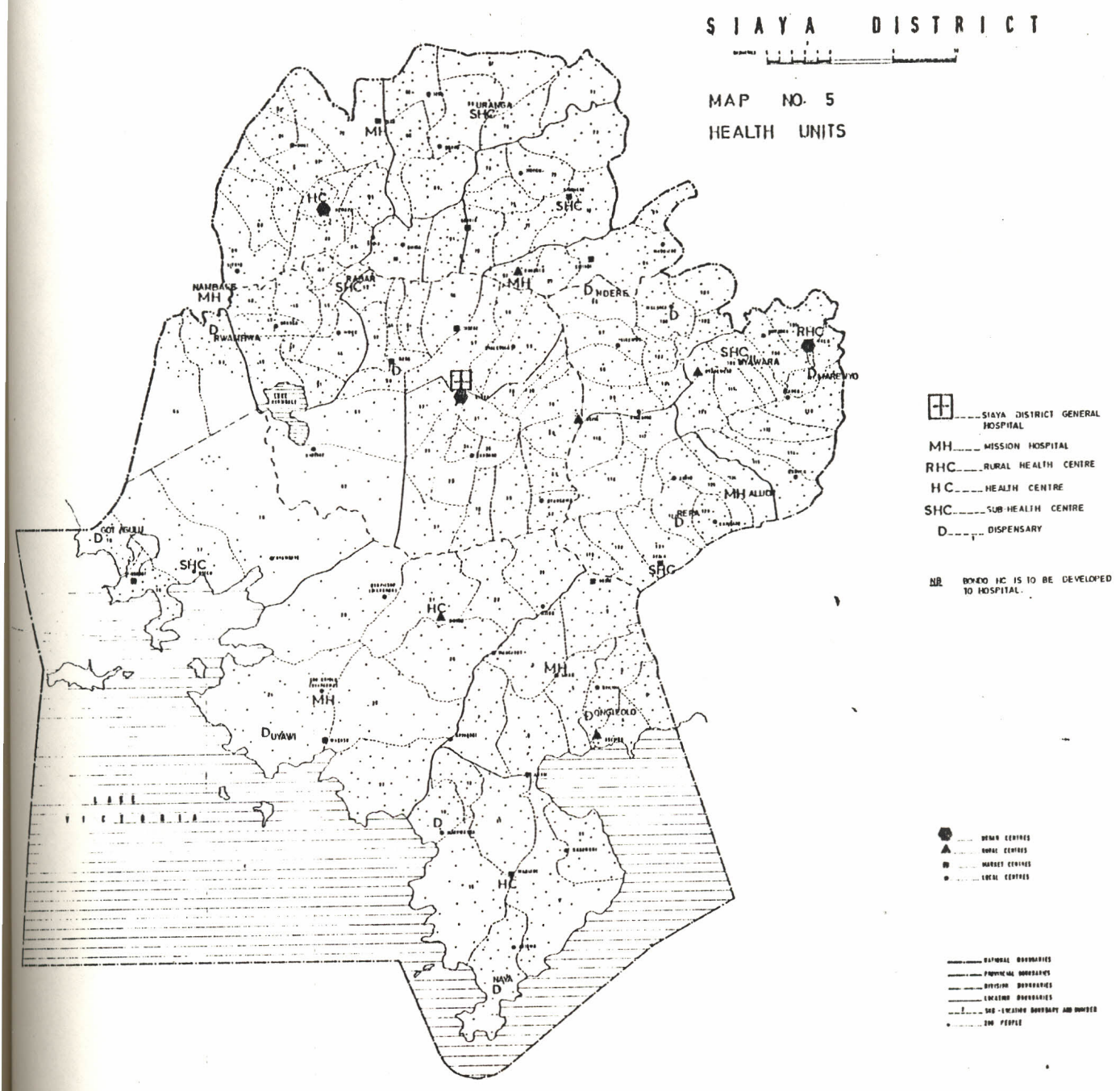
There is no government hospital in the whole of this division, and the nearest is in another division, that is Siaya District Hospital. There is 1 mission hospital namely Lwak in the location. It has bed capacity of 48 beds, 20 maternity and 28 general. Lwak is considered a dispensary according to list of facilities at planning section of Ministry of Health (see Map 5).

b) Health Centres:

There is no government health centre. The only one available is S.R.H.P. It has a clinical Officer in charge with a number of health and supporting staff. It has a maternity unit with bed capacity of 5 beds. The project uses cold chain for storage of vaccines and it has a motor vehicle being used among other things for running mobile clinics. It is considered as a dispensary according to Ministry of Health.

c) Dispensary:

There are two government dispensaries in the location namely Abidha and Ongielo. Ongielo offers some MCH/FP services.



3: 1.5.2. Health Services

(a) Curative Services:

All facilites, both private, non-governmental and governmental public sectors provide curative services. There are some disease prevention and health promotive activities provided within these facilities, but these are sketchy. The commonest diseases for which people seek treatment are malaria, upper respiratory tract infection (URTI), Eye conditions, skin conditions and worm infestations.

(Source: Siaya District 5th Health Development Plan; 1984-1988)

(b) Maternal and Child Health/Family Planning Services (MCH/FP Services):

Saradidi Rural Health Project (S.R.H.P.) extensively provides this service including mobile clinics, Lwak and Ongielo provide static clinic MCH/FP services only. Lwak takes selective patients because it is a private hospital and a fee is paid for services.

(c) Nutrition Programme:

Lwak has a nutrition rehabilitation centre, but they do not

engage in extensive preventive work, therefore many patients after discharge from the centre are known to have reoccurrence of malnutrition after a period of time.

(d) Primary Health Care: (PHC)

The only PHC project is by S.R.H.P. which is non-governmental, though it works in collaboration with government ministries. The ministry of health provides support, both technical and material. It provides the vaccines for immunization and sends a visiting COTULEP from time to time.

3:2. Study Design

The study was a descriptive, prospective study. The study group were pregnant women who met the inclusion criteria, having been identified by village health workers (CHWs). Those who were recruited were followed-up until termination of pregnancy. The out-come of pregnancy , that is, all live-births and still-births were documented. Where there was a live-birth, the follow-up period continued for another seven days. A questionnaire was administered at the end of follow-up period. The design ought to have been effective since there were no problems with memory recall.

3: 2.1. Sample size Estimation

The minimum sample size was calculated using the formula for descriptive study design.

Sample size (N) = $\frac{Z_{\alpha}^2 \quad P(1-p)}{C^2}$

by Snedecor and Cochran (86).

Where:

N = Required minimum sample size

Z = Z value at the desired confidence level,

C = d-error for the desired confidence limit,

P = the prevalence of the study condition. The level of confidence was selected to be 95%,

Confidence level = 95%

Z = 1.96 at (α - error of 0.05)

p = estimated prevalence = 46%

c = level of precision which is the compliment of confidence limit, (1-confidence limit)

Sample size = $\frac{(1.96)^2 \ (0.46) \ (0.54)}{(0.05)^2}$

= 381.7

Minimum sample size was estimated at 382 cases.

3.2.2. Sampling Method

A register of all pregnant women who met the inclusion criteria and accepted to participate in the study was compiled. There was no need for random selection of subjects as all eligible participants were included in the study.

All women in their reproductive age in Asembo location formed the sampling frame. A pregnant woman in a house hold was the sampling unit. For the K.A.P. study the same pregnant woman in a house-hold was the respondent.

3: 2.3. Selection of Respondents

All pregnant women in Asembo location were identified by CHWs in their respective villages. Those who agreed to visit the mobile centres were seen by both the investigator and a community nurse. The investigator having explained the purpose of the study, left the recruitment to be done by community nurse, but with guidance from the investigator. Those who declined to visit the mobile clinic centres were visited at their homes. This technique ensured that all pregnant women were seen, and that none who was eligible to participate in the study was left out.

The criteria for inclusion and exclusion were as follows:

(a) Inclusion Criteria:

-All pregnant women of gestational age of 26 weeks and above.

-No age limit.

-Married, single, widowed or divorced.

-Residents of Asembo Locations.

(b) Exclusion Criteria:

- Any pregnant woman who does not meet the inclusion criteria.

- Those who meet the inclusion criteria, but are "visitors" in the study area.

Those who were selected to participate in the study were given a follow-up card (Appendix 2) and their particulars entered in a register.

3.3. Field Planning and Organization

The Principal Investigator was responsible for overall supervision and co-ordination of the project. The responsibilities included liaison with relevant authorities and also recruitment and training of those who were carrying out the research activities.

The P.I. made exploratory visit in September, 1987. She met with Director of S.R.H.P., who is also her external supervisor. She was introduced to the clinical officer in-charge of S.R.H.P. and the manager of the project.

In November, 1987, having developed research proposal and questionnaire, the P.I. met with a staff of Aga Khan Primary Health Care Unit, who assisted in refining the questionnaire.

At the same time, the P.I. met with clinical officer in-charge of S.R.H.P. and a meeting was scheduled to discuss the research activities with the community and community health workers. At the meeting, those who were prospective research assistants were also invited to attend (see plates 1,2,3 and 4).

Later the field assistants were selected and trained. They were those people who were from the community and had good command of both English and local language. The training was to acquaint them with research procedures. They were also trained on the local version of asking questions in the questionnaire. The questionnaire was then pretested and where the research assistants felt there was a problem in respondents' understand of questions, this was reviewed and modified.

The community health workers were then told to identify all pregnant women in their areas of operation. These pregnant women were further seen by P.I. and Community Nurse. The purpose of research was explained to them. Those who met the inclusion criteria and accepted to participate in the study were entered into a register and a follow-up card was given to each. The community health workers visited those who were recruited on weekly basis, to assess their progress. Research assistants also made periodic follow-up, to minimize loss of respondents.

The last monthly period (LMP) was noted before recruitment, and where this was lacking, estimation of gestational age was done

clinically by the community nurse. This allowed estimation or calculation of expected date of deliver(EDD). This was needed to allow frequent follow-up as one approached her expected date of delivery.

The community health workers reported if respondents had delivered. The research assistants would visit the respondent together with investigator whenever it was possible. Having allowed sometime for the immediate period following live-birth or death, for the mother to be composed, then a questionnaire was administered.

These questionnaires duly completed were collected given to P.I. who checked if all required information was missing or suspected to be incorrect, the P.I. and the research assistants would revisit the respondent to ascertain this. Having been satisfied that the information obtained was correct and complete the questionnaires were kept to await analysis.

3: 4 Data Collection Technique and Procedures

The main tool for data collection that was used in the study was specially prepared questionnaire (Appendix 1). This was interviewer-administered and checked by investigator.

The questionnaire had been pre-tested for validation and modifications were made where necessary. This was administered to those women who had already had a delivery (a birth).

3.5. Ethical Consideration

The study was carried out under the umbrella of S.R.H.P. The investigator worked in collaboration with S.R.H.P., therefore this minimized the long procedures of requesting for permission from every authority concerned. However, chiefs and assistant chiefs were informed and their approval was obtained, for the study to be carried out on their subjects.

The DMOH of Siaya district was informed and a copy of study proposal was given to him. He then granted verbal consent for the study to be carried out.

Those who were recruited were assured of the confidentiality of the information given. The purpose of the study was explained and those who felt that they did not wish to participate were allowed to do so, however, none declined. No beneficial treatment was withheld from study subject for the sake of getting desired outcome. Those who had a known risk of bad perinatal outcome were taken care of, some were taken to health care institutions, so that they could be treated instead of waiting for the outcome. About four potential foetal and maternal deaths were averted by taking the mothers for ceaserian section. No inducement was given to study subjects for the sake of getting their cooperation.

3. 6. Constraints

The major constraint to the study was that during the proposal development, all pregnant women were to be recruited without consideration given to gestational age. The initial recruitment took all pregnant women, but it was soon realised that some of them were going to deliver after July, 1988 after the end of the study period. It was not possible to follow them up to the end, as the study period was to end in April. The fact necessitated a change and the setting up of inclusion criteria to include gestational age limit to 26 weeks and above. Therefore the initial recruitment that was done had to be abandoned and new recruitment began in early February, 1988, including only those old study cases who satisfied the new recruitment criteria. This slowed the progress of the study but allowed only those study cases who were likely to get an outcome of pregnancy within the study period to be included in the study.

The other constraint was that of transport, there was too much rain around March to May. The follow-up became very difficult, sometimes the investigator and research assistants had to spend hours out in the rain when the pick-up got stuck in the mud, ideally this area needed a four-wheel drive during the rainy season.

The crude birth rate that was used to estimate the expected deliveries during the study period, was higher than the actual birth rate for the area. Therefore fewer deliveries were experienced than expected, although the minimum number required was achieved. It needed more time for this kind of study to be done and to follow-up all pregnant women irrespective of their gestitational age.

3.7. Data Analysis and Interpretation

Data from the field was organised, coded and entered into an IBM XT personal micro-computer. Before entry, a code-book was made (Appendix 3) containing variables name and code number. After data entry was completed, data validation was done. The appropriate files were then set-up and the bank of information was analysed using the SPSS package. This was done with the help of a biostatistician from Medical Research centre of KEMRI, and a biostatistician/epidemiologist from the department of community health of Univeristy of Nairobi. Frequencies, cross-tabulations and multiple regression analyses were worked out.

Plate 1 (a) Field Organisation: PI Meeting with CHWs and Management of S.R.H.P.

(b) Clinical officer in-charge of S.R.H.P addressing the first meeting and introducing PI

Plate 2 (a) Pregnant Women waiting for recruitment

Plate 2 (b) Ndori: One of the centres for mobile clinic

Plate 3 (a) Field assistants discussing the questionaire after training

Plate 3 (b) Community nurse and CHW discussing the progress of a participant.

Plate 4 (a) A field assistant is administering a questionaire to a mother of twins.

Plate 4 (b) A Cotulep addressing a meeting of CHWs at S.R.H.P

CHAPTER 4

RESULTS

The object of the study reported here was to record all perinatal deaths of infants born in Asembo Location during the study period; to identify factors associated with deaths and to suggest how some improvement in the mortality rate might be achieved.

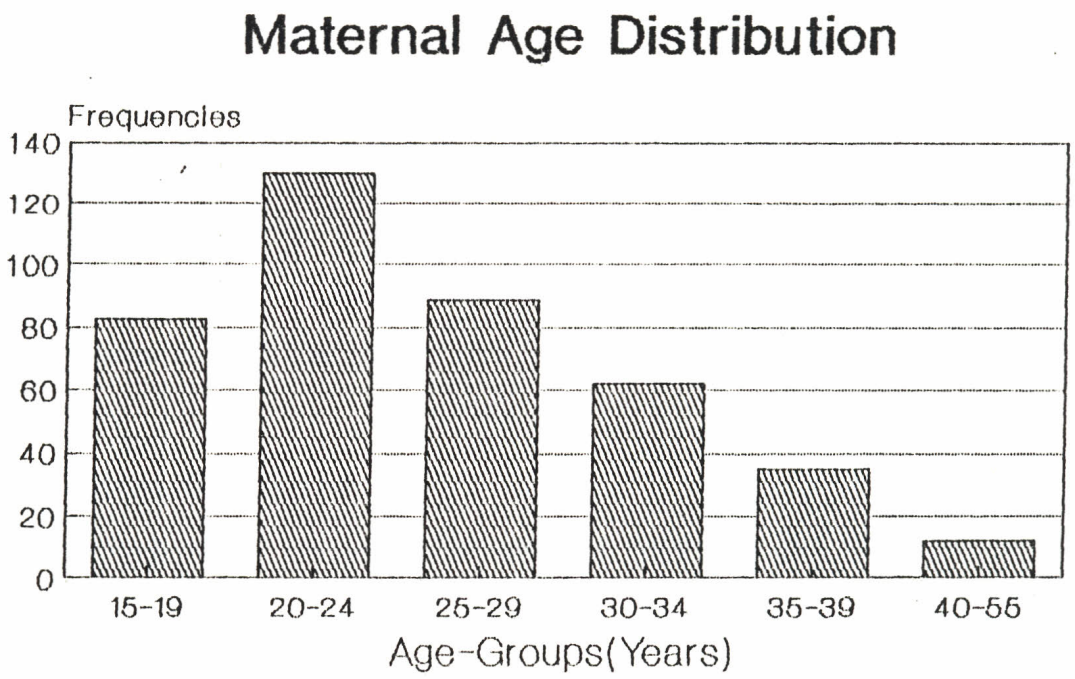
During the study period, a total of 431 women who met the inclusion criteria were recruited, registered and followed up. By the end of the study period in May, 1988, 426 women had delivered. There were 5 pairs of twin and 421 singleton births, therefore the total births experienced were 431, twins being taken as two separate births. Among the total births, there were 8 still-births and 16 first week infant deaths, giving a perinatal mortality rate of 55.7 per 1000 total births

Among the 426 women who delivered, two died immediately after giving birth. One gave birth to still-born infant, while the other to a pair of twins, who died on the same day of delivery as the mother. This gave a maternal mortality ratio of 4.64 per 1000 total births (464 per 100,000 total births).

4. 1. Frequency Distribution

A total of 426 respondents' data was analysed. Their mean age was 25.4 years with a standard deviation (SD) of $\pm$ 6.6. The ages ranged between 15 years and 55 year. This gave a range of

Figure 1:


Maternal Age Distribution
Frequencies
140
120
100
80
60
40
20
0
15-19
20-24
25-29
30-34
35-39
40-55
Age-Groups(Years)

40 years, although there were 15 missing observations. These missing observations were due to unknown ages or those whose ages were not recorded.

The total number of household members were 2498 persons derived fron 426 households, giving an average number of 5.9 persons living in each household. The range varied from 2 to 13 persons living in variuos households.

4.1.1. General Information

Several variables were included in this section of questionnaire containing general information. The results on the included variables were presented using tables for easy interpretation (Tables 2-10).

TABLE 2: Respondents Usual Place of Residence

Place of Residence	No. of Respondents	Percentage (%)
Rural	372	87.3
Urban	10	2.3
Both Rural and Urban	44	10.3
TOTAL	426	99.9

TABLE 3: Level of Education Completed by Respondent

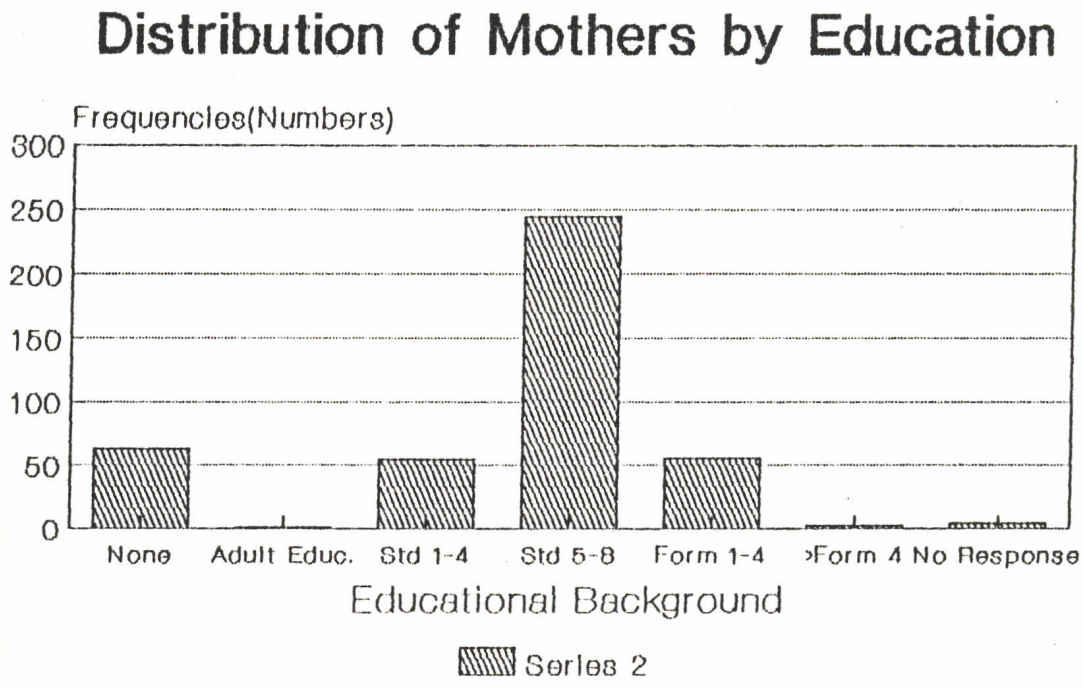
Education	No. of Respondents	Percentage %
None	63	14.8
Adult Education	1	0.2
Standard 1-4	55	12.9
Standard 5-8	246	57.5
Form 1-4	56	13.1
Above Form 4	2	0.5
No Response	4	0.9
TOTAL	426	99.9

From the above two tables, it can be seen that the majority of respondents were rural dwellers 372 (87.3%) and most of them had upper primary school education 245 (57.5%)

TABLE 4: The main occupation of the Respondent

Type of Work	No. of Respondents	Percentage %
House-work	38	8.9
House-work/peasant farming	361	84.7
Teaching/salaried	7	1.6
Self-employment	16	3.8
Others	4	1.0
TOTAL	426	100.0

Figure 2:



Note: One and two mothers had received Adult Education and Above Form 4 respectively

TABLE 5: Marital Status of the Respondents

Marital Status	No. of respondents	Percentage (%)
Marital Status	54	12.7
Currently married	358	84.0
Separated/ Divorced/ Widowed.	12	3.3
TOTAL	426	100.0

Table 5 represents distribution of respondents according to marital status, the result was as follows; 54(12.7%) of respondents had never been married, 358(84%) were currently married and the remaining 12(3.3%) were either separated, divorced or widowed.

TABLE 6: Percentage of Respondents smoking tobacco or/and cigarettes

Tobacco/Cigarettes Smoking	No. of Respondents	Percantage %
Yes	28	6.6
No	398	93.4
TOTAL	426	100.00

Those who were smoking cigarettes during pregnancy were 28

(6.6%) compared to non-smokers who were 398 (93.4%), therefore the risk of low-birth weight due to cigarette smoking could be minimal in this study group. Out of the 28 smokers, 4 gave up smoking during pregnancy, 8 cut down the frequency and number of cigarettes smoked during pregnancy, while 6 increased. The remaining 10 smokers had no change at all in their smoking habits.

TABLE 7: Percentage of Respondents drinking alcohol during this pregnancy

Alcohol drinking	No. of Respondents	Percentage (%)
Yes	36	8.5
No	390	91.5
TOTAL	426	100.0

TABLE 8: Type of Alcohol drunk by Respondents

Type	No. of Respondents	Percentage (%)
Local brew	27	75.0
Both local brew and beer	2	5.5
Beer	6	16.7
Others	1	2.8
TOTAL	36	100.0

TABLE 9: Respondents with Chronic Illness(es)

Chronic Illness	No. of Respondents	Percentage (%)
Yes	116	27.2
No	310	72
TOTAL	426	100

TABLE 10: Type of Chronic Illness(es)

Type of Illness	No. of Respondents	Percentage (%)
Malaria	21	18.1
Cough	2	1.7
Chest problem/TB	23	19.8
High blood pressure	4	3.4
Stomachache	25	21.6
Headache	26	22.4
Arthritis/Backache	13	10.3
Skin Disease	3	2.6
TOTAL	116	99.9

4.1.2. Past Obstetric History

The past obstetric history was included so that it could be related to perinatal mortality. It has been known that those with bad obstetric history tend to have a higher risk of perinatal loss (Tables 11-12).

TABLE 11: Status of previous pregnancies, including miscarriages and still-births

Response	No. of Respondents	Percentage (%)
Yes	361	84.7
No	65	15.3
TOTAL	426	100.0

Out of the total study group, only 65(15.3%) had no previous pregnancy, but the remaining 361 (84.7) had had at least one previous pregnancy.

TABLE 12: Past obstetric problems experienced by respondents

Problem	No. of Respondents	Percentage(%)
History of infer tility	10	6.9
Previous multiple pregnancies	12	8.3
Previous premature births	27	18.6
Previous births with malformations	3	2.1
Previous births of very big infants	7 5	51.7
Responses 2+5	3	2.1
Responses 3+5	13	8.9
Responses 2+3+5	1	0.7
Responses 1+5	1	0.7
TOTAL	145	100.0

4.1.3. Present Pregnancy

The pregnancy that was being investigated was referred to as present pregnancy and a number of variables were included under it. The following were some of the findings that were obtained (Tables I3-22).

Table 13: Antenatal Care during this pregnancy

ANC Attendance during pregnancy	No. of Respondents	Percentage (%)
Yes	407	95.5
No	19	4.5
TOTAL	425	100.0

Among those who were investigated, the ANC attendance was very high. 407(95.5%) received some antenatal care at least once, only 19(4.5%) did not get antenatal care.

TABLE 14: Total number of ANC visits throughout pregnancy

No. of visits	No. of Respondents	Percentage (%)
One	27	6.6
Two	50	12.3
Three	108	26.5
Four	119	29.2
Five	47	11.5
Six	31	7.6
Between 7-9	11	2.7
More than 10	8	2.0
Don't know	6	1.5
TOTAL	407	99.9

Of those who attended ANC clinics, the majority had a total of four visits. These were 119(29.2%) of all those who had ANC care, followed by three visits, 108(26.5%) and the least were those with more than ten visits.

TABLE 15: Frequency distribution by Place of Antenatal Care

Place	No. Respondents	Percentage (%)
T.B.A.	10	2.5
Mobile Clinic/S.R.H.P	339	83.3
Dispensary	50	12.3
Private Institution	8	1.9
Severally	0	0.0
TOTAL	407	100.0

TABLE 16: Response to whether referred to health centre or hospital

Response	No. of Respondents	Percentage (%)
Yes	34	8.0
No	392	92.0
TOTAL	426	100.0

TABLE 17: Frequency distribution by Institution for Referrals

Institution	No. 'of Respondents	Percentage (%)
Health Centre	23	67.6
Hospital	11	32.4
TOTAL	34	100.0

TABLE 18: Frequency distribution by Place of Delivery

Place	No. of Respondents	Percentage (%)
Home	263	61.5
Health Units	92	21.6
Hospital	69	16.2
Other	3	0.3
TOTAL	426	100.0

The majority of respondents 262(61.5%) delivered at home. There were 3(0.3%) who neither delivered at home nor health facility, these deliveries took place on the way to health facility.

TABLE 19: Frequency distribution by types of medication taken during pregnancy

Response	No of Respondents	%
Malaria Chemoprophy-laxis	201	47.2
Herbal remedies	23	5.4
Medication given by health workers	114	26.8
Other	4	0.9
Responses 1+2	36	8.5
Responses 1+2+3+4	1	0.2
Responses 1+3	22	5.2
Responses 1+2+4	2	0.5
None	19	4.5
Responses 2+3	4	0.9
TOTAL	426	100.0

Medication given by health workers included analgesics, actal and malarial tablets as chemoprophylaxis against malaria attack. Therefore, those who received malaria chemoprophylaxis were more than the number shown. It is estimated that, about 75% of respondents received chemoprophylaxis against malaria.

TABLE 20: Admission in any Health Facility during Pregnancy

Response	No. of Respondents	%
Yes	19	4.5
No	407	95.5
TOTAL	426	100.0

TABLE 21: Reasons for admission during pregnancy

Reason	No. of Respondents	%
Complication of pregnancy	1	5.3
Bleeding	1	5.3
Malaria	1	5.3
Headache	1	5.3
Anaemia + swollen legs	1	5.3
Not known	14	73.6
TOTAL	19	100.0

TABLE 22: Frequency distribution by Length of admission during pregnancy

Length in days	No. of Respondents	%
1 day	4	21.1
2 days	11	57.9
3 days	2	10.5
4 days	2	10.5
TOTAL	19	100.0

4.1.4. Details of Labour

There were several variables listed under the above sub-heading. The frequency distributions are given below in Tables 23-31.

TABLE 23: Who conducted (assisted) delivery

Persons	No. of Respondent	%
Doctor	9	2.1
Midwife	134	31.5
CHW	73	17.1
T.B.A.	30	7.0
Relative/Neighbour	109	25.6
Self	66	15.5
Other	0	0.0
Responses 3+5	5	1.2
TOTAL	426	100.0

From the table above, it is evident that those who were assisted by trained qualified personnel were 143(33.6%). Some received assistance from CHWs and T.B.A.s. Among the remaining respondents, 109(25.6%) were assisted by either a neighbour or a relative. 66(15.5%) delivered on their own without assistance.

TABLE 24: Frequency distribution by duration of active labour

Duration in hours	No. of Respondents	%
Less than 6 hours	97	22.8
Between 6-12 hours	159	37.3
Between 12-24 hours	89	20.9
Longer than 24 hours	74	17.4
Not known	6	1.4
No response	1	0.2
TOTAL	426	100.0

TABLE 25: Frequency distribution by duration between membranes rupture and delivery

Duration in hours	No. of Respondents	%
Less than 12 hours	315	85.7
Between 12-24 hours	84	8.0
More than 24 hours	5	1.2
Not known	19	4.5
No response	3	0.7
TOTAL	426	100.1

TABLE 26: Presentation of infant at delivery

Presentation	No. of Respondents	%
Normal	407	95.5
Malpresentation	15	3.5
Don't know	3	0.7
No response	1	0.2
TOTAL	426	100.0

TABLE 27 Complications occuring during labour

Response	No. of Respondents	%
Yes	61	14.3
No	365	85.7
TOTAL	426	100.0

TABLE 28: Frequency distribution by types of complications experienced by respondents

Complication	No. of Respondents	%
Infant too big	5	8.2
Excessive bleeding	8	13.1
Very long labour	17	27.9
Painful labour	5	8.2
Obstructed labour	5	8.2
Problems with placenta	7	11.5
Fatigue	2	3.3
Others	3	4.9
No response	9	14.8
TOTAL	61	100.0

The prolonged labour seems to be the type of complication with the highest number of respondents. The respondents were 17 (27.9%) out of a total of 61 (100%).

TABLE 29: Method of delivery

Method	No. of Respondents	%
Spontaneous vaginal delivery (SVD)	412	96.7
Forceps/Vacuum	6	1.4
Caesarean	7	1.6
Other	1	0.2
TOTAL	426	100.0

There was one delivery which was mechanical and it was

categorised under other method. This delivery was done at home, and the infant was pulled out using excessive force, it formed 1(0.2%) of all deliveries.

TABLE 30: Frequency distribution by number of infants born from these deliveries.

Response	No. of infants	%
Singleton	421	97.7
Twin	10	2.3
TOTAL	431	100.0

TABLE 31: Condition of the mother after delivery

Response	Frequency	%
Alive	424	99.5
Dead	2	0.5
TOTAL	426	100.0

There were two maternal deaths during the study period. These were also accompanied by deaths of infants born.

4.1.5. Details of Live-birth

The total live-births were 423. The details were needed so that any factors leading to first-week's deaths could be revealed. The following were the results obtained after analaysis (Tables 32-38).

TABLE 32: Conditions of infant at birth

Response	Frequency	%
Normal	400	94.6
Some abnormality	23	5.4
TOTAL	423	100.0

TABLE 33: Frequency distribution by types of abnormality

Abnormality	Frequency	%
Jaundice	3	13.0
Small for age	7	30.4
Birth injury	5	21.7
Pre-term	6	26.1
Responses 1+2	1	4.4
Responses 1+3	1	4.4
TOTAL	23	100.0

TABLE 34: Response to whether the infant required resuscitation

Response	Frequency	%
Yes	74	17.5
No	349	82.5

Those infants who required some form of resuscitation formed 74(17.5%) of the total live-births.

TABLE 35: Duration of infant feeding soon after birth

Response	Frequency	%
Immediately	271	64.1
6-12 hours later	102	24.1
13-18 hours later	12	2.8
19-24 hours later	7	1.7
More than 24 hours	15	3.6
Don't know	2	0.5
Not fed	10	2.4
No response	4	0.9
TOTAL	423	100.0

TABLE 36: Response to whether the infant had any illness during the first week of life

Response	Frequency	%
Yes	69	16.3
No	354	83.7
TOTAL	423	100.0

TABLE 37: Fate of infant at the end of first week of life

Response	Frequency	%
Alive	407	96.2
Died before 7 days old	16	3.8
TOTAL	423	100.0

TABLE 38: Frequency distribution by period of death after delivery

Period	Frequency	%
0-1 day	13	81.3
2-3 days	1	6.2
4-5 days	2	12.5
6-7 days	0	0.0
TOTAL	16	100.0

The majority of infant deaths occured on 0-1 day period. These deaths accounted for 13(81.3%) of total first week deaths. There were no deaths experienced on 6-7 day period.

4.1.6. Still-birth

There were a total of 8 still-birth deliveries during the study period. The table over leaf shows how they were categorised.

TABLE 39: Response to whether the foetus was macerated or not

Response	Frequency	%
Yes	3	37.5
No	5	62.5
TOTAL	8	100.0

The fresh still-births were 5 and 3 macerated. This shows that the 5 still-births could have died during labour and 3 macerated ones before the onset of labour.

TABLE 40 Frequency distribution by outcome of deliveries

Outcome	Number	%
Still-births	8	1.9
1st week deaths	16	3.7
Survivors after first week	407	94.4
TOTAL	431	100.0

$$\text{PMR} = \frac{\text{Still-births + 1st week deaths}}{\text{Total births}} \times 1000$$

$$= \frac{24 \times 1000}{431}$$

$$= 55.7 \text{ per } 1000$$

Still-birth rate

$$= \frac{8 \times 1000}{431}$$

$$= 18.6 \text{ per } 1000$$

4.1.7. K.A.P. Survey

This section of the questionnaire was designed to try and establish the relationship between knowledge, attitudes and practices of the consumers of MCH services and perinatal events. Below are the tables showing the responses from the respondents (Tables 41-47).

TABLE 41: Response to - where do you normally go for treatment when any member of the family is sick?

Response	Frequency	%
Clinical/Dispensary/ Health Centre	410	96.2
No response	16	3.8
TOTAL	426	100.0

TABLE 42: Frequency distribution by uses of modern medicine

Response	Frequency	%
Prevention	65	15.3
Treatment	91	21.4
Both prevention and treatment	255	59.9
Do not know	11	2.6
No response	4	0.9
TOTAL	426	100.0

TABLE 43: Frequency distribution by childhood diseases that are preventable by immunization

Response	Frequency	%
Measles	29	6.8
T.B.	2	0.5
Tetanus	0	0.0
Whooping cough	2	0.5
Polio	4	0.9
All the above	109	25.6
Other	1	0.2
More than 2 responses	239	56.1
Don't know	40	9.4
TOTAL	426	100.0

TABLE 44: A child is taken to clinic only when it is sick?

Response	Frequency	%
Yes	12	2.8
No	407	95.5
Don't know	2	0.5
No response	5	1.5
TOTAL	426	100.0

TABLE 45: Frequency distribution by response to when should a pregnant woman go to the clinic

Response	Frequency	%
Regularly for check-ups	413	96.9
When she is sick	2	0.5
Only for delivery	2	0.5
Don't know	4	0.9
No response	3	0.7
Responses 1+2	2	0.5
TOTAL	426	100.0

TABLE 46: Frequency distribution by response to: is delivery at home as good as delivery in hospital?

Response	Frequency	%
Yes	20	4.7
No	390	91.5
Don't know	12	2.8
No response	4	0.9
TOTAL	426	99.9

Among those who responded to the above question 20(4.7%) thought that there is no difference between delivering at home and hospital. Those who indicated that there was a difference were 390(91.5%) and they believed that hospital was better than home delivery, however one respondent believed that home delivery is better than hospital delivery. The remaining respondents were 16 and 12(2.8%) did not know whether home or hospital delivery had any advantage over one another. There was no response from the 4(0.9%), but two died, therefore only two living respondents did not respond to the above question.

TABLE 47: Should people use both modern and traditional medicines?

Response	Frequency	%
Yes	178	41.8
No	235	55.2
Don't know	8	1.9
No response	5	1.2
TOTAL	426	100.1

178(41.8%) thought that both modern and traditional medicine should be used, however 235(55.2%) preferred the use of one form or the other, but majority preferred the use of modern medicine, except one respondent who preferred to use traditional ways of treatment.

4.2. Cross-Tabulations of Variables

This section deals with cross-tabulations of variables in the study. The chi-square was used to determine the significance, but where it was thought that chi-square would not be sensitive, then Fisher's Exact Test was also done.

4. 2.1 General Information:

TABLE 48: Relationship between perinatal mortality and various factors

NO	COMPARISON	CHI-SQUARE	D.F.	SIGNIFICANCE (P)
1	Place of residence	3.69186	2	0.1579
2	Maternal Education	2.61823	5	0.7586
3	Maternal Occupation	1.93603	4	0.7475
4	Marital Status	0.45128	2	0.7980
5	Education of husband	3.14109	7	0.8717
6	Husband's occupation	2.45105	4	0.6534
7	Age at first pregnancy	9.45048	18	0.9484
8	Smoking habit	0.61195	1	0.4341
		1.45505	1	0.2277
9	Alcohol drinking	0.00000	1	1.0000
		0.00045	1	0.9830

There was no significant relationship between the variables listed on the table 48 above.

4. 2.2: Present Pregnancy

TABLE 49: Relationship between perinatal mortality and various factors

NO	COMPARISON	CHIC-SQUARE	D.F.	SIGNIFICANCE (P)
1	Antenatal care	8.11653	1	* 0.0134
	attendance	8.89310	1	* 0.0029
2	Place of antena-			
	tal attendance	6.23514	4	0.1823
3	Birth interval	33.65104	29	0.2523
4	Place of delivery	23.43306	3	**0.0000
5	Malaria chemopro-			
	phylaxis	15.01379	8	0.0589(WA)
6	Admission during			
	pregnancy	0.18076	1	0.6707
		0.86861	1	0.3518
		Fisher's		
		Exact Test		

KEY: * = Significant

** = Highly significant

WA = Weak association

4: 2.3. Details of Labour

TABLE 50: Relationship between perinatal mortality and various factors

NO	COMPARISON	CHI-SQUARE	D.F	SIGNIFICANCE(P)
1	Person conducting or assisting delivery	12.23963	6	0.0568(WA)
2.	Length of active labour	12.74007	4	*0.0126
3	Length of membranes rupture	17.19693	3	**0.0006
4	Presentation of infant at delivery	51.87642	3	**0.0000
5	Complications during labour	29.56305	1	**0.0000
		32.91483	1	**0.0000
		Fisher's Exact Test	-	**0.0000227
6	Method of delivery	9.20380	3	*0.0267
7.	The number of infants born	16.61092	1	**0.0000
		22.74894	1	**0.0000
8	Condition of the mother	18.09284	1	**0.0000
		33.49131	1	**0.0000

4: 2.4. If Live-Birth

TABLE 51: Relationship between perinatal mortality and various factors

NO	COMPARISON	CHI-SQUARE	D.F.	SIGNIFICANCE(P)
1	Condition of infant at birth	20.89529	2	**0.0000
2	Preterm delivery	106.44061		**0.0000
3	Infant requiring	0.82592	1	0.3635
	resuscitation	1.54070	1	0.2145
		Fisher's Exact Test	-	0.1851
4	Interval of infant feedig	250.05472	6	**0.0000
5	Illness during	4.57598	1	*0.0324
	the first week	6.06630	1	*0.0138
6	What was used for infant feeding	253.72510	4	**0.0000

4: 2.5 K.A.P. Survey

TABLE 52: Relationship between perinatal mortality and various factors:

NO	COMPARISON	CHI-SQUARE	D.F.	SIGNIFICANCE(P)
1	Place of treatment	0.00000	1	1.0000
		0.05398	1	0.8163
2	Knowledge about the use of conventional medicine	15.75441	4	*0.0034
3	Knowledge about when a child is taken to clinic	28.47829	3	**0.0000
4	Knowledge about when a pregnant woman should go to the clinic	31.45046	3	**0.0000
5	Preferred place of delivery	17.99828	3	**0.0004
6	Attitude about the use of modern and traditional medicine	1.05092	2	0.5913

Table 52 presents relationships between perinatal mortality and several variables on knowledge, attitude and practice on use of available health facilities. All the variables except attitude about the use of modern and traditional medicine and place of treatment were found to be significantly related to perinatal mortality.

Figure 3:

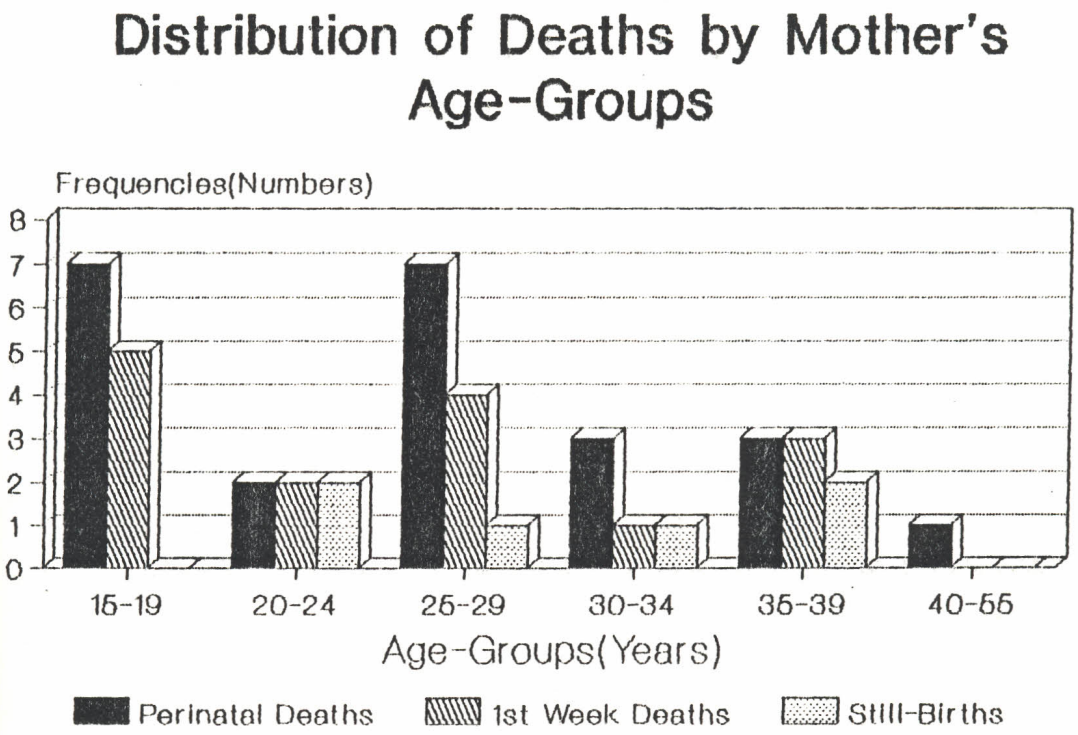

Distribution of Deaths by Mother's Age-Groups
Frequencies(Numbers)
8
7
6
5
4
3
2
1
0
15-19
20-24
25-29
30-34
35-39
40-55
Age-Groups(Years)
Perinatal Deaths
1st Week Deaths
Still-Births

Figure 4:

Distribution of Deaths by Mother's Age-Groups

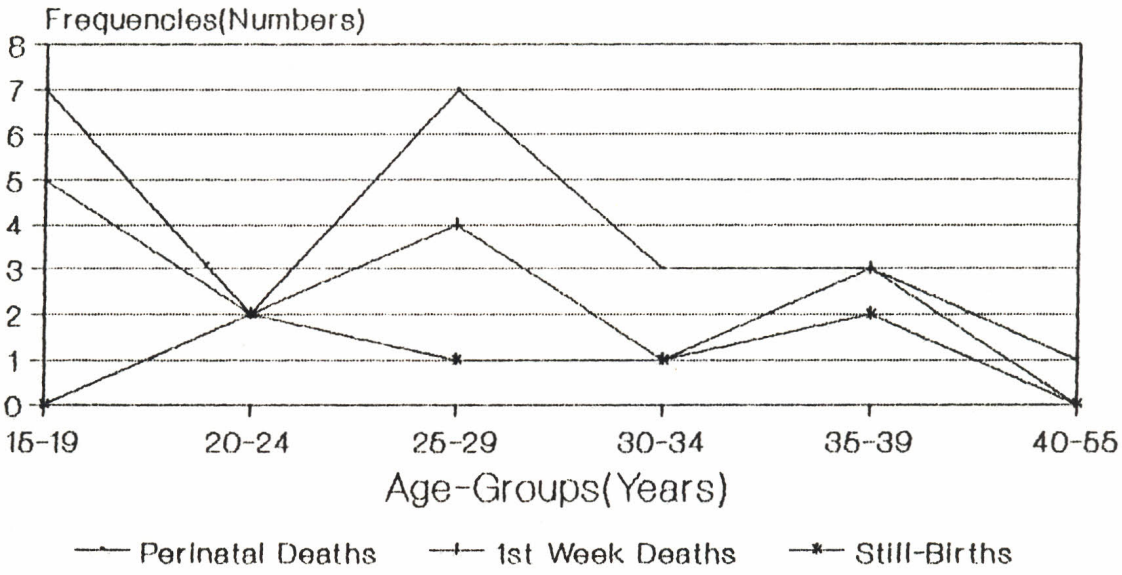
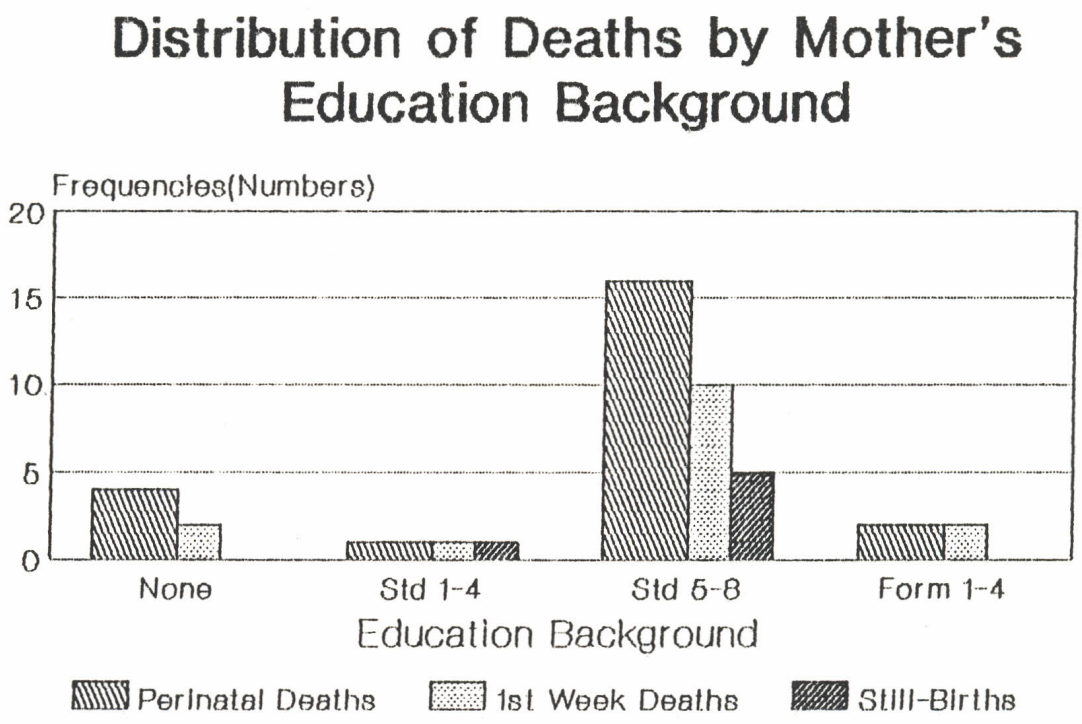


Figure 5:



Note: No deaths reported from Mother's with Adult and Above Form 4 Education

TABLE 53: Perinatal mortality versus number of babies resulting from the pregnancy

NO. OF BABIES	MORTALITY PRESENT (YES)	MORTALITY ABSENT NO	TOTAL
Singletons	20(4.8%)	401(95.2%)	421
Twin	4(40%)	6(60%)	10
TOTAL	24	407	431

When the analysis of Table 53 was done, numbers of babies resulting from a pregnancy was found to be significantly related to perinatal mortality. There was a chi-square of 22.75 with p-value less than 0.0000 before Yates correction, and 16.61 with p-value less than 0.0001 after Yates Correction (X^2=22.75, $p \leq 0.0000$).

4.3. Multiple Regression Analysis

Multiple regression analysis was done to select variables that contribute signficiantly to perinatal mortality when other variables were controlled for. In cross-tabulations some variables were significant in relation to perinatal mortality, but it was not clear which ones had the most effect. The

effects also could have been present when many factors were operating together, therefore there was need to find out the effects of each variable on perinatal mortality when other variables were controlled for. The variables found to be significant after this analysis could be used for identification of risk cases or to predict those cases that could have bad perinatal outcome.

4.3.1 Step-wise Regression Analysis

This was the first multiple regression analysis done, but sooner, it was realised that logistic regression analysis could have given better results. Step-wise regression analysis is used when dependent variable is continuous, but in this case perinatal mortality is not. To avoid any biases that could have occured, logistic regression analysis was used.

4.3.2 Logistic Regression Analysis

Logistic regression analysis was also performed to find out which of the variables considered had a significant effect on perinatal mortality. This was an appropriate method since the dependent variable was not continuous. Results of the analysis are presented in Table 54

TABLE 54A: Logistic regression analysis of the dependent variable (Perinatal mortality) on the factors associated with it

NO	VARIABLE IN EQUATION	ESTIMATE CO-EFFICIENT	t-STATISTIC	p-VALUE
1	Respondent's usual place of residence	0.2725024	1.3253	0.1876
2	Maternal education	0.4135328	-1.9219	*0.056
3	Maternal occupation	-0.1133036	-0.69363	0.4893
4	Marital Status	0.1501246	1.5435	0.1253
5	Paternal Education	0.3006902	2.1647	**0.0316
6	Paternal Occupation	-0.2558491	-1.7729	*0.078
7	Age at first pregnancy	-0.2917670	-4.1025	***0.000059
8	Maternal age in completed years	-0.3730498	-3.7536	***0.000023
9	Cigarrets smoking	0.2476076	-1.2506	0.2135
10	Smoking in pregnancy	-0.3862099	-1.8562	*0.065
11	Change of smoking habit during pregnancy	0.5209460	0.21245	0.8321

Cont. next page

TABLE 54B: Logistic regression analysis of dependent variable (Perinatal Mortality on the factors associated with it)

NO	VARIABLE IN EQUATION	ESTIMATED CO-EFFICIENT	t-STATISTIC	p-VALUE
12	Alcohol during pregnancy	-0.2187425	-2.5234	**0.0124
13	Type of alcohol	-0.1148072	-0.84702	0.3987
14	Previous pregnancies	0.3379270	1.8761	*0.0620
15	Past bad obsteric history	-0.1950898	-1.5697	0.1180
16	Antenatal care during pregnancy	0.4387156	0.76921	0.4433
17	Number of Antenatal visits	-0.7099894	-0.42251	0.6734
18	Place of antenatal care	0.8710830	0.95179	0.3431
19	Birth interval	-0.3776410	-1.5027	0.1355
20	Place of delivery	0.3472220	1.3461	0.1880
21	Referral to any health institution	0.809229	0.39925	0.6904
22	Swollen legs in pregnancy	0.3163196	1.1527	0.2512
23	Use of malaria chemoprophylaxis	0.4106513	2.1858	**0.0290
24	Admission during pregnancy	0.4174793E	0.52531E	0.9582
25	Reason for admission	0.9646808E	2.9585	***0.00346
26	Duration of admission	0.2636140	0.13965	0.8891

Cont. next page.

TABLE 54C: Logistic regression analysis of the dependent variable (perinatal mortality) on the factors associated with it

NO	VARIABLE IN EQUATION	ESTIMATED CO-EFFICIENT	t-STATISTIC	p-VALUE
27	Duration of active labour	0.2597806	0.82531	0.4108
28	Duration of membranes rupture before delivery	0.5386358	3.1077	***0.00216
29	Presentation of infant at delivery	-0.5783208	-0.27317	0.7851
30	Complications during labour	0.3760807	0.22413	0.8230
31	Complication present	0.6014027	0.58334	0.5608
32	Method of delivery	-0.6786835	-1.5622	0.1209
33	Duration taken to feed infant after birth	0.4394083	2.2564	**0.0260
34	Place for general medical treatment	-0.1121905	-0.84789	0.3982
35	Knowledge about when a child should be taken to clinic	0.5239588	1.1540	0.2508
36	Knowledge about when pregnant women should go to clinic	-0.8733626	-2.4835	.**0.0140

Cont. next page.

TABLE 54D Logistic regression analysis of the dependent variable (perinatal mortality) on the factors associated with it

NO	VARIABLE IN EQUATION	ESTIMATED CO-EFFICIENT	t-STATISTIC	p-VALUE
37	Preference of home versus hospital delivery	1.377947	3.5653	***0.00045
38	Attitude about use of both convectional and traditional medicine	-1.2446894	-1.2120	0.2297

KEY:
* = Weak association
** = Significant assocation
***= Highly significant association

From tables 54A, 54B, 54C, 54D the following factors were found to be significantly related to perinatal mortality after controlling for other variables:- Education (paternal and maternal), paternal occupation, age at first pregnancy, maternal age, smoking in pregnancy, alcohol drinking during pregnancy, previous pregnancies, duration taken to feed infant after birth, knowledge about when a pregnant woman should go to clinic, preference of home versus hospital delivery, use of malaria chemoprophylaxis, reason for admission and duration of membranes rupture before delivery.

4. 4 Sensitivity and Specificity

The current method used for EDD estimation, that is, calculation using the LMP was assessed in this rural community. The EDD as recorded after calculation was taken to be the Test. This was compared with the actual deliveries in a particular month. For our purposes the month of March was randomly selected.

		EDD (TEST) (3) +	EDD (TEST) (3) −	
MOD (3)	+	77	30	107
	−	51	268	319
		128	298	426

SENSITIVITY = $\frac{77}{107} \times 100$ = 71.96-72%

SPECIFICITY = $\frac{268}{319} \times 100$ = 84%

CHAPTER 5

DISCUSSION AND RECOMMENDATION

5. 1. DISCUSSION:

The basic needs in planning for medical care in pregnancy are probably the same throughout the world, although the skills and facilities vary enormously. The first need is to ensure that all pregnant women have access to basic level of obstetric care. The question of acceptability is relevant to all levels of care, ad may only be resolved where medical care is organised at local level with strong 'consumer' participation (4). This seems to be the case in the study area. Those who attend antenatal services run by community health workers under the Saradidi rural health project were 83.3%. 12.3% were attending either government dispensary or private institution.

The Perinatal mortality rate of about 56 per 1,000 total births was found among the study group. This rate was much lower than the national average estimate of 85.22 per 1,000 in 1987 (37). This could be due to increased coverage and accessibility of MCH services offered by CHWs.

There is an urgent need for those collecting and disseminating perinatal statistics, whether at national, regional, district or local hospital level to adhere to standard definitions. It is recommended that current world health organization (WHO)

definitions are used in collection of statistical data (20). These are useful for comparisons, but local data could be interpreted according to local situations. Basically, all newborns, alive or dead, with a birth weight of 500g. or more, should, be included in the statistics of the countries (27). This is not possible with the current situation of man-power, and equipment such as weighing equipments, especially when birth takes place at home.

Criteria for inclusion in perinatal statistics have elements of uncertainty. The use of gestational age of 28 weeks as a cut-off point, to define late foetal deaths does not allow that maturity is uncertain in a considerable number of pregnancies, especially so in those that end in early death. It has been pointed out that the definition of live-birth applied at different gestational ages, may be affected by factors such as place of delivery, rules relating to payment of maternity and other statutory financial benefits, and the religious and cultural affiliations of the community (12, 28, 85).

It has been suggested that perinatal mortality should be classified in several ways (21, 103). Each classification should have its own value and compliments the other.

The study being a descriptive one did not examine in details the causes of perinatal deaths; but it was undertaken to yield areas for useful information for further research. A study done in Thailand (9), showed that causes of death in foetal deaths, were

mostly unknown even after complete autopsy. Neonatal tetanus is extremely rare in babies delivered in hospitls, but a common problem in those born at home (25). In this study, this was not the case, perhaps due to immunization against tetanus given to expectant mothers who undertake antenatal care during pregnancy. Also due to the fact that, most deliveries that occur at home are attended by CHWs who apply relatively safe, aseptic techniques.

Inspite the fact that weight gain during pregnancy was minimal, there were very few cases low-birth weight infants. In the study, only about half of the infants had their birth-weight recorded, therefore, birth-weight data was left out in the analysis. A study done in Machakos by Jansen, et al (43) showed that inspite of the low weight gain during pregnancy, the incidence of low birth was only 6.5%. this was similar to that of 6.7% reported by Butler and Alberman (14) for Britain in 1969.

In this study, prematurity was highly associated with perinatal mortality, though this could not have been predicted before the onset of labour. Factors contributing to prematurity should be investigated (29,102). It is accepted that in up to 50% of women in apparently established preterm labour, contractions subside spontaneously, and pregnancy continues (44).

In United Kingdom (U.K.) the mean birth-weight is about 3.4 kg (14), and so an infant is defined as low birth-weight if that

infant weighs 2.5 kg. In Nigeria mean birth-weight is about 2.9 kg, therefore the limit of 2.5 kg which is acceptable for U.K. is considered too high (53). In this study, some infants who weighed less than 2 kg survived, therefore an acceptable cut-off point for birth-weight should be determined for this community. Those who had increased risk were preterm low-birth weight infants, but small for age infants had less risk of perinatal death.

A study done in America (52) showed that perinatal mortality was higher among teenage mothers and among mothers of advanced age and partiy. In this study teenage mothers had increased perinatal mortality rate, though single mothers had no increase in perinatal mortality rate, this could be due to social and family support they received from community. In this study,the maternal height was recorded for only some of the study cases. This was due to lack of equipment, therefore maternal height in relationship to perinatal out-come was not analysed. Other studies which have been previously done (54), showed that in Rhodesia, maternal height had no practical use in that country. In Addis Ababa where obstructed labour was the second most common cause of perinatal death, no significant correlation between maternal height and perinatal death from that cause was found.

In this study, the information on still-births was not detailed enough and even the clinical information was lacking. The still-birth rate of about 18 per 1,000 total births was found.

A recent literature (57) revealed that up to the present the clinical information given on many still-births and death certificates has been unreliable and inaccurate. According to Annual Report of Ministry of Health of 1967 (35), a number of factors had contributed to the improvement in the reduction of still-births. These factors were better housing, better sanitary environment, cleaner food, pasteurized milk, supplementary foods, vitamins and iron, better maternal care and antenatal service, better hospital accommodation, more skilled personnel and skilled care for the sick mothers and the rising standard of education of parents and public in general.

The above report also cited prematurity as one of the problems encountered in Kisumu Provincial Hospital then. It was responsible for the prolonged hospitalization and thus increasing pressure on beds and also contributed to very high perinatal mortality of 120 per 1,000. Still-births rate was 90 per 1,000 total births. Prematurity was associated with increased perinatal deaths in this study, therefore factors that bring about premature births should be investigated.

The antenatal attendance rate was very high among the study group, perhaps this could have attributed to the unexpected low PMR. A study done by Malone (58) showed that antenatal care does influence not only maternal but also perinatal morbidity and mortality. A study done by Koten (51) found that the greater number of death recorded were preventable. He suggested that some could have been saved by

early and energetic treatment, others by antenatal care or by better health education, better housing and socio-economic conditions. Antenatal care is now universally accepted as an essential part of obstetric care, which has played an important role in the tremendous decrease in maternal and perinantal morbidity and mortality in developed countries (62). In this study, home deliveries had no increased risk of perinatal death, unless there were other complications. A study done in Missouri in 1978-1984 (101) found out that there was lack of mortality increase for unplanned home births weighing less than 1500g, this was rather surprising.

In obstetric the final objective is to get a live and healthy mother, alive and well baby (67). To evaluate this objective one needs data on maternal mortalities and morbidities and also perinatal statistics. It would be an oversimplification, however to regard the evolution of obstetric and neonatal services as independent of each other (7). Worse still, neonatal services especially for the care of a neonate at risk are not available. The PMR for this area which is currently thought to be one of the lowest in the district, could be further reduced by provision of more obstetric facilities and neonatal services. There should also be integrated effort in improving standard of living. The Black report (60) recommended that there would be more hope of achieving further reduction in perinatal mortality if resources could be devoted to improving the standard of living of the least healthy parents and children in the population. Among the study group, it is suspected that

some deaths could have been avoided if there were technologies that care for the baby, especially preterm infant at home level. According tothe work of WHO 1980-1981 (105), there are fewer technologies for the care of the mother and her baby during the perinatal period, especially technologies that are suitable for the home level and can be adapted to local conditions in rural or urban peripheral areas. When method of delivery was examined in relation to PMR, caesarean deliveries had no mortality. This is in agreement with a study done in California in 1970 (110). The California study showed that the decrease in mortality rates was significantly faster for ceasarean deliveries.

A study done in Hong Kong by Woo (111) showed that the decline in perinatal mortality is probably a result of complex interacting factors. There was an overall improvement in socio-economic conditions and education of the population. An increasing number of deliveries were performed in hospital. In this study, few deliveries took place in hospital, and it will take alonger time before many pregnant women deliver in hospital. The skilled personnel and development of hospitals adequate to satisfy the growing demand of pregnant women in rural areas will take some time to be achieved. Therefore identification of risk factors to be used in this community is essential. The reduction in perinatal mortality in this community could have been due to services offered by community health workers. This has worked effectively due to utilization

of available resources balanced with patient needs. A community health worker looks after about 50-100 families on average, but what is important is that being a member of that community, a CHW knows the problems of each individual family and can therefore offer solutions based on felt needs. The communication net-work is so poor that the referral system is almost non-existent. The government health centre which is nearest is 26 miles away, but even then, the access is poor. For continuity of Primary health care programme referral system needs to be improved (77). Dramatic improvements in obstetric and newborn care have occured in the past 15 years. Initially, the benefits of these advances, reached only those patients with ready access to a large hospital, usually a major teaching centre (40). Because of the need to make modern perinatal services available to all patients regardless of locale, the concept of regionalization of perinatal services should be considered. If this is not possible, then there is a need to get good transport system to be used in the perinatal period, connecting communities with a regional perinatal centre, this too requires good communication net-work.

A study done in Makassar, Indonesia (5) showed that simple case records in hospital population, if kept consistently can yield interesting and useful information. A lot of information as the ones got from this study could be found from hospitals' or patients' records. The missing gap is the timely analysis of such records and dissemination of the results. Our major objective has been to improve the care of the mother and baby.

This can be achieved by using a computer system for collecting accurate and complete data for dissemination to the primary health care team and planners (17,59), or simple analysis at community level for local use. The study, it is hoped has provided, data for the use and planning for the local population. The principal purpose of which is to supplement national level information. Epidemiological surveillance is systematic collection, analysis, interpretation and timely dissemination of health data for planning, implementation and evaluation (92). The application of these data to disease prevention and health promotion programmes complete a surveillance cycle in public health.

Sociological inquiry can illuminate the meaning of the birth event in a woman's life and thereby its effect on initial parental adaptations (22). In this coomunity childlessness is a stigma and having children is of vital importance especially baby boys. This fact has been reflected on this result. Those families with perinatal deaths tend to have many pregnancies immediately after the dead ones. Also those families with baby girls tend to have many repetitive births. Among Ga women of Ghana (72) reaching middle age without a child was looked upon with suspicion, as though a woman were a witch. Even if the care of them was inadequate, having many children was always a sign of blessing and prosperity. On arrival of the tenth child, there was alot of fuss over the mother with special ceremonies of congratulations

In this community, any important decision is taken by the husband. Those decisions related to health and expenditure are taken by the husband, therefore perinatal mortality was found to be highly associated with paternal education and occupation. Another factor which has contributed to the above finding is that economy is not land related. The land per family is so small and in most cases so unproductive, therefore family income depends on paternal education and the type of occupation. In a study done in Nigeria (38) it was found that, the decision to transfer to hospital a desperately ill pregnant woman is nearly always taken by the husband. Women are now exposed not only to the same physical and emotional hazards of the work environment as men, but they are also uniquely exposed to the pressure created by multiple roles and conflicting expectations (41). The health consequences of these dramatic and rapid changes are complex and largely unknown.

The use of other health care system in this community has been found to exist. Whether this affects the perinatal mortality needs to be investigated. Successful planning and management of health services requires knowledge about frequency and pattern of morbidity in a population, as well as utilization of preventive and curative services. Information is needed on the utilization of/and attitudes towards other forms of health care (78). Recent data from Nepal (84) indicate that in urban areas reproductive attitudes are changing much more rapidly than behaviour resulting in many unwanted births. While in a rural community people still have many children as a sign of security and future investment some urban communities view children as burden and liability.

Health is too important to be the responsibility of the health sector alone. Other sectors such as agriculture, education, water development, social services, communication/transport are involved in health and health related activities and contribute to the improvement of the health status of the population(66). Good health is obviously of direct benefit to the individual and the family. A healthy nation will learn more rapidly work more steadily and productively and manage its tasks more efficiently. Effective medical care, particularly when preventive in nature and directed to the rural areas contributes significantly to national development (34). One of the major health policies according to the 5th development plan was to increase coverage and accessibility of health services in rural areas. In real terms, the strengthening of rural health services will require further improvement in service delivery methods, increased efficiency in logistical support and increase in the number and quality of trained manpower suitable for rural areas.

5: 1.1. General Information

The majority of respondents fell into 20-24 year age group, followed by 25-29 age group (see figure 1). There were few respondents in 40-55 age group. When education background of the respondents was analysed, it was found that the majority had standard 5-8 primary education (see figure 2).

Marital status did not seem to have significance as far as perinatal outcome in this community was concerned, however, those who were single were fewer and therefore could have affected the result.

5: 1.2. Past Obstetric History

Those who had had previous pregnancies, excluding this pregnancy being investigated were 84.3%. High parity was associated with early infant or perinatal death. Those who had many previous pregnancies were found to have had many infants or children dying at an early age. Those with infant deaths, miscarriages, abortions, tended to conceive immediately, therefore birth interval was greatly shortened. There is great need for health education and change of attitude so that the next pregnancy does not follow immediately so as to decrease chances of pregnancy wastage.

5: 1.3. Present Pregnancy

Among the study group, those who received antental care during this pregnancy were 95.5%. The majority were attended by community health workers. There was no significant relationship between where antenatal care was received and perinatal mortality rate. Some of the important risk factors were missed in a few individuals and were only found out when it was too late. It is therefore important if research can be done and a simple scoring system of risk factors be developed that can be used in the rural areas by community health workers.

The majority of respondents delivered at home. The place of delivery had significant relationship to perinatal outcome. It was found out that those infants that were delivered on the way to hospital had higher perinatal mortality rate. This could be due to the fact that there was a delay in taking a decision to seek medical intervention and when it was taken it was too late.

5. 1.4. Details of Labour

Those who had prolonged labour had increased perinatal mortality rate. Those who had rupture membranes but stayed for a period of time before delivery took place had also high perinatal mortality rate. It is therefore advisable to do a study to determine the optimum length of time for active labour and rupture of membranes for this community. When this has been done, then it can be used as a basis for referral to the higher level of health care.

Twin deliveries were found to have higher perinatal mortality rate, however, most of twin deliveries were also preterm, therefore it was difficult to ascertain which one had increased risk of perinatal outcome. Those few cases who had twin deliveries that were also full term had no associated increase in perinatal mortality, it can therefore be concluded that preterm delivery was highly associated with perinatal mortality, but this needs analytical study to either disprove this or confirm it.

The distribution of deaths were done according to mother's age groups (see figure 3 and 4). It was found out that overall perinatal mortality were higher in age group 15-19 years and 25-29 years. Still births were very few in 15-19 years age group. When distribution of deaths were done by mother's education back-ground (see figure 5) the standard 5-8 primary education group had the highest perinatal mortality. This group also constituted the majority of respondents, therefore this could be a reflection on their big number

5: 1.5. K.A.P. Survey

This section of the questionnaire revealed that knowledge about MCH/FP services was high among the study group. They thought that hospital delivery was superior to home delivery and those who were not delivering in hospital were doing so due to economic factors. There is need for health education programme to be evaluated and re-planned so that the message of at risk approach be passed on to the users. The antenatal attendance is to select those that are at risk so that they can deliver under medical care, but those who are not at risk can deliver at home, but to seek medical attention when complication arises.

Those who were attending the private and missionary dispensaries were not very knowledgeable about the preventive aspects of MCH/FP services. There is a need for the Ministry of Health to monitor health education and preventive activities that go on in these institutions. They tend to concentrate on curative services where the patients are passive consumers of what has been designed for them. Therefore the awareness level of these patients is low and problems tend to recur due to lack of change of attitude and practices.

5: 2. CONCLUSION

The perinatal mortality rate found among women of Asembo Location is relatively low. This rate could have been possibly brought about by the effective community based health care under Saradidi health care project. The project has covered adequately the area of maternal and child health and family planning.

The factors that were found to be significantly associated with perinatal mortality were as follows. When cross-tabulations between variables were done, antenatal care attendance, place of delivery, duration of active labour, duration of membranes rupture, presentation of infant at delivery, number of infants born from a single pregnancy, complications during labour, method of delivery and knowledge, attitudes and practices of the mother were some of the factors found to be related to perinatal mortality. When logistic regression analysis was done, both maternal and paternal education, paternal occupation, age at first pregnancy, maternal age, smoking in pregnancy, alcohol drinking in pregnancy, parity, use of malaria chemoprophylaxis, reason for admission in health facility during pregnancy, duration of membranes rupture, duration taken to feed infant after birth, knowledge about ANC attendance were some of the factors found to be significantly related to perinatal mortality.

Perinatal mortality rate can further be reduced by application of non-medical measures and medical measures applied together.

These measures could include integrated efforts of different ministries so as to uplift the standard of living by raising family income. There should also be logistical support in terms of transportation and good communication net work. Care of preterm infant at the village level should improve perinatal mortality but first factors that bring about preterm deliveries need to be investigated.

Perinatal mortality rate does not need sophisticated medical care so as to be reduced, but simple and effective measures can reduce PMR when applied properly and consistently.

5.3. RECOMMENDATIONS

This project has demonstrated the great need for increasing attention to perinatal problems and their prevention. The findings and recommendations are on aspects of service, standards of care, definitions, statistical requirements, education and research relevant to the prevention of perinatal mortality. It is imperative that the best possible care be provided for the foetus in utero and during birth, for the newborn in the crucial first days of life and for the child at all stages of subsequent development. It is desirable that comprehensive health services, including maternal and child health services, be planned and organised in order to improve the health, development and education of children so that they reach parenthood with healthy bodies and sound minds, well informed about the principles of healthy living, family life and reproduction. Care should be taken to ensure flexibility in the allocation of resources, so that these services should be directed towards those individuals or groups whose obstetric and perinatal risks are known to be highest.

Some specific recommendations are as follows:-

5: 3.1. Health Education

Health education programmes and activities should be targetted and should start early enough, so that those groups to whom it is intended should have sufficient time for change of attitutde

and to internalise it in order to have a desired change in behaviour. It should also be part of the groups activities so that it is not viewed as a foreign concept. This works better when health educators are part of the groups and also practice what they themselves advocate.

To lower both maternal and perinatal mortality, awareness must be created. For such awareness to be achieved, family members, birth-attendants, health workers and policy-makers should be educated to understand the risks the pregnant woman face. This calls for improvements in health education and the obstetric care objectives must be known to all groups concerned. Therefore MCH/FP services providers should extend health education programmes to include the families of their beneficiaries and communities in which they live.

5: 3.2. Community Participation

Community involvement and participation is the key to successful programmes. Where a community is motivated and are involved, they view health and other programmes as theirs and therefore there is no rejection of the intended programmes.

Traditional birth-attendants whose role is now recognised by the government should be integrated in the MCH Services so that they can provide the necessary health education, promotive and preventive activities. Together with other health workers they must be educated in order to have good knowledge of high risk pregnancy factors so that they can refer women with such factors

for timely appropriate action. This calls for simple methods that can be used for identifying the risk factors and those that can be applied at home and easily interpreted by T.B.As and CHWs.

5: 3.3. Intersectoral Collaboration

Health is not a responsibility of health sector alone. There are many sectors that carry out health and health related activities. To achieve the goal "health for all by the Year 2000" all sectors must play their part. This can only work effectively when there is a joint committee of all sectors involved. They should plan together and work out possible strategies for achieving health for all in their areas of operation. This can only be achieved through proper and rational distribution of resources and sometimes pooling together of resources and their proper management. It also calls for man-power that is adequate both in quality and quantity. There is a need for adequate training at different levels for intersectoral groups, therefore in case of the absence of one member, the others can continue with service delivery even if it is not directly in their line of operation. Maximum usage of the services can only be achieved through full acceptance and participation of the service consumers and through administrative support.

5: 3.4. Health Information System

There should be good health information system that begins from the peripheral areas to the national level. This can be done by

either establishing sentinel centres for health information or using key persons for collection and dissemination of health information. The information at the local level is useful for planning and evaluation at that level, whereas the national level information is also required for comparison with other nations and evaluation of national programmes.

Accurate assessment of the magnitude of perinatal problems is extremely difficult due to lack of data. The analysis and interpretation of perinatal data from health facilities and vital registration systems can be improved if a variety of other data sources are used. Presently, coverage of deliveries in hospitals seem to be adequate, but deliveries at home are not well covered. If this is improved, then it might yield more realistic picture of the magnitude of perinatal problems in a region or district.

5: 3.5. Manpower and Physical facility development

Manpower that is suitable for rural areas should be trained under similar conditions to those that they are expected to work at the end of training. Rural areas do not need very specialised cadre of manpower. Regional perinatal services should be established or a good transport system that can be used by mother and neonate at risk in the perinatal period. Emphasis should be placed on ensuring high risk patient access to level of care appropriate to their needs. There should be improved referal system. There should be maternal and newborn transport.

Transportation is a problem in area of MCH/FP services, especially when the clinic run is mobile type. Sometimes the vehicle which is normally used for mobile clinic is given out for use in other areas which the administration think requires priority. This means delay or cancellation of mobile clinics. The consumers, with time lose faith in the services provided, therefore they seek other alternative health services. It would be appropriate to address this problem and solutions to it sought. Static health services is also not the appropriate answer to this due to high recurrent expenditure involved. It is not cost-effective. The consumers also incur transportation cost which could inhibit the use of the facility. The kind of service needed should be acceptable to the consumers (women) and community around it. It should be accessible both in terms of distance and socially. It should also be affordable in terms of cost incurred in transportation and waiting time. It should be available such that the consumers can use it anytime that is convenient for them.

5.3.6 Knowledge, attitude and practice

It was found out that those who had good knowledge of MCF/FP Services had lesser risk of perinatal death. This could have been due to the fact that, this group of women were utilizing the available services and as such the risk factors were identified in time and intervention provided. However, this fact can be used to screen those women who could be at risk and

the characteristics of such women be studied to yield factors that inhibit them from using the available conventional MCH/FP Services.

Screening of expectant women was sufficiently done and pregnancy risk factors were well known to CHWs, but twin pregnancies were not detected during antenatal attendance. Monitoring of labour was well done, except that when there was labour related problem it was beyond the scope of most CHWs. When referals were done, waiting hours at casualty area were relatively long, therefore CHWs felt that some form of identification should be given to them to assist them in getting a quicker service to their clients.

5.3.7 Follow-up action

It must be stressed that practical benefits of MCH Services in promoting better health are wholly dependent on effective follow-up action being taken by mothers and health workers. This means that mothers must be motivated and enabled to acquire the necessary knowledge, skills and resources to take action. Any advice given to mothers must be culturally appropriate and compatible with the resources that exist within the home and community.

The basic health services must be readily available, including the provision of vaccines, drugs, emergency intervention

services, for example, working ambulance and simple laboratory back-up services. Current experience suggests that MCH programmes are not always fulfilling these prerequisites and consequently are not achieving the desired impact on maternal and child health. The fear is, this could lead to a backlash of disillusionment with MCH Services. It is therefore urged that MCH programmes should not be instituted unless the proper infrastructure is in place to permit effective follow-up action.

5: 3.8. Areas of further research

a) Appropriate technology:- Most birth in rural areas take place outside hospital setting, therefore technical support for the development of appropriate technologies for the non-institutional care during pregnancy and childbirth is an area that needs an urgent consideration. The main areas would include, development of a primary health care methodology for monitoring the progress in labour, development of an effective method for the resuscitation of the new-born, development of appropriate environment-specific thermal control methods for the new-born. Emphasis should be placed on perinatal surveilance and controlled clinical trials.

b) Research on low-birth weights and preterm deliveries. Well designed case-control analytical studies are needed.

c) Scoring system of risk factors that can be used by primary health care workers without too much demand on educational background are needed. This requires research on measurement techniques with high specificity and sensitivity.

d) A similar project should be done in an area where there is no primary health care project, so that the results can be compared.

e) More research is needed to relate reproductive patterns with maternal health and to assess whether and how women of different regions and socio-economic background are differentially affected. It should also separate 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 birth-interval.

f) A research should be done on care of the new-born, to establish care that can be safely administered at home level and those that can only be done at health facility. When this is done, the knowledge acquired should be included in health education programmes and training of CHWs, T.B.As, health personnel and policy-makers.

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APPENDIX 1 - QUESTIONNAIRE FORM

PERINATAL MORTAILITY AND ITS DETERMINANTS

Interviewer .....

Date .....

Area .....

Village .....

Household Number .....

Name of Recruitment	Day	Month	Year

A. Demographic Data

List the age and sex of all persons living in this household. Record ages in completed years. For children below one year record 00 and 99 for those who do not know. Record "HH" for head of household, on the following table.

NAME	SEX		AGE IN	RELATION
	MALE	FEMALE	COMPLETED	TO "HH"
	=1	=2	YEARS	
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
15.				

CIRCLE THE CORRECT ANSWER FOR EACH QUESTION UNLESS OTHERWISE INDICATED

B. GENERAL INFORMATION

1. Respondent's usual place of residence

   1. Rural
   2. Urban
   3. Both rural and urban

2. What is your highest level of education?

   0. None
   1. Adult education
   2. Standard 1-4
   3. Standard 5-8
   4. Form 1-4
   5. Above Form 4
   6. Do not know
   7. No response

3. What is the main type of work done by you?

   1. House-work
   2. Housework/peasant farming
   3. Teaching/salaried
   4. Self Employment
   5. Other (specify)

4. What is your marital status?

   1. Never married
   2. Currently married
   3. Separated/Divorced/Widowed
   4. No response

   If NOT currently married omit questions 5-6.

5. What is the highest level of education completed by your husband?

   0. None
   1. Adult education
   2. Standard 1-4
   3. Standard 5-8
   4. Form 1-4
   5. Above form 4
   6. Do not know
   7. No response

6. What type of work does your husband do?

   1. Farmer
   2. Self employed
   3. Salaried employees
   4. Unknown
   5. Other (specify) .....

      .....

7. At what age did you get your first pregnancy?

(Record) .....years.

8. Do you smoke tobacco or/and cigarretes?

1. Yes
2. No

If yes, when did you start smoking?

1. Before this pregnancy
2. During this pregnancy

9. Did you change your smoking habit during pregnancy?

1. Yes
2. No.

If yes, did you

1. Give it up
2. Cut down
3. Increase

10. Were you drinking alcohol during this pregnancy?

1. Yes
2 No

If yes, which type?

1. Local brew
2. Beer
3. Other (specify) .....

.....

11. Do you have any chronic illness(es) (Specify)

.....

C. PAST OBSTETRIC HISTORY

(Exclude present pregnancy)

12. Have you had any previous pregnancies, including miscarriages and stillbirths?

1. Yes
2. No

If yes, please give details on table C, taking the pregnancies in order of occurence (the earliest first). Record twins as two separate births.

TABLE C

	SEX OF BABY	DATE OF DELIVERY	PLACE OF DELIVERY	OUTCOME OF PREGNANCY LIVE - BIRTH		COMPLICATIONS OF PREGNANCY	METHOD OF DELIVERY
Pregnancy Number	Male =1 Female=2	Month Year	Home=1 Institu-tion=2	Alive Now = 1 Dead =2 If dead, age at death (Specify if days, months years)	Still-Birth=3 Abortion=4	NO complications At All =1 complications =2 Do not know=3	SVD =1 Forceps=2 Caesarean=3 Others=4 Do Not know =5
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							

13. Before the outset of this present pregnancy, was there any of the following?

1. History if infertelity (involving sterility).
2. Previous multiple pregnancies (twins)
3. Previous premature births
4. Previous births with malformations
5. Previous births of very big infants

D. PRESENT PREGNANCY

MATERNAL HEIGHT (CENTI-METRES)	DATE OF DELIVERY DAY, MONTH, YEAR	SEX OF BAY M=1 F=2	WEIGHT OF BABY (G.)	TIME AFTER BIRTH WT. TAKEN (HOURS)

14. Did you receive some antenatal care during this pregnancy?

    1. Yes
    2. No

    If yes, what was the total number of visits throughout pregnancy? (Record here) .....

    .....

15. Where were you receiving antenatal care?

    1. By TBA (VHW)
    2. Health Centre
    3. Private Institution
    4. Hospital
    5. Severally

16. What is the birth internal between present and previous live or still-birth (specify) .....

    ..... months/years.

17. Place of delivery?

    1. Home
    2. Health Centre
    3. Hospital
    4. Other (Specify).....

18. Were you referred to any of the institutions below for antenatal care?

    1. Health Centre
    2. Hospital

19. Were you bleeding during this pregnancy?

    1. Yes
    2. No.

20. Did you have swollen legs during this pregnancy?

    1. Yes
    2. No

21. During this pregnancy, were you using any of the following?

    1. Malarial chemoprophylaxis
    2. Herbal remedies
    3. Medical given by health workers
    4. Other (specify).....
       .....

22. Were you admitted in any health facility during this pregnancy for any reason?

    1. Yes
    2. No

    a) If yes, for what problem (specify).....
       .....

b) For how long?

1. 1-2 days
2. 3-5 days
3. 6-8 days
4. 9 or more days
5. Do not know

23. Expected date of delivery (Record here).....

.....month.....year.

Was this:

1. Calculated
2. Estimated from other means
3. Not known

NB: The above question to be answered by health workers.

E. DETAILS OF LABOUR

24. Who conducted (assisted) delivery?

1. Doctor
2. Midwife
3. CHW (VHW)
4. TBA
5. Relative/Neighbour
6. Self
7. Other (specify).....

25. How long did the active labour take?

1. Less than 6 hours
2. Between 6-12 hours
3. Between 12-24 hours
4. Longer than 24 hours
5. Do not know

26. How long before delivery did the memberanes rupture?

1. Less than 12 hours
2. Between 12-24 hours
3. More than 24 hours
4. Do not know

27. How was the presentation of infant at delivery?

1. Normal
2. Malpresentation

1. Alive
2. Dead
4. No response

28. Were there any complications during labour?

1. Yes
2. No

If yes (specify).....

29. What was the method of delivery?

1. Spontaneous viginal delivery(SVD)
2. Forceps/Vacuum
3. Caesarean
4. Other (specify) .....

.....

30. The number of infants born from this pregnancy?

1. Singleton
2. Twin
3. Triplet
4. Other (specify).....

.....

31. Conditions of the mother after delivery?

1. Alive
2. Dead

F. <u>IF LIVE-BIRTH</u>

Note: For multiple births, a separate schedule is required foreach child, then attach them together.

32. Condition of infant at birth

1. Normal
2. Congenital abnormality
3. Other (specify).....

.....

33. Did you observe the following? (answer could be more than one)

    1. Jaundice
    2. Small for age
    3. Evidence for birth injury
    4. Preterm
    5. Other (specify) .....

       .....

34. Did the infant require resuscitation?

    1. Yes
    2. No.

35. How soon was the infant fed after birth?

    1. Immediately
    2. 6-12 hour later
    3. 13-18 hours later
    4. 19-24 hours later
    5. More than 24 hours later
    6. Do not know

36. What was used for feeding the infant?

    1. Breast milk .....
    2. Other (specify) .....

37. Did the infant have any illness during the first week of life?

1. Yes
2. No

If yes (specify type) .....

38. What was the fate of infant at the end of first week oflife?

1. Alive
2. Died before 7 days old

If dead, specify the day of death after delivery:

1. 0-1 day
2. 2-3 days
3. 4-5 days
4. 6-7 days
5. More than 7 days

IF STILL-BIRTH

39. Was the foetus macerated?

1. Yes
2. No

G. **K.A.P. SURVEY**

40. Where do you normally go for treatment when any member of the family is sick? (specify)

.....

41. What is modern medicine for?

1. Prevention
2. Treatment
3. Both Prevention and treatment
4. Do not know
5. No response

42. What childhood diseases are preventable by immunization? (Tick off those mentioned).

1. Measles
2. T.B.
3. Tetanus
4. Whooping Cough
5. Poliomylitis
6. Other (specify).....

43. A child is taken to clinic when it is sick?

1. Yes
2. No
3. Do not know
4. No response

44. When should a pregnant woman go to the clinic?

    1. Regularly (for check ups)
    2. When she is sick
    3. Only for delivery
    4. Do not know
    5. No response

45. Delivery at home is as good as delivering in hospital?

    1. Yes
    2. No
    3. Do not know
    4. No response

46. Should people use both modern and traditional medicine?

    1. Yes
    2. No
    3. Do not know
    4. No response

APPENDIX 2: FOLLOW-UP CARD

S.R.H.P.

P.M.S. FOLLOW UP CARD

Name ..... Serial No. .....

Adddress .....

.....

Dates of Contact ....

....

....

APPENDIX 3

CODE BOOK FOR QUESTIONNAIRE

VARIABLE	VARIABLE NAME	CODE
Identification	ID:	1 - 426
Household Number	House R	Actual

1. Residence — Q1:

Rural	1
Urban	2
Both rural and Urban	3

2. Education of Respondent Q2:

None	0
Adult Education	1
Standard 1-4	2
Standard 5-8	3
Form 1-4	4
Above Form 4	5
Don't know	6
No Response	7

3. Occupation of Respondent — Q3:

Housework	1
Housework/peasant	2

	farming	
	Teaching/salaried	3
	Self employment	4
	Other	5

4. Marital Status Q4:

Never married	1
Currently married	2
Separated/Divorced/Widowed	3
No Response	

5. Husband's education Q5:

None	0
Adult Education	1
Standard 1-4	2
Standard 5-8	3
Form 1-4	4
Above Form 4	5
Don't know	6
No response	7

6. Husband's Occupation Q6:

Farmer	1
Self Employed	2
Salaried employee	3
Unknown	4
Other	5

7.	Age at First Pregnancy (in years)	Q7:	Actual
8. (a)	Tobacco or/and cigarret smoking	Q8A: Yes	1
		No	2
8. (b)	When Smoking was started	Q8B: Before pregnancy	1
		During pregnancy	2
		No response	9
9. (a)	Change of smoking habit	Q9A: Yes	1
		No	2
9. (b)	If response was 'Yes', type of change	Q9B: Gave it up	1
		Cut down	2
		Increase	3
		No response	9
10. (a)	Alcohol drinking during pregnancy	Q10A: Yes	1
		No	2

10.	(b)	If response was 'Yes', type of alcohol	Q10B:	
			Local brew	1
			Beer	2
			Other	3
			Local brew and beer	4
			No response	9
11.		Chronic Illness(es)	Q11:	
			No	0
			Malaria	1
			Chronic cough	2
			Chest problem/TB	3
			Nose bleeding/high blood pressure	4
			Stomachache	5
			Headache	6
			Arthritis and backache	7
			Skin problem	8
			Others	9
12.		Previous pregnancies	Q12:	
			Yes	1
			No	2

VARIABLE	VARIABLE NAME	CODE
13. (a) Past Obstetric History	Q13A:	
	Infertility	1
	Multiple pregnancies	2
	Premature births	3
	Births with malformation	4
	Births of very big infants	5
	Responses 2+5	6
	Response 2+3+5	8
	Responses 3+5	7
	Responses 1+5	0
	No response	9
13. (b) Maternal height in centimeres	MATHT:	
	Recorded	Actual
	Blank	99
(c) Day of delivery	DAYDEL:	
	Recorded	1-31
	Blank	99
Month of delivery	MODEL	
	Recorded	1-6
Year of delivery	YEARDEL:	8
	1988	
(d) Sex of baby	SEXBABY:	
	Male	1
	Female	2

(e)	Weight of baby in grammes	WTBABY	
		Recorded	Actual
		Blank	99
(f)	Time Weight taken after birth in hours	TIMEWT:	
		Immediately	88
		Recorded	Actual
		Blank	99
14. (a)	Antenatal Care	Q14A:	
		Yes	1
		No	2
14. (b)	Total number of ANC visits	Q14B:	
		None	0
		One	1
		Two	2
		Three	3
		Four	4
		Five	5
		Six	6
		Between 7-9	7
		More than 10	8
		Don't know	9

15.	Place of Ante-natal care	Q15:	
		By TBA	1
		Dispensary	2
		Private Institution	3
		Hospital	4
		Severally	5
		No response	9
16.	Birth interval between present and previous birth (in months)	Q16:	
		Recorded	11-96
		More than 100 months	98
		Blank/NA	99
17.	Place of delivery	Q17:	
		Home	1
		Health Centre	2
		Hospital	3
		Other	4
18.	Referral to other institution for ANC	Q18:	
		Health Centre	1
		Hospital	2
19.	Bleeding in pregnancy	Q19:	
		Yes	1
		No	2

20.	Swollen legs during pregnancy	Q20:	
		Yes	1
		No	2
21.	Medication in pregnancy	Q21:	
		Malaria chemoprophylaxis	1
		Herbal remedies	2
		Medication by health workers	3
		Other	4
		Responses 1+2	5
		Responses 1+2+3+4	6
		Responses 1+3	7
		Responses 1+2+4	8
		None	9
		Responses 2+3	0
22.	Admission during pregnancy	Q22:	
		Yes	1
		No	2
22. (a)	Reason for admission	Q22A:	
		Pregnancy complications	1
		Bleeding	2
		Malaria	3

		Headache	4
		Anaemia	5
		Not known	9
22.	(b) Length of admission	Q22B:	
		1-2 days	1
		3-5 days	2
		6-8 days	3
		9 or more days	4
		Do not know	5
23.	Expected date of delivery	Q23:	
	Expected day	E DAY:	
		Recorded	1-31
		Blank	99
	Expected month	E MON	
		Recorded	1-7

	VARIABLE	VARIABLE NAME	CODE
	Expected Year	E YEAR	8
23 (a)	Determination of EDD	Q23A	
		Calculated	1
		Estimated	2
		Blank	9
24.	Who conducted delivery	Q24:	
		Doctor	1
		Midwife	2
		CHW	3
		T.B.A.	4
		Relative/Neighbour	5
		Self	6
		Other	7
		Response 3+5	8
25.	Length of active labour	Q25:	
		Less than 6 hours	1
		Between 6-12 hours	2
		Between 12-24	3
		Longer than 24	4
		Do not know	5

26.	Membranes rupture	Q26:	
		Less than 12 hours	1
		Between 12-24 hours	2
		More than 24 hours	3
		Do not know	4
27.	Presentation at delivery	Q27:	
		Normal	1
		Malpresentation	2
		Do not know	3
		No response	4
28. (a)	Complications during labour	Q28A:	
		Yes	1
		No	2
28. (b)	Type of complication	Q28B:	
		Infant too big	1
		Excessive bleeding	2
		Prolonged labour	3
		Painful labour	4
		Obstructed labour	5
		Problems with placenta	6
		Fatigue	7
		Others	8
		No response	9

29.	Method of delivery	Q29:	
		Spontaneous viginal delivery (SVD)	1
		Forcepts/Vacuum	2
		Caesarean	3
		Other	4
30.	Number of infants born	Q30:	
		Singleton	1
		Twin	2
		Triplet	3
		Other	4
31.	Condition of the mother	Q31:	
		Alive	1
		Dead	2
32.	Condition of infant at birth	Q32:	
		Normal	1
		Some abnormality	2
33.	Abnormalities observed	Q33:	
		Jaundice	1
		Small for age	2
		Birth injury	3

		Preterm	4
		Responses 1+2	5
		Responses 1+3	6
34.	Did infant require resuscitation?	Q34:	
		Yes	1
		No	2
35.	Infant feeding after birth	Q35:	
		Immediately	1
		6-12 hours later	2
		13-18 hours later	3
		19-24 hours later	4
		More than 24 hours	5
		Don't know	6
		Not fed	7
		No response	8
36.	What was used for feeding	Q36:	
		Breast milk	1
		Other	2
37. (a)	Illness during 1st. week of life	Q37:	
		Yes	1
		No	2
(b)	Type of illness	Q37B:	

	Feeling cold	1
	Rashes	2
	Stomachache	3
	Starvation	4
	Diarrhoea	5
	Fever	6
	Constipation	7
	Others	8

38. (a) Fate of Infant — Q38A:

Alive	1
Died before 7 days	2

38. (b) Day of death — Q38B:

0-1 day	1
2-3 days	2
4-5 days	3
6-7 days	4
More than 7 days	5

39. If still-birth, was foetus macerated — Q39:

Yes	1
No	2
Blank	-9

40. Place of treatment — Q40:

Clinic/Dispensary/

		Health Centre	1
		Blank	9
41.	Uses of modern medicine	Q41:	
		Prevention	1
		Treatment	2
		Both prevention and treatment	3
		Do not know	4
		No response	5
42.	Knowledge of immunizable childhood diseases	Q42:	
		Mealses	1
		T.B.	2
		Tetanus	3
		Whooping coungh	4
		Poliomyelitis	5
		All the above	6
		More than 2 responses above	7
		Other	8
		Don't know/blank	9
43.	A child is taken to clinic only when it is sick	Q43:	
		Yes	1
		No	2
		Do not know	3
		No Response	4

44.	When should a pregnant woman go to the clinic	Q44.	
		For check-ups	1
		When sick	2
		For delivery	3
		Responses 1+2	6
		Don't know	4
		No response	5
		Responses 1+2+3	7
45.	Delivery at home is as good as delivery in hospital	Q45:	
		Yes	1
		No	2
		Don't know	3
		No response	4
46.	Use of modern and traditional medicine	Q46:	
		Yes	1
		No	2
		Don't know	3
		No responese	4
47.	Perinatal mortality	PM	
		Present	24
		Absent	402
48.	Sex of respondent	SEX P:	
		All females	2

49.	Age of respondent in complete years	AGE P:	
		15-19	1
		20-24	2
		25-29	3
		30-34	4
		35-39	5
		40-55	6
		Unknown	9
50.	Relation to household head	RELHH:	
		Husband	01
		Wife	02
		Son	03
		Daughter	04
		Grandson	06
		Sister-in-law	07
		Step daughter	08
		Grand daughter	09
		Daughter-in-law	10
		Sister	11
		Head of household	05