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UNIVERSITY OF DURHAM

SCHOOL FOR HEALTH

CENTRE FOR COMPARATIVE PUBLIC HEALTH

Maternal and Child Death in Nakuru, KENYA:

A Case Study

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MA THESIS
ANNA E.F. WITHAM
MARCH 2004



28 FEB 2005

ACKNOWLEDGEMENTS

My grateful thanks go to Dr. Philip Cheung, for all his advice and efforts on my behalf. My thanks also go to Heather.

To the University of Durham and all the staff and students who have been so helpful, especially Dr. Gerda Arts.

My sincere gratitude to St. Charles RC Church, Gosforth, Newcastle and to The Newby Trust, both of whom gave financial support to the Provincial General Hospital, Nakuru, project.

To Dr. Kibosia, the Medical Superintendent and the Provincial Hospital Matron Mrs. Waweru of the Provincial General Hospital, Nakuru, for their kind permission to carry out the research in their hospital.

Finally to my family for all their support during the years I have spent in Kenya.

Abstract

Kenya is one of the poorest countries in Africa. The GNP per capita in Kenya was 250\$US and only 5% of the GNP was allocated to health. One can make a direct link between the health expenditure and the general health status of the population in a poor country. Vulnerable population groups such as childbearing women, children, especially the very young, and the aged are more affected by the low level of funding in the health service. Mortality rates amongst childbearing women and the very young in Kenya are partly determined by the structure of the health service, availability of primary care and the accessibility to health care of these vulnerable groups. However, the basic standards of care such as hygiene, good nursing and medical practice, could be maintained in spite of the difficulties referred to.

This study focuses on the magnitude, causes and factors affecting maternal death and child death in Nakuru Provincial General Hospital, Kenya. Action research methodology was adopted in this study as it was believed that introducing some basic changes in hospital practice could improve care standards in the maternity and paediatric units and could save lives in the longer term. Instituting a more accurate system of recording hospital admission and clinical records could identify causes of deaths. The information could be used to justify further changes and for health planning.

Preliminary investigation revealed that the hospital records were poorly kept and that many mistakes and omissions were made. More importantly, causes of deaths were not accurately recorded. A more reliable system was adopted following a 3-month pilot data collection.

Examination of the 3-month data revealed that 436 women died during labour per 100,000 births and that 160 in every 1,000 children between ages of 0-5 died. It would appear that these deaths in Nakuru Provincial General Hospital were closely related to poor facilities, low staff morale, poor hospital management, lack of clinical supervision in maternity services. A programme of improvement was implemented in August 2001.

Evaluation was carried out 18 months after the action programme. The hospital is cleaner, infection control practice has improved, supervision of junior nursing and medical staff in these units has improved and more importantly patients in these clinical areas are enjoying better care.

It is difficult to establish whether a reduction in mortality in these 2 clinical specialities could be achieved as factors such as funding, the health service structure, the establishment of accessible primary care and changes in cultural norms and harmful health practices all play a role in mortality rates.

Staff in the hospital believe that the action programme has benefited the hospital, but question whether the changes can be sustained.

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Chapter 1. Background

The researcher is a nurse and midwife who intended to work in Kenya in her professional capacity. During the process of obtaining her professional registration in Kenya, it was necessary to complete a period of induction and orientation. This period of induction and orientation for registration included working in both the paediatric and maternity wards of the Rift Valley Provincial General Hospital, in Nakuru. During the period of induction from January until mid April 1998, specific deficiencies were noted in the maternity unit and in some paediatric wards. For example, some of the deficiencies noted were:

- a) Lack of accurate recording of admission and outcomes: for example, the time of admission was not routinely recorded on in-patients notes, some were recorded a few days after discharge. The doctors often failed to enter details of treatment prescribed and the effects of treatment were absent in patients' files.
- b) Lack of reporting and recording of deaths and their causes: In the Special care baby unit, details of admission were not completed until babies was discharged, therefore babies who died were never admitted; neither were details of date of admission available. There was no supervision from senior nursing and medical staff in this aspect of hospital management.
- c) Poor basic hygiene and apparent lack of infection control on wards: It was not uncommon to find broken floor tiles on all wards which was a major cause of cross infection. Equally serious was that clinical wastes and un-sheathed needles were found lying on ward floors and dried blood and excrement were present on walls and bed frames.
- d) Low morale among staff and lack of understanding the need for improvements in the standard of care they provide to clients: Staff were poorly motivated, lacking in discipline, Poor time keeping was found to be a common problem; some staff would appear on duty up to 3 hours late. One ward sister refused to accept the responsibility of producing a manual database for the new record system as she



told the researcher she was a nurse not a clerk, therefore had no need to rule books and keep records of care she provided. Internal communication was found to be poor.

These deficiencies identified were considered very serious which in my view would jeopardise the life and well being of women and children. More specifically some of the problems identified could have contributed to a number of maternal deaths noted during the induction period.

1.1. High maternal mortality in Nakuru

A retrospective examination of the admission records and death records available in the maternity unit at the Provincial General Hospital, Nakuru, confirmed my observation. Having examined a number of incomplete hospital records, 10 women had died during pregnancy or while giving birth, during the period between 16/9/1997 and 15/12/1997. Based on this fragmented information the figure extrapolated for the year (40), is equivalent to 570 maternal deaths per 100,000 births. The high maternal mortality rate at the Provincial General Hospital, Nakuru, appeared to be supported in official reports such as the Demographic Health Survey (KDHS, 1994) and those reported by the World Health Organisation. (WHO/UNICEF, 1996)

Having had experience as a midwife in England there is a large disparity between maternity services offered in England and those offered in Kenya. Although no valid comparison can be made between these two countries, as resources spent on health are hugely different. If one were to compare the maternal death rate between England and Kenya the disparity is large. For example, in the UK there were 6-7 maternal deaths per 100,000 live births, whereas 365 deaths per 100,000 live births were reported in the Kenyan Demographic Health Survey. (KDHS, 1994).

The Review of Safe Motherhood in Kenya was launched by the Ministry of Health, Kenya, in July 1997, stating the basic requirements of a pregnant woman in a developing country like Kenya are:

- a) the size of the family unit should be planned,
- b) antenatal care must be provided for every pregnant woman,
- c) the maternity environment must be clean and safe,
- d) and essential obstetric care must be available.

Currently the recommendations in the mentioned Review are not met in Nakuru Provincial General Hospital where the researcher had had close involvement before the start of this project.

1.2. Discrepancies in health records

It was reported in a Kenyan National newspaper in regard to the above mentioned review that the maternal death rate in Kenya was far greater than in any of the developed countries of the world, which is understadable. However, the figures reported in the newspaper for Kenya 365 per 100,000, (KDHS, 1994) appeared to contradict the statistics produced by WHO and UNICEF where maternal deaths for Kenya were reported as 650 per 100,000 live births. (WHO/UNICEF, 1996:12) The WHO figures being almost twice those reported in KDHS.

In the light of the high death rate reported in the Kenyan Demographic Health Survey, an attempt was made to ascertain the accuracy of these figures reported in the newspaper and examine other sources of records, which are considered more reliable such as the WHO. It was also considered necessary to identify whether there were any regional variations in the incidence of maternal deaths in Kenya. If for example, Nakuru were shown to be worse than other districts in Kenya then further investigations would be deemed necessary.

Having examined various sources, it was found that discrepancies exist in all sources. For example, there are discrepancies in the statistics compiled by the health district in Nakuru and by the central government in Nairobi. The accuracy of the data kept by the Registrars of births and deaths is also in question. In addition there was also a major problem in discovering where information is kept in the first place as experienced by the researcher before the research proposal was constructed.

Further investigation into the reported statistics from the various sources mentioned showed the figures quoted by the newspaper corresponded with the Kenya Demographic Health Survey. This raised further questions such as, which of the figures quoted was closest to the true incidence of maternal deaths in Kenya, those from Kenya DHS or WHO? If there were discrepancies between these major sources of information how had they arisen? This would cause problems for those planning health services. Might it be reasonable to suggest, that locally there needs to be a system whereby important health data can be gathered for monitoring clinical standards and planning future services?

One purpose of health data is to provide accurate information on health trends and indicators. Interpretation of these trends and indicators should then lead planners towards predicting interventions that could provide possible solutions or practical changes, the implementation of which could lead to improvements in health outcomes.

The problem of data collection is not completely scientific, it relies on human resources to collect and record the information required. The human element can lead to a number of errors, such as, wrong information, under reporting, mis-reporting and omissions, not understanding the questions that are asked, or the purpose of asking them and if those collecting and reporting the data do not understand the importance of record keeping.

Agencies reporting on the same thing, but using different systems can lead to discrepancies if the questions asked are not interpreted in the same context by each agency. In developing countries problems of accuracy can be exaggerated when there is no reliable system in place to collect health information. One of the possible explanations may be that the methods used for data collection by various health departments could contribute to error: for example, some population groups, particularly those who live in the remote regions, might be left out completely, which is not an unusual occurrence in developing countries due partly to the difficulty of accessing the targeted groups.

While the researcher was working in Nakuru Provincial General Hospital, it was noted that the completion of admission records and clinical records was often carried out after discharge or deaths had occurred. Assuming this were the general approach throughout Kenya, then the existence of data error between different sources could be further explained. This could then create further problems for health planners such as, how to predict future health needs and health trends, without accurate epidemiological data. How can a country know how great the gaps are in their public health services if records and data are incomplete?

Accepting the existence of statistical discrepancy between various published sources, the number of maternal deaths published by Nakuru health district and in the newspaper is shown to be high. Several questions need to be addressed. For example, the question of whether current clinical practices in Kenya, particularly in Nakuru Provincial General Hospital contributed to rather than prevented a percentage of these deaths. The hospital in Nakuru could not be considered in isolation since certain constraints might be imposed from provincial and national levels which could hamper the efforts of enlightened managers to improve the quality of care. However, there appears to be no evidence to suggest that this is the case in Nakuru.

1.3. Management weaknesses

During the course of my induction, I noted that Nakuru general hospital was not well managed. The matrons in charge of various units, did not use their authority appropriately. Due to lack of nursing leadership, the morale of the nursing staff was low. The standards of nursing practice was poor in my view, e.g. no daily allocation of duties for staff resulted in no organised delivery of care to patients, no recording of care provided which led to no record of treatment or care delivered. Therefore staff who reported for the next period of duty had no record of what had been done for individual patients, being forced to rely on what they remembered from the ward report. Staff reporting late for duty were never corrected or reported to the hospital senior matron. Low morale of nurses in the clinical areas concerned could be contributory to poor standards of care. (Benner, 1984) Equally, doctors were not managed well by the medical superintendent.

e.g. Of the 70 doctors theoretically working at the hospital, many of them were not available when supposedly on duty, either being out working in a private capacity or under the influence of alcohol. When present, junior doctors would at times carry out treatments and measures they were not competent to perform. One could argue that low staff morale could be seen as a consequence of poor leadership, inadequate resources to support the work of the hospital, absence of incentive to encourage staff to make best use of resources, knowledge and skills. (Schon, 1987) The consequences of low morale in the health service in general is that patients will suffer. If standards of practice are to improve changes are required.

Prior to the commencement of the study, the researcher put forward a number of suggestions as to how the standard of care in the maternity unit in Nakuru Provincial General Hospital could be improved. These suggestions were met with resistance. The researcher recognised the fact that if suggestions were to be taken seriously, documentary evidence was needed. The researcher was also cognisant of the fact that there might be difficulties in convincing management and staff of the need for change and in implementing new practices, in the light of my observations as a participant of the hospital.

If changes were to be introduced successfully, it would seem imperative that one would need to find ways of obtaining the cooperation of staff at ward level to achieve change in traditional working practices. Once the need for change was accepted the availability of training opportunities would need to be looked at and new programmes for continuing education possibly implemented, which in turn would require establishing ways for staff to have access to appropriate resources for study.

Improvements in the availability of accurate information and better management in hospitals might have a positive impact and help reduce the death rate in the long term. If, sustainable improvements were to be achieved some basic elements essential to health needs in developing countries would need to be examined. For example, ill health, incidence of disease, incidence of deaths and causes of deaths are multi factorial, with finance and human resources playing a key role. Health policies, the ease of accessing health services, social attitudes of society towards

particular population groups, cultural norms, etc. are important contributory factors. The World Health Report in 1998 pointed out that women's health is inextricably linked with their status in society and that their health benefits from equality and suffers from discrimination. It also states that in many parts of the world this discrimination begins before they are born and stays with them until they die. (WHO, 1998(A))

Although investigating the relationship between some of the external factors and maternal and child deaths is not part of the current study, nonetheless, if long term changes were to be achieved and sustained by Nakuru, then social issues should receive some theoretical attention. Equally, children across the age spectrum are discriminated against in developing countries and their basic rights and needs are violated.

1.4. Paediatric unit in Nakuru

During the course of my orientation programme in Nakuru, I was introduced to a number of paediatric wards for children with neonatal, medical and surgical conditions. The physical environment of all wards was poor and management weaknesses similar to those identified in the maternity unit were noted. From the hospital records for 1997, in excess of 150 children (0-5 yrs) died, however, the causes of death were not reported, only the reason for admission being given; most of these deaths being reported in a group at the end of the month, when they were recorded as being admitted.

Child deaths in the range from birth to 5 years appeared to have risen in Kenya. According to UNICEF sources, in 1996 the rate was reported as 61 per 1,000 who would die before their 5th birthday.(UNICEF, 1996(B)) The number of deaths in this range appeared to be on an incline, for example, the rate in 1998 is given as 74 per 1,000. (UNICEF, 1998) These rates are disturbingly high and may not include stillbirths. During the process of my investigation, there were indications that the Nakuru Provincial General Hospital did not appear to notify the majority of the stillbirths occurring in the hospital to the regional registrar, due to lack of understanding the importance of keeping accurate data statistics. What causes such a high mortality rate among these children in their first five years? Some of

the major problems associated with ill health and deaths in children are poverty based. Malnutrition is generally seen in developing countries and the root causes cannot seem to be eradicated. The consequences of chronic malnutrition correlate with retardation of physical and mental growth affecting ultimately their chances of survival in an already hostile socio-economic environment.

Young children who are between the ages of 0-5 are more vulnerable. Nutrition and decent living conditions are essential for survival. The survival of very young children is closely linked with the health status and survival of their mothers. Being orphaned as a result of AIDS has an incalculable effect on these children's well being. Many will die because of lack of shelter and care compounded by chronic malnutrition.

The health service in Kenya appears to mirror that of the UK in theory. The infrastructure in Kenya appears complicated and does not seem to match the needs of the population. Secondary care appears fairly well developed with established hospitals and staff establishments. The primary health service is shown to be under developed. There are also private hospitals for those who can afford them. Those people who live in poverty rely on locally run private clinics such as the one offered by the researcher where the clients have to pay for their treatments and medications. Those who cannot afford medical care will have to do without or rely on charity.

Kenya is a large country which is divided into 8 provinces, the largest of these is Rift Valley Province. Provinces are then broken down into districts, Rift Valley contains 14 health districts and each health district covers a vast geographic area, one of these districts is Nakuru. Even if primary health services were available, there would be difficulty of access for those who live in remote areas or live some distance away from clinics. There is no regular public transport for those who have to travel across difficult terrain. The health of many women and children could be seriously affected. While some of the distances in kilometres may seem unexceptionable, there is no road access to parts of the interior and to certain rural areas.

1.5. Personal aim

My original priority in Kenya was to establish a private clinic in a poor district in Kenya. My experience in my induction period suggested that I was in a position to work with Nakuru Provincial General Hospital to introduce some remedial activities to correct some of the problems highlighted earlier in this chapter, while continuing to run my own clinic. That was the reason why this project was undertaken. Prior to embarking on this project, the researcher experienced a great deal of frustration and wasted a considerable amount of time seeking health data relating to maternal and child deaths from various departments in Nakuru and Nairobi. Documents were not kept centrally and even if the availability of specific documents is known officials could not identify where these were kept. This is considered totally unsatisfactory for research and planning. It would seem necessary that changes would have to be made at local level if future health needs were to be evidence based. As previously mentioned the importance of keeping accurate clinical records was not understood by staff at Nakuru Provincial General Hospital.

As discussed earlier the lack of understanding by staff about the essential nature of record keeping while the patients were in hospital was of serious concern. As a result the causes of high death rates in the areas investigated could not be identified. Based on personal experience and empirical observation the researcher believes that the high number of deaths in these two clinical areas could be reduced if a systematic review of the causes of deaths were to be undertaken. The proposal would involve some basic data collection for analysis. The results could then be used for implementing change.

Whilst agreeing that money is a most important factor in making changes happen in developing countries, it is not the only solution, particularly in a situation where the basic health infrastructure is well established as is the case in Nakuru. From the researcher's perspective several changes could be implemented in Nakuru that would reduce the incidence of cross infection in both units without additional funds. The difficulty was to make these changes acceptable in the first place. It is intended in this study to investigate ways of instituting minor and affordable

changes which will have an immediate impact on patient care. e.g. the sharing of beds and incubators with no discrimination between infected and non infected patients; or improved clean techniques in ward hygiene.

1.5.1. Aims and objectives of the research

It was proposed to: a) investigate the high rate of maternal death rate at Nakuru Provincial General Hospital; b) ascertain a baseline data for deaths occurring in children between 0-5 years of age; c) examine the standards of care in units where the newborns will be cared for; d) identify ways of involving staff in implementing change with a common purpose.

The aim of this project is to investigate the nature and problem of the high maternal and infant mortality, with a view to implementing an action research programme which will benefit patient care in the immediate future. The aim of the project was formulated based on the assumptions of:

(1) The probability of reducing deaths in these two units may benefit from instituting a new system of hospital admission and discharge records. The success of implementing a new record system is dependent upon nursing staff having the knowledge, skills and understanding of the new data system and the necessity of obtaining accurate information of the service delivered.

(2) A properly designed health record system alone could not reduce death rates in both the maternity unit and the paediatric wards. Because, a data system even if it is improved cannot reduce death rates without targeted interventions as identified by the researcher. By introducing specific programmes of change in these two units, such as infection control, ward hygiene, regular review of care standards, would in both short and long terms improve care and staff morale.

In order to meet this aim there were a number of objectives:-

(i) to institute a new and comprehensive record system in both the maternity and paediatric units for clinic audit purposes.

- (ii) to audit the infection control practices with a view to introducing evidence-based changes.
- (iii) to introduce a programme of affordable changes in the maternity and paediatric units which help to negate management and nursing practice deficiencies.

Chapter 2. Literature review

Since this study is based in a developing country where data on health is difficult to access, and may not be available at all, there might be a small collection of published papers on the subjects being researched into. e.g. maternal and child mortality in Kenya, because the Kenyan medical fraternity do not publish papers on a regular basis. The majority of papers published so far were produced by non Kenyan academics and authors, who may not have experience of working in a specific location in Kenya such as Nakuru.

The literature reviewed to support this thesis will, as far as possible, consider both the theory and reality of existing conditions and the services pertaining to health provided in Kenya at the present time. The review is carried out under the following headings.

- The problem of obtaining accurate health statistics
- Maternal deaths and causes of these deaths in Kenya and Nakuru
- Infant deaths from 0 - 5 years in Nakuru
- External factors influencing health and health care in Nakuru, particularly women and children
- Successful interventions in maternity care and services

2.1. The problem of obtaining accurate health statistics

The registration of births and deaths, censuses and annual reports from the Department of Health are public health tools, which are a valuable source of information at national and local level. Among activities which benefit from this type of statistic are the monitoring of health among populations, the setting of priorities and the targeting of interventions. This type of statistic forms the bedrock of most epidemiological study: it informs and directs the focus of research and complements mortality data in follow-up studies. (Sibai et al, 2002)

An unknown number of women die daily of causes that are directly or indirectly linked to their pregnant state. It is reported that 99 percent of these maternal deaths

occur in the developing countries of the world. (Midirs, 1997) (WHO/UNICEF, 1996) The reason why the exact number is unknown arises from the lack of means to carry out accurate measurement in many parts of the developing world which is where the majority of these deaths occur.

Being able to gain insight into the true extent of health problems within the country would be invaluable in terms of planning. However, there are difficulties in a) getting at the sources of information, and b) even if the information was obtainable, there are discrepancies between sources of information as briefly described in chapter 1. The reasons why discrepancies between sources of information occur are briefly discussed here.

When those collecting data for measurement of health statistics adopt the use of different variables, this would be likely to result in discrepancies, as the data collected is not using the same markers and variables for comparison. For countries which lack vital registration or other recognized reliable methods of measurement, certain other approaches have been tried with varying degrees of success.

Identifying and implementing methods of measuring maternal mortality and morbidity can present difficulties. There are two main measurements that this investigation wished to obtain in relation to maternal and child deaths: one was the prevalence and the second was the individual cause. What constitutes the determinants of incidence of these deaths is not necessarily the same as the individual cause. (Rose, 1985) While it may be necessary for the provision of statistics to discover magnitude, without discovering the individual causes it would not be possible to provide appropriate interventions to prevent these deaths occurring in the future.

Some Western countries have carried out audits in many spheres of health and social welfare for a number of years. For an audit to be effective it must be based on accurate figures. With the use of accurate data, it then becomes possible to know how many of a certain commodity were dealt with, in what manner, and the outcomes of any of the actions and strategies adopted. This then allows for

examination of interventions or omissions, which in turn allows conclusions to be reached in regard to which of the actions employed were effective, non-effective or positively harmful. Audit should be precise, measured and analytical, reflecting the process of thought in the brain, which is, to take in, absorb and assimilate information, check the information gathered against memory and then present or suggest options. (Pratchett, 2001)

Accurate identification of maternal deaths in Kenya is not possible at the present time. The existing system in Kenya is recognized as being inefficient by agencies both outside and within the country itself. (WHO / UNICEF, 1996) (MoH Kenya, 1997). Some of the reasons behind the inefficiency require extra resources to address them, others do not – requiring only more efficient use of existing resources and a change in attitude of staff and management.

The 4 yearly Demographic and Health Survey programme is the world's largest survey, collecting data on mortality and morbidity among mothers, infants and children as well as other health service indicators. This programme is now in its 18th year and has conducted at least 125 comparable surveys in 62 developing countries. (Rustein, 2000) But are these figures accurate?

The accuracy of the estimates given for maternal deaths in the health indicators would depend on the method used to determine them. The method used for Kenya was based on the survival of the sisters of the survey respondents over the previous ten years. Therefore accuracy in regard to magnitude would be dependent on the sample population and whether the sample was representative of the population as a whole. The maternal mortality figures quoted in the Demographic Health Survey for Kenya (KDHS) in 1994 was 365 per 100,000 (KDHS, 1994), four years later in 1998 the maternal mortality ratio was reported as having increased to 590; with maternal deaths reported as representing 27 percent of all deaths of women between the ages 15-49 years in Kenya. (KDHS, 1998) The cause of this huge increase in Kenya's own estimates could be due to a number of factors, such as a change in the population sampled, improved methods of information collection or an increased risk to women in childbearing. However the

figures are still an estimate, which can indicate magnitude but gives no indication of the causes of these maternal deaths.

Demographic Health Survey field sites are not the same as the four yearly Demographic Health Surveys: the purpose of field sites is to carry out a regular and repeated census of a geographically defined population. These field sites supply systematic recording of data of vital events (births, deaths and migrations) occurring in their specific area. This type of system is said to allow for a wide range of evaluation of new or untested interventions in regard to health, social, economic and behavioural studies. However, it has been found that when the results of research from these sites have been implemented into primary health care systems their impact has fallen below that predicted by efficacy studies. This makes their role in health care system reform, at national or international level of limited value. (Tollman and Zwi, 2000) It would appear that although these survey field sites would provide an estimate of the incidence in their specific geographical area, they would not indicate the actual causes of maternal deaths.

2.1.2. WHO/UNICEF methods

Lack of confirmation of accurate figures regarding maternal mortality however, should not hinder people from trying to ascertain the magnitude of this problem. (Rosenfield and Maine, 1985) For countries which lack civil registration, there are methods employed that estimate the numbers of maternal deaths. The method employed by the WHO and UNICEF for Kenya and her neighbours, Uganda and Tanzania, is to predict the proportion of all deaths of women of reproductive age and this proportion is applied to the 1990 United Nations projections of adult female deaths to derive the maternal mortality ratio. This model uses two widely independent variables – general fertility rate and the proportion of births that are assisted by a trained person. (WHO/UNICEF, 1996:5)

The WHO goes on to point out that the new approach to estimation has limitations, though it represents an improvement on previous efforts. They stress that the strategies they employ are only a short-term solution to the problem of measuring and that the long-term solution to the problem of accurate information regarding

maternal mortality is dependent on improved vital registration systems, plus incorporation of these figures into national health information systems. (WHO / UNICEF,1996:8)

What may raise some queries is that estimates for East Africa projected the old estimations as 680 maternal deaths per 100,000 live births and the newly revised estimates as 1060 per 100,000. This could be due, in part, to the fact that Somalia is being included with Kenya, Uganda and Tanzania , the former British East Africa. Somalia is listed as having the third highest maternal death rate in the world. (WHO / UNICEF, 1996:14). Without Somalia the rate would still be high as the new estimates list Kenya with 650 maternal deaths per 100,000 live births. (WHO / UNICEF, 1996:12). The estimates for maternal deaths in Uganda are given as 1,200 per 100,000 live births and in Tanzania as 770 per 100,000 live births. (WHO / UNICEF, 1996:15) Using the aggregate of these three countries would then produce an average of 871 per 100,000 live births.

What makes these figures questionable is that the rates given for each country in the Demographic Health Surveys for each of these three countries is a complete reversal of the order in the WHO/UNICEF statistics.

The percentage increase in the figures for Kenya between the DHS figures and the WHO figures is approximately 10%, being 590 and 650 maternal deaths respectively. The Tanzanian figures and WHO figures represent a 46% difference, the figures given being, 529 (Tanzanian DHS, 1996) and 770 maternal deaths (WHO, 1996). The WHO figures reported for Uganda show a difference of 137% between the Ugandan figures and WHO figures. The Ugandan figures are reported as 506 per 100,000 (UDHS, 1995) whereas the WHO have increased their estimate to 1,200 maternal deaths per 100,000 live births, with no explanation given for this massive difference (WHO, 1996).

There might be other more reliable methods of data collection than those discussed above, some of these are briefly described next.

An evaluation of the use of a population census across an entire nation as a method for measuring maternal mortality was carried out by examination of the results and findings from five countries: Benin, Islamic Republic of Iran, Lao People's Demographic Republic, Madagascar, and Zimbabwe, which identified maternal deaths in their censuses. The census figures for Benin and Zimbabwe, were then compared with those from recent Demographic Health Surveys. (DHS) The results from Zimbabwe showed very similar figures: the census reported 395 maternal deaths and the DHS 393 maternal deaths. In contrast, the second country, Benin, showed the DHS estimates to be 498 maternal deaths per 100,000 live births and the adjusted census figures to be 338 maternal deaths revealing a very large discrepancy. This discrepancy suggested that some DHS estimates were very imprecise.

This report found that in regard to estimation of maternal mortality the census was a feasible and promising approach for measurement under certain favourable conditions. All five countries evaluated had agreed that the most important condition to be met was commitment on the part of the Ministry for Health to use the data for programming and policy level decision making. (Stanton et al, 2001) With a few extra questions built in to the 10 year census, this would yield the magnitude, but not the causes of maternal deaths.

A system implemented and then referred to as 'networking' by those who carried out the research, was used to identify maternal deaths occurring in a coastal district of Kenya over the period 1984-1987. The district used for the pilot study was made up of seven clusters of villages that were selected within three locations. The total population of the whole district at that time amounted to almost 400,000 and more than ten percent of the designated population was surveyed. The main purpose was to carry out a baseline survey, sponsored jointly by the Kenya government and UNICEF, to determine factors affecting child health and survival. The final questions of the survey interview concerned maternal death. The family of each of the 52 maternal deaths identified were then interviewed and verbal autopsies carried out. It was felt that this allowed the most accurate information collection in regard to maternal deaths in the designated area during the period 1984 – 87. In the majority of cases it was also possible to identify the probable

causes of those deaths, with less than 23% of the deaths designated as cause unknown. (Boerma and Mati, 1989)

This 'networking' did not find the magnitude of abortion deaths, which are said to account for between 13% maternal deaths worldwide, (WHO, 1998) and 17% of maternal deaths in Kenya. (MoH Kenya, 1997) However, this type of survey would be costly both in monetary terms and in the manpower needed to collect this data, making the overall cost to the economy an added burden. (Boerma and Mati, 1989)

2.1.3. Enquiries or audits after death

Another method of estimation could be to examine hospital statistics. While explaining the usefulness of these types of statistics for the estimation of maternal mortality in developing countries, Ties Boerma (1986) warns that not all hospital generated figures are suitable for use. Regarding hospital based figures, he points out that those from regional and district health facilities provide useful information, but figures from national referral hospitals could be misleading since these facilities would have a very high rate of complicated cases referred from district hospitals where there would be an increased risk of maternal death.

Boerma points out that the key issue is the level of coverage of births by health facilities, explaining that if this is low, (he quotes 34 percent), as in much of Africa, then the level of population-based maternal mortality is low. He cautions that the lower the proportion of deliveries covered by health facilities, the more uncertain are the estimates. In the introduction to his 1987 paper Boerma points out that there is general agreement that the WHO estimates regarding maternal mortality are based on defective data. (Boerma, 1987) Unfortunately, Boerma did not explain in which ways the data is 'defective'.

In three districts of Indonesia, a method of district-based audit of maternal and perinatal mortality was started in 1994. This strategy appears to be proving successful, with both medical and non-medical documentation being compiled and examined. The resulting assessments have shown how to make progress towards improvements in a number of areas, which include substandard care, delays in seeking help and delays in decision making, plus poor quality of care at health

facilities. The sources of information used included verbal autopsies with family members and medical records. Between 1995 and 1999 the audit reviewed 130 maternal deaths, the causes of these deaths being identified in all but 7 of the 130 cases examined through the methods employed. The main causes of the deaths were identified as haemorrhage (41%) and hypertensive diseases (32%) indirect (11.5%) sepsis (5%) and three early pregnancy deaths; two abortion deaths and one from ectopic pregnancy. (Supratikto et al, 2002) This would appear to be a useful tool for Nakuru..

However this type of enquiry requires an efficient system of reporting and notification of incidence and specific causes as a pre-requisite to its successful implementation.

It would not be realistic to expect a country to go from a position of absence of data to reliable data status in a short period. For Kenya, a decision needs to be made on the best method to gain the type of robust data necessary for the country, one that it is possible to implement and monitor, within the existing restraints. A new and inexpensive method would have to be instituted in Nakuru.

2.2. Maternal deaths and causes of these deaths in Nakuru

The WHO considers it is important to measure maternal mortality for the human and social development it reflects, as it is considered “a particularly sensitive indicator of inequity.” It provides a picture of the status of women, their access to health care and the adequacy of the health care system in responding to their needs. Information on levels and trends in maternal mortality is considered necessary for numerous reasons, which include the risk of pregnancy and childbirth and the implications for women’s general health, together with the picture it gives of their social and economic status. (WHO / UNICEF, 1996: 2.)

The figures for global maternal deaths per day shown in Figure 2.1 clearly demonstrate the inequity for women throughout the world. Sub-Saharan Africa, Asia and the Pacific regions are the worst affected parts of the world - a large number of women die daily during childbirth.

Every day at least 1,600 women die due to complications of pregnancy according to the report by the WHO on World Health Day in 1998. The majority of these deaths, almost 90%, are reported as occurring in Asia and sub-Saharan Africa, approximately 10% in other developing regions and less than 1% occur in the developed world. (WHO WHD 98.1)

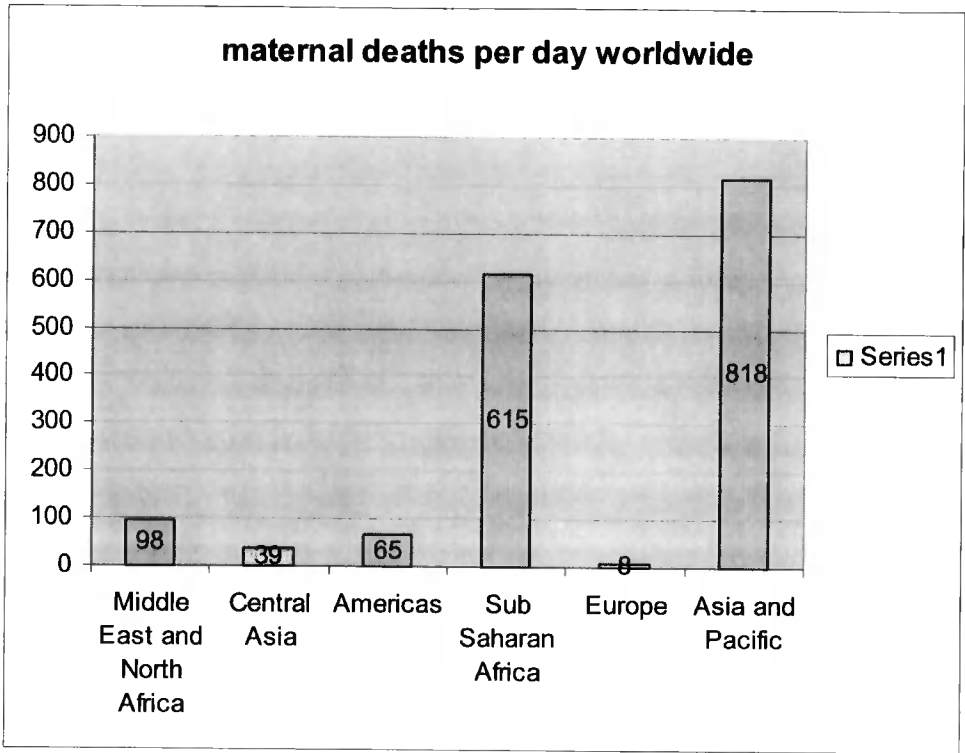


Figure 2.1: Maternal Deaths per day worldwide and areas where they occur

WHO/UNICEF 1997

Information on levels and trends in maternal mortality is necessary for a number of reasons, which include the risk of pregnancy and childbirth and the implications for women’s general health plus the picture it gives of their social and economic status. (WHO / UNICEF 1996: 2)

To discover and address the causes of these deaths is not just a task for those concerned with measurement. Uncovering causes involves a number of aspects and a variety of skills. The actual cause of death may well have been the culmination of a number of decisions, some made by individuals and their families and others made by the professionals the family sought assistance from. Examination of the circumstances surrounding a maternal death is not easy in any

country; in places like Kenya where autopsies and investigations are not carried out routinely, the task is more difficult. Unless the family involved can pay to pursue the enquiry very little may be known about the death or the conditions which surround and possibly contribute to the death of a mother in Kenya.

Maternal deaths are not a new phenomenon. However there is a large gap between the numbers occurring in developed and developing countries. The extent of maternal deaths in much of the developed world has dropped drastically in the past 70 years due primarily to improved standards of living, the improved health of the population and a better standard of health care. More particularly, more attention has been afforded to prenatal and postnatal care. The situation is vastly different in developing countries, as basic health care provision in poorer countries is scarce. The differences can be highlighted by comparing the level of GNP allocated to health care per capita: in the UK 18,340\$; 250US\$(Kenya); 140US\$(Tanzania). The case can be made that figures for maternity deaths correlate with levels of wealth.

If the number of maternal deaths is to be reduced to the level prevailing in the developed world the following pre-conditions must be satisfied:

- the basic necessities for healthy living must be provided
- basic health care must be accessible to all, including those living in remoter areas
- women who are pregnant must have regular attention during antenatal and postnatal periods
- hygiene conditions in the maternity units must be of an equal standard to those in any developed country.

In the light of the level of finance being spent in Kenya the conditions set out above cannot be achieved for many years. Other measures to save the lives of women must be considered.

Maternal deaths are classified as direct, indirect, and fortuitous. The purpose of such enquiries is to identify causes of deaths which are preventable. Once identified, the necessary changes can be put in place to avoid such deaths in the future. The criterion used in the examination and classification of these deaths in the UK was applied as shown in Table 2.1.

Maternal deaths	Deaths of women while pregnant or within 42 days of termination of pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.
Direct	Deaths resulting from obstetric complications of the pregnant state (pregnancy, labour and puerperium), from intervention, omissions, incorrect treatment, or from a chain of events resulting from any of the above.
Indirect	Deaths resulting from previous existing disease, or disease that developed during pregnancy and which was not due to direct obstetric causes, but which was aggravated by the physiological effects of pregnancy.
Fortuitous	Deaths from unrelated causes which happen to occur in pregnancy or the puerperium.

Table 2.1. Definitions of maternal deaths. Adapted from HMSO. 2000.

The classification of maternal deaths would be useful in designing a new record system as suggested in chapter 1 of this thesis, as it will provide some useful information for investigating deaths in the maternity unit.

The causes of maternal deaths world-wide are documented in various papers. (WHO, 1998); (Adamson, 1997) The most common causes of maternal deaths in Kenya, cited as the immediate and direct causes, being haemorrhage, sepsis, hypertensive disease in pregnancy and abortion. (MoH Kenya, 1997:8; MoH Kenya Nov. 1996:27) It was reported by Hazem El-Rafaey that post partum haemorrhage alone accounts for between 17 percent and 40 percent of maternal deaths in some parts of the developing world. (Hazem El-Rafaey et al, 1997)

The Kenya National Reproductive Health Strategy 1997-2010 points out that abortion is thought to be responsible for 1 in 3 maternal deaths in Kenya, with

other predisposing factors that contribute towards maternal mortality and poor health cited as: overwork, malnutrition and anaemia. (MoH Kenya, 1996:27) Certain tropical diseases, such as malaria, predispose a pregnant woman to an increased risk, as pregnancy reduces acquired immunity, (Audu, 1991) and malaria, if it remains untreated will result in anaemia, which can have serious, if not fatal consequences for pregnant women.

Anaemia alone has been identified as contributing to, if not the principal cause of, 20 per cent to 23 percent of all post-partum maternal deaths in Africa and Asia, with this estimate being seen as conservative by many experts. (UNICEF, 1998 (B)) The most common causes of maternal deaths are cited as: uncontrolled bleeding, incomplete delivery and infection. The effect of these complications is reduced if the woman is well nourished and in good health. (Kjellstrom et al, 1992)

In both the developed and the developing countries some maternal deaths are inevitable: no interventions could save these mothers. Midwives in the UK know that maternal deaths still occur: the chances of a mother succumbing are 1: 9000. (Mander, 1999) The life time risk of a mother dying of causes related to pregnancy in the UK is 1: 5000 while in the worst affected areas of the developing world the risk is 1: 7. (News, July 1996)

In much of Africa and other developing countries women continue to die from pregnancy complications and other basic, health related complications, many of which do not affect the female population in the developed world. Many of these complications could be avoided if certain mechanisms were in place. The WHO poses the question “Why are women dying?” and then states,

“most maternal deaths could be prevented if women had access to basic medical care during pregnancy, childbirth and the postpartum period”.

(WHO, 1998; 94:1)

There have been basic minimum recommendations in regard to reproductive health care for women. Those put forward by the WHO in 1998 include:

- antenatal care,
- care at delivery
- postpartum care.

These recommendations encompass: health promotion for the mother and the newborn; immunization; breastfeeding advice and family planning. (WHO WHD, 1998)

A situational analysis carried out in Kenya, found that the standard of care in many of the Kenyan health facilities was of poor quality, with antenatal care providers not routinely advising women about the basic warning signs of complications. Providers were also found to be not educating mothers or carers on the correct responses to illness in young children. (KSPA, 1999: xviii)

This same analysis found that deficiencies in regard to recording and reporting were identified for all services, with the majority of facilities frequently not making full use of records to monitor performance and improve the standard and quality of care. (KSPA, 1999: xx).

Two Kenyan official publications state that 95 percent of women in the country receive ante-natal care, both of the reports going on to point out that any single contact visit is counted as attending for ante-natal care. These reports also mention that there is no measure of the quality or the standard of the ante-natal care that is delivered to pregnant women in Kenya. (MoH. Kenya, 1997:16), (MoH. Kenya, 1996:7) However, not all agencies agree that ante-natal care provision is worthwhile in regard to its impact on maternal mortality. UNICEF refers to low cost strategies like increased ante-natal care and training of traditional birth attendants as having demonstrated very little impact in regard to reducing maternal deaths. (UNICEF, 1998 (A))

Antenatal screening is documented as identifying 20% of women with complications and high-risk pregnancies. (Chalmer et al, 1989) (MoH Kenya, 1997) With this level of detection, this practice, with appropriate provision, would appear well worth the input. It should also be remembered that ante-natal care enables possible difficulties to be detected at an early stage so that appropriate

preventative measures can be taken, as well as providing the opportunity for health education.

2.3. Child mortality and causes in Nakuru

Approximately 90% of children in Africa live in unfavourable socio-economic conditions, these conditions pre-dispose the African child to many life threatening illnesses; i.e. infection, tuberculosis, rheumatic heart disease and malnutrition. (UNICEF, 1998 (B) The negative impact of HIV/AIDS on the improvements achieved in child survival over the past decade, are not yet fully known.

The basic indicators for children, as shown in the Kenya Demographic Health Survey, show that 1 in 3 children below 5 years of age are sickly and small for their age, that a further 6 percent are wasted and 1 percent are severely wasted. These levels are on a par with the 1993 indicators, therefore it must be concluded that this indicates no improvement in children's nutritional status. (KDHS, 1998) Wasting, low weight for height has emerged as being an important indicator for screening severely malnourished children who are at increased risk of dying. (de Onis, 2000)

Malnutrition is recognized as a serious problem in many parts of the developing world, malnutrition is referred to as 'the silent emergency', in *The State of the Worlds Children*. (UNICEF, 1998:9(B) This report points out that;

“Of the nearly 12 million children under five who die each year in developing countries, mainly from preventable causes, the deaths of over 6 million (55 per cent), being either directly or indirectly attributable to malnutrition.”

(UNICEF, 1998:11(B)

This statement illustrates the gravity of the problem of malnutrition in relation to the health and well being of children in the developing world. This paper goes on to point out that malnourished children suffer in other areas too as their educational ability is impaired. Malnutrition reduces the capacity for concentration, motivation and curiosity: abilities that are known to be necessary

for a child to be able to interact positively with his or her environment. The definition given for malnutrition at its most basic level is “a consequence of disease and inadequate dietary intake, which usually occur in a debilitating and often lethal combination.” (UNICEF, 1998 (B) This definition emphasizes that the consequences of malnutrition can be long term ill health, a shorter life expectancy and possibly death.

A child’s bodily response to malnutrition can be measured in two ways:-

1. a cessation or deceleration of growth, which over the long term results in low height for age or stunting. Long term malnutrition results in stunting.
2. wasting is a short term response to inadequate nutritional intake, commonly assessed by weight relative to the child’s height. Short term malnutrition results in body wasting.

The 1998 health indicators for Kenya suggest that the country has an acknowledged problem in regard to malnutrition in the under 5 year olds The health indicators for 1998 reported 33% of children as sickly and small for their age and 6% as wasted. (KDHS, 1998) The de Onis method would suggest the group identified as ‘wasted’ require screening due to their increased mortality risk. (de Onis, 2000)

In a speech (5/8/99), the Permanent Secretary for Health, Kenya, stated that 70% of deaths occurring in children below 5 years of age in Kenya are caused by, malaria, pneumonia, diarrhoea, malnutrition and measles. Another report announcing the measles campaign for 2002 states, that measles contributes to 20 per cent of deaths among Kenyan children below the age of 5 years. (Okwemba, 2002)

Specific information in regard to Nakuru was given in January 1999, in a seminar given by Doctor Ruth Nduati, a lecturer in paediatrics at the University of Nairobi. This doctor was concerned that she had to report that 33% of antenatal mothers tested at clinics in Nakuru, had tested positive to HIV; and out of the 100,000 babies born each year to HIV positive mothers, 30-35% will acquire the virus,

which usually kills them before their fifth birthday. The Human Development Report 1999, states that AIDS will reduce life expectancy by 17 years in nine Sub Saharan countries, reducing life expectancy from 64 years to 47 years by 2010 in Botswana, Kenya, Malawi, Mozambique, Namibia and Rwanda. (UNDP, 1999)

In a study carried out by Macro International in 1994, the reported figures for child mortality in Kenya and Uganda in 1988/89 were compared using Demographic Health Survey findings for both of these countries. (Macro, 1994)

	<5 years mortality		infant mortality	
Kenya	87.9 (1988)	115 (1998)	60.7(1988)	74 (1998)
Uganda	176.8(1988/89)	147 (1995)	98.3 (1988)	81 (1995)
(1988/89) Macro, 1994		(1995 and 1998) DHS Kenya & Uganda		

Using the surveys for the following 8-10 years to compare figures for the same age group indicate that in Kenya 27 more children died before their fifth birthday in 1998 compared to 1988; and in Uganda 30 more children lived to see their fifth birthday against the 1988 figures. What caused this increase in Kenya and the decrease in Uganda is impossible to say with certainty. There is possibly an association between the economic decline in Kenya and the improvement in the economy in Uganda. Another important influence could be the impact of HIA/AIDS on both countries. Uganda was reported in the Kenyan press as having had a large reduction in new cases on World AIDS Day 2001 and is reported as one of the success stories in the fight against AIDS, Uganda having achieved a drop in prevalence from approximately 14% incidence in 1992 down to 8% by the end of 2000 (UNAID, 2000)

Uganda is mentioned as one of the countries where political leaders have invested in basic social services since the early 1990’s and have achieved reductions in both infant and child mortality since 1992. (UNICEF, 2000:12-13)

The educational standard of the mother was seen to play a significant part in survival of the child, while children of mothers with little or no education suffered the highest rates of mortality in all three countries. That female education leads to

a reduction in child mortality rates was strongly suggested by all the DHS for each of these countries. (KDHS, 1998) (Tanzania DHS, 1996) (Uganda DHS, 1995)

2.4. External factors influencing health and health care in Nakuru, particularly women and children

The Secretary General of the United Nations, pointed out in September 2000, that

“...during the UN Millennium Summit, world leaders resolved to halve the proportion of people whose income is less than one dollar a day, the proportion of people who suffer from hunger and the proportion of people unable to reach or to afford safe drinking water.” (Annan, 2000)

The World Health Report for 1995 identified poverty as the greatest cause of suffering, highlighting the ever widening gap between the rich and poor and recommending the necessity of making the most effective use of available resources, redirecting those resources to those who need them most. (WHO, 1995) This does not appear to have happened in Kenya, judging by the fall in the economy and the increasing levels of poverty.

In Kenya, government expenditure on development has dropped from 30% at independence in 1963-64 to 18% in 1998-99. Kenya levies some of the highest taxes in Africa, 25% of GDP – while services have almost ceased to exist. Economic growth between 1990 and 1998 was 2.1%, dropping in 1998-99 to 1.4% and a further drop in 2000-01 to a negative -0.3%. (Kweyu, 2001:13) This poor economic growth in Kenya is in sharp contrast with the 5% increase in both Uganda and Tanzania against Kenya -0.3% negative growth, illustrating the decline in living standards, especially among the very poor in Kenya. Prior to the Budget in June 2001, the Kenyan ordinary revenue collection comprised 27% of GDP, while in the neighbouring countries of Tanzania and Uganda the figure was 10%. Tax for individuals in Kenya was 30% with VAT 18% plus a with-holding tax of 15 – 20%. (Ndungu, 2001)

CBS statistics for Kenya, indicate that 56% of monthly income is spent on food, 20% on non food expenses, medical 5% and education 3%. For Kenya in 1996

GNP stood at \$283 per capita and debt \$217 per capita, therefore 77% of GNP = debt. (CBS, 2000)

In Nakuru town itself, 80 percent of the population lives in slums. (CBS, 2000); (Muganda, 2000) If one assumes that the decision to reside in a slum is not made by choice but of necessity, it would seem that these people do not have funds to live elsewhere. The rural areas of Nakuru District are shown as suffering 45% absolute poverty in 1997. Conditions have not improved economically in the intervening period, as there has been a steady decline in economic growth. (Appendix iii)

The Kenya Economic Survey in May 2000 reported that more than fifty percent of Kenyans live below the poverty line. (CBS, 2000) It has been reported that fifty percent of Kenyans live on one half of a US dollar per day, which in the present population translates to 15 million people living on this meagre sum. (Oluoch, 2001) A government announcement on 12/08/2001, made by the assistant Minister for Vocational Training admitted that 14 million Kenyans (almost 50% of the population) are unemployed. In this type of economic climate it is probable that all the women of child bearing age in this group, that is those who live in dire poverty, are denied access to basic health and maternity care on the grounds of affordability. Maternity services are not available free of charge, they have to be paid for by clients. This in turn would limit their choice and access to both ante-natal care and to place of delivery, limiting them to very narrow options. Those options would be to deliver either at home with a relative, friend or a traditional birth attendant in attendance, or if money is available, at a government health facility.

The Director of the African Women and Child Information Network (Kenya) reminded the community that: “ In 38 years of independence, little has changed for Kenyans”, pointing out that, “Illiteracy, disease, ignorance and poverty – the four major factors hindering social-economic development are still rampant.” (Omale, 2001:12) These factors are intrinsically linked with health. It can therefore be understood that maternal and child deaths are closely related to social and economic conditions in a country such as Kenya.

Many of the problems and difficulties regarding the implementation of changes in Kenyan society, as in other developing countries, are brought about by poverty. Lack of access to basic education and health care can be cited as being rooted in the conditions that bring about and entrench the cycle of poverty. CEDAW state their organization's concerns that, in situations of poverty, women have the least access to food, health, education, training, employment and other needs. (CEDAW, 2000)

Finding appropriate solutions to the problems of access to affordable and acceptable health care is a problem that varies with circumstances. Griffiths (1991) points out that it is possible to identify two conflicting approaches to the explanation of class in relation to health problems and their determinants. These two conflicting views are individualism and collectivism. Individualism argues that it is the way the individuals choose to lead their lives and their lifestyle habits that bring about their inequality in health. Collectivism argues that it is the economic and environmental factors, which are beyond the immediate control of the individual, that are responsible for these inequalities. This suggests that due to lack of access to care on economic grounds, the explanation that would most closely fit the poorer 'classes' in Kenya would be collectivism, as the lack of access is beyond their immediate control, being more in the control of the government. In turn this may also suggest that without real freedom of choice, there can be no individual choice in regard to health needs for the majority of Kenyans who are poor.

2.5. Successful interventions in maternity care and services

One tool designed to help expose the requirements necessary to enable improvement in maternity service provision, as mentioned in a number of papers, is situational analysis. (MoH Kenya, 1997); (Murray, 1999) Pertaining to maternal and child health care, this appears not to have been carried out in Kenya until 1999. This analysis was a service provision assessment survey at 388 health facilities. The facilities surveyed included government and private facilities which offered reproductive health care and maternal and child health services. (MoH

Kenya/NCPD, 1999) A true picture of the current situation, including the present standard and type of care delivered would be a huge asset before changes are implemented. This would allow for audit of the impact of changes in delivery of care through measured outcomes. This may not be possible immediately as the first national estimates for maternal mortality were only presented in 1994, which may cause some difficulties as this would mean that currently there are no discernable trends available. (MoH Kenya, 1997:7)

Another suggestion or recommendation has been to investigate and analyse maternal deaths by examining events that occurred prior to the death, such as the care provided, whether in the community or family in order to understand the issues that surround the incidents. This type of information could be used to influence and possibly benefit future outcomes. (Murray, 1999) It was also recommended that investigation into maternal deaths should become part of a minimal reporting system. The District Medical Officer would be required to inform the Division of Primary Health Care of all maternal and perinatal deaths that occurred within health facilities. It was thought that this type of reporting system could be used to form the basis for the country's own Confidential Enquiry. (MoH. Kenya, 1997:21)

Boerma suggested it was possible in African countries to achieve a decrease in maternal mortality to less than 100 per 100,000 live births, by improvements in the relationship between the traditional birth attendants and the health services. This he felt, together with improvements in the standard of antenatal care, identification of high-risk cases, and appropriate action by staff at these facilities when patients arrived, could achieve this huge drop in maternal mortality. (Boerma, 1987)

This appears to support the results, opinion and philosophy of Sr. Etetu's work in Ethiopia. (Lewis and Mellor, 1997) If Boerma's suggestion is even half true, a drop of this magnitude in maternal deaths, would cut maternal mortality to approximately one third of the present rate in all three of the countries, Kenya, Uganda and Tanzania. This dramatic difference, if brought about, whilst being of very little cost in real economic terms, would however be of huge import to the mothers and their families. This suggestion was made fourteen years ago. Boerma

is not inexperienced in research in African health needs, having been a researcher with UNICEF in Africa for a number of years. It is interesting to note that Boerma who has been working at the grass roots in Kenya and other African countries networking and researching maternal mortality, appears to have more faith in the trained traditional birth attendants than WHO. His research findings suggest that provision of effective and appropriate antenatal care of an improved standard, would most certainly have a positive impact on maternal mortality.

Another intervention that was found to be of benefit in a study in Nepal, was the use of beta carotene or vitamin A supplements for expectant mothers. The preliminary results of these tests showed both substances to be of benefit when given in certain doses. These women were given either a low dose of vitamin A weekly or a similar amount of beta-carotene (a vitamin found in fruit and vegetables that the body converts to vitamin A). It was found that among women receiving vitamin A there were 38% fewer maternal deaths; among the group who received beta-carotene the fall in maternal deaths was recorded as 50%. The rate of anaemia was also found to have fallen by at least 15% in both these groups. (UNICEF, 1998 (B))

Another forward step was a statement that was composed by midwives in Tanzania, called the 'African Midwives Statement of Intent'. (Maclean, 1994) This statement set out a philosophy of care which the midwives themselves felt it was necessary to define and promise to uphold.

'We as midwives, believe that maternity care in the community is essential and therefore we intend to:-

Distribute maternity care equally in the community through reaching mothers where they are, integration of maternal healthcare in outreach clinics which are already existing and by doing home visiting.

Involve mothers, families, traditional birth attendants, community leaders and health workers in order to tackle factors which

prevent safe motherhood in the community.

Assist midwifery students to acquire knowledge, skills and attitudes in order to give high quality maternity care by working hand in hand with midwife teachers, clinical practitioners and the community.

Assess our areas of work and find out factors which hinder safe motherhood and those which promote safe motherhood, so that through education we can encourage those which promote and discourage those which are harmful.'

Adapted from Maclean, 1994

In Ethiopia, Sister Etetu, a nurse, brought a new concept into the training of traditional birth attendants. (Lewis and Mellor, 1997) In previous training these women had been talked at and not to, their existing knowledge not being acknowledged by their trainers.

During the period between 1981 and 1990, in East Harare, 402 traditional birth attendants and 385 community health agents were trained. This training turned out to have little impact on the delivery of maternity care. In 1992 an analysis was carried out to determine why the training scheme had failed. The failure was attributed to lack of support from those who should have been supervising them, that is, the qualified health workers. The supervisory staff had not been involved in the training of the groups and so it was found that there was no interest in support and follow-up. In 1993 a revised programme was started with this nurse Sr. Etetu in charge of training. She adopted a facilitatory approach and used the traditional midwives' own knowledge as a basis for the new training. The sharing of practice and introduction of new concepts had been very successful. By 1996 the new training programme had successfully re-skilled 377 traditional birth attendants, of these 146 of them had also stopped performing female circumcisions.

Changes in attitude by trained staff had obviously proved beneficial. (Alemayehu et al, 1997) In Ethiopia there are about 14,000 traditional birth attendants and only

300 midwives; more than 97 percent of babies are born at home attended only by a traditional midwife. (Lewis and Mellor, 1997)

The responsibility for health care does not rest entirely with health professionals. The necessity for accurate documentation must be recognized by the medical practitioner, the Ministry of Health, planners and the registration department within the countries involved; the political will to bring about affordable, efficient methods of provision and monitoring of outcomes also needs to be in place for a health system to be successful. While examining factors affecting death certification, Sibai points out that the four elements of particular concern in this area are: the certifier, the certificate, the deceased and the cause of death. (Sibai et al, 2002) This implies responsibility on the part of the individual, the health profession and the health care system.

Policy makers do of course have a major responsibility regarding the provision of adequate health care, together with the necessary resources, both personnel and equipment to provide that care. One problem that needs addressing in countries like Kenya, where staff see themselves as underpaid, are the coping methods adopted by poorly paid staff which lead to corruption and poor standards of care. A study which reviewed this type of behaviour reported that staff are often labelled as 'unproductive', 'poorly motivated', 'inefficient', 'client unfriendly', 'absent', or even 'corrupt'. The employer was usually reluctant to initiate official discussions with staff regarding this problem, which appeared to perpetuate these practices. (Van Lerberghe et al, 2002)

The 1979 recommendations for maternal and child health and family planning services in Kenya by INFPA contained many improvements needed in supervision and management of supervision, improvements in staff education and evaluation of training, encouraging participation and suggestion and adding training in teamwork and management to existing programmes. Simplifications of administration procedures and routines as well as increases in regular maintenance of equipment was among other recommendations made in this report. (UNPFA, 1979)

Attempting to discover and prove which strategy would reduce maternal mortality in any setting is not without difficulty. Programmes which target reductions in maternal mortality from direct obstetric causes, usually involve all levels of the health system rather than a single procedure, and they are usually applied to communities rather than individuals. Researchers examined what has been seen as contributing to success in reducing maternal mortality in some developing countries. Their findings were then translated into four models, which allowed the countries using the models to reduce their mortality rates in this target group. By the use of these models, applied, monitored and supervised appropriately, the incidences of maternal mortality in China and Malaysia especially, have been reduced dramatically. (Koblinsky et al, 1999)

MODELS OF SAFE MOTHERHOOD CARE; FEATURES OF SUCCESSFUL SERVICE ORGANISATION			
WHO DELIVERS	WHERE BIRTH TAKES PLACE		
	HOME	BASIC ESSENTIAL OBSTETRIC CARE FACILITY	COMPREHENSIVE ESSENTIAL OBSTETRIC CARE FACILITY
NON- PROFESSIONAL	<u>Model 1</u> Lay provider recognizes complications; family or provider organizes access to essential obstetric care available.		
PROFESSIONAL	<u>Model 2</u> Professional recognizes complications; professional provides basic essential obstetric care; family or provider organises access to essential obstetric care; functioning essential obstetric care available.	<u>Model 3</u> Professional recognizes complications; professional provides basic essential obstetric care; facility organises access to essential obstetric care; functioning essential obstetric care available.	<u>Model 4</u> Professional recognizes complications; professional provides basic and comprehensive essential obstetric care.

Adapted from Koblinsky et al, 1999

Reduction in maternal and child deaths can only be achieved over a long period of time. More importantly, there is a strong link between the health status of the individual and survival.

Chapter 3. Research Methods

3.1. Introduction

The primary purpose of this study was to seek ways of reducing deaths of women during delivery and to improve the survival rates of children aged 0-5years following admission to a provincial general hospital in a major city in Kenya. However, it became clear, through the researcher's work carried out in 1999, that it was impossible to discover the full extent of maternal and child deaths without an accurate reporting system in place. In addition, Nakuru District was too large an area for this type of investigation to be carried out by one person. So this made it more practical to choose an accessible and manageable site to continue this research. It was necessary therefore to focus the investigation on the maternity unit and three of the children's wards in Nakuru Provincial General Hospital.

The present research study hopes to discover improved methods that could provide accurate recording of information, leading to the implementation of appropriate mechanisms to avoid preventable deaths of mothers and their children in the future in the general hospital where the research was carried out. The overall aim of the study was to discover what contributed to these deaths and seek possible solutions to the problems identified; with the intention of implementing appropriate actions to address preventable causes.

In an attempt to achieve the aim of the project, several steps had to be taken.

- Since the discrepancy between various sources of mortality statistics existed, it was essential to establish a meaningful manual database to assess the prevalence of maternal deaths and the reasons associated with these deaths. Similarly a new database was also needed for paediatric deaths in 3 wards in Nakuru Provincial General Hospital.
- The newly designed manual record system required to be piloted in the maternity unit and in the 2 medical and 1 surgical paediatric wards, to

ensure the proposed new system produced the information required and would be usable for clinical audit and other service delivery purposes.

- The piloted manual recording system needed to be introduced into the clinical areas involved in the study for a designated period, so that changes in subsequent phases of the project were based on evidence.

2) Further observations required to be carried out to identify hospital managerial and clinical practice deficiencies, including auditing of infection control policies and practice.

3) It was recognised by the researcher that if changes had to be made to reduce the death rates in mothers and children, the research project would require a programme of implementation. The proposed research would be considered as a type of action research using a particular setting where changes could be planned, implemented and evaluated.

3.2. Action research

One of the key research objective was concerned with the implementation of change, it was considered that an action research approach would be the most appropriate as the approach enables changes to be made and evaluated within an identified location or situation. Action research can be defined as “small-scale intervention, in the functioning of the real world and a close examination of the effects of such intervention. (Halsey, 1972)

Action research is situation specific: problems can be diagnosed in a specific context and solutions are then identified and implemented in that context. The implementation of changes involves a team of relevant individuals who will engage directly and indirectly in a programme of change. Such an approach is therefore said to be collaborative and participative. (Cohen, Manion, 1990), According to Blum,

“the use of action research can be resolved into two stages, namely; a diagnostic stage in which problems are analysed and hypotheses

developed; and a therapeutic stage in which hypotheses are tested by a consciously directed change experiment, preferably in a social life situation”.

Projects using action research methodology are self evaluating cyclically where success and/or failure can be examined. Thereby problems can be further defined or re-defined and appropriate change effected during the course of implementation. Therefore flexibility is inherent in the research process. (Blum, 1955)

Action research as a methodology has been used widely in social science and it offers the flexibility of using both quantitative and qualitative paradigms. The actions are evidence based having a direct effect on the beneficiaries, in this study, the women and children in Nakuru Provincial General Hospital.

In the context of Nakuru Provincial General Hospital, the first phase of the research was to reaffirm the deficiencies identified when the researcher was acting in an observer capacity during the period of orientation. This was achieved by carrying out a further period of observation and auditing of infection control in conjunction with the designing of a new recording system, with a view to identifying necessary changes. e.g. inadequate reporting system on hospital admissions, deaths treatment, modalities; due to aforementioned major deficiency, cause of deaths in both women's and children wards could not be identified, thus hampering any activities which could save lives.

The second phase of the research was to use the observational data obtained from stage one and translate it into research problems, which are;

- 1) How possible is it to introduce a new system of recording which will show details of patient admissions, treatment, and deaths.
- 2) Why death rates are high in the maternity unit and the paediatric wards.
- 3) What causes low staff morale.
- 4) Can the problem of poor standard of hygiene be eliminated.

5) To what extent infection control can be implemented without extra financial costs.

6) To what extent can in-service training improve standards and staff morale.

The third phase is to design a programme of change in the light of some of the research questions posed. A conscious decision was made to implement a small number of changes as too ambitious a programme will undermine possible success and staff confidence.

The following kinds of interventions are specifically relevant for this project:

- a) a spur to action – its purpose is to introduce some changes quickly, e.g. piloting a new admission and clinical records for a specified period to estimate death rates and for the purpose of introducing a more reliable performance indicator instrument in the future
- b) job and organisational analysis seeking to improve professional and organisational efficiency, e.g. nurses' clinical performance in the maternity unit, premature baby unit and in the infection control unit, accountability issues of senior nursing management
- c) change in the on-going system, e.g. using the results in (a) introducing a more permanent and reliable system for health data collection,
- d) problem solving which is an on-going process during the programme of implementation.

Action research relies chiefly on observation and behavioural data. This implies that over the period of the project information is collected, shared, discussed, recorded, evaluated and acted upon and from time to time this sequence of events forms the basis of reviews of progress. Therefore, the process of action is said to be cyclical.

The final stage of the programme for the project is evaluation.

3.2.1. Location of the study

Kenya is in East Africa, situated near the Equator. (Map 1) Kenya is approximately two and a half times larger than Great Britain being 582,644 square

kilometres. Kenya was a British Colony from 1895 until it gained independence in 1963. Much of northern Kenya is plateau, a region of wide grassland. In the southwest, the Kenya Highlands include the two highest mountains, Mount Kenya 17,057 feet and Mount Elgon 14,177 feet. The Nyanza plateau stretches from the highlands to Lake Victoria, which is one of the finest agricultural regions. Lake Victoria is on the border and has its shores in Kenya, Uganda and Tanzania.

The Great Rift Valley runs across Africa from the Zambezi Delta (Mozambique) to the Jordan Valley (Israel). The African Rift Valley runs through Kenya and is considered the country's most distinguished topographical feature. The collision of two parallel plates during the Pleistocene era, pushed hard rock upwards and caused soft rock to fall. This movement formed a wide trench base which resulted in a chain of lakes and extinct volcano cones. The Rift Valley lakes stretch out along a north-south axis from Lake Turkana in the far north to Lake Magadi in the south. Lake Magadi contains the world's largest soda deposits and is completely dry.

The lower parts of Kenya are dry arid lands and thorny savannah. The country is famous for its wildlife reserves, with more than 75% of the world's flamingo population being found in Kenya's Rift Valley lakes.

It was necessary to choose a location that was both accessible and of manageable proportion for the researcher to continue the investigations, hence the choice of the Provincial General Hospital, Nakuru, in the Rift Valley Province of Kenya. The Provincial General Hospital, Nakuru is the referral centre for the Province and the District. As there is no District hospital, this hospital also serves the local community in that capacity. The Provincial General Hospital is a teaching hospital for the Kenya Medical Training College, Nakuru campus and for Egerton University, Njoro.

This study was conducted in the maternity, obstetric and paediatric departments of the Nakuru Provincial General Hospital, Kenya. The researcher was engaged as a participant as she was involved in data collection; planned changes included planning and implementing an in service training programme for qualified nurses

in the maternity and paediatric units. The researcher also took an active part in clinical audit meetings to monitor progress and to modify the programme of change during the studied period.

A description of the maternity, obstetric and paediatric departments in Nakuru Provincial General Hospital is as follows:

The maternity unit consists of a labour ward, a combined antenatal and postnatal ward and the special care baby unit in one building. A few minutes walk from this building is ward 1 where post caesarean section patients are cared for. The obstetric and gynaecological section (ward 4) is housed in a separate building adjacent to ward 1. The hospital does not have an obstetric operating theatre and all surgical cases from these departments use the main operating theatre.

The paediatric departments consist of 2 medical wards and 1 surgical ward, the special care baby nursery would also belong to this department. None of these wards are housed next to each other and are all in separate buildings.

While acknowledging incomplete records, based on the information available for the year 2000, estimated admissions to departments involved in the study were:

Department		estimated number of admissions
Maternity		8,000 resulting in 7,000 deliveries
Obstetric		1,200
Ward 6 paediatric	Medical 0-2 yrs	4,000 plus
Ward 2 paediatric	Medical 2-14 yrs	800 children age 2-5 years
Ward 14 paediatric	Surgical 0-14 yrs	600 children age 0-5 years

It is difficult to estimate the number of staff on these wards as staff are moved at intervals and do not have specialities. The staffing levels on each ward are supposed to be 4 trained staff in the maternity unit on a morning shift, 3 staff for the evening shift and two for the night shift. Other departments will have 2 trained staff mornings and 1 at other times.

While these staffing levels seem very low for such a large hospital, it is normal in the general and children's wards in Kenyan hospitals for the relatives of patients to be care givers and share non nursing care with staff.

3.2.2. Personnel involved in this project

Involved in this study were 4 members of staff from the maternity departments and 3 from the paediatric departments; the staff involved being responsible for disseminating information to their colleagues.

The matron of the maternity unit was appointed as co-ordinator of the project for these departments and responsible for ensuring that the necessary materials for the new records system were available and that staff were aware of their role. This matron was also responsible for tracing patient notes for the maternal mortality meetings.

The Head of the Continuing Education department was appointed co-coordinator of the project to ensure that recording was carried out and the necessary materials available in the paediatric departments. No mortality meetings were held in these departments.

The researcher acts as the principal researcher and administrator for the research project. In conjunction with an in-service training officer, she was responsible for the planning and execution of the intervention programme in the hospital.

In addition the Head of Medical Records was involved to ensure that targets set for changes in the records and reporting were both feasible and attainable.

3.2.3. The research process

In this section the process by which the research was conducted will be described. During the first stage, additional observation was carried out as described on page 38. The information was used at audit meetings, introduced as part of the research. A new system of hospital recording was designed; upon successful pilot in November 1999 the new system was introduced. Data on admission, types of delivery, number of deaths and cause of death was collected for a 3 month period. The effectiveness of this new system will be reported in this chapter.

Following the introduction of this project, the researcher became part of the hospital team where staff attitudes, behaviour and job performance, were observed with the researcher as a participant. The following aspects were observed:

Services delivered to sick children and women who were in labour
Supervision of clinical practice
Staff's attitude and approach to implementing nursing management instructions,
Management relationship between senior nursing and clinical staff

Some of the information obtained from the above was used for the intervention phase where the researcher used the data to interrogate the causes of death and identify solutions for immediate and longer term implementation. The medical superintendent, the matron in charge, departmental and unit matrons', ward sisters and paediatricians were all involved in these audit meetings in order to achieve a common approach. It is understood that these audit meetings would contribute to improvement in clinical care and hospital management.

It was identified that the level of infection was a cause for concern and could be a cause contributing to maternal deaths. Certain practices employed could have been increasing the possibility of the HIV virus being transmitted from patient to patient, and from patients to staff. During the intervention phase of the study, new procedures for infection control were put into place and the results of the impact of intervention will be reported in chapter 4.

The study was evaluated using focus groups comprised of staff from the various departments involved. Questionnaires based on the feedback from the focus groups were devised by the continuing Education dept; this department also being responsible for the distribution and collection of questionnaires, thus ensuring staff were involved in assessing the success of the project.

3.2.4. Piloting the new recording system

The new forms as shown on pages 45, 47 and 49 were piloted for one month to ensure that the data collected from this system served the researcher's purpose and would be viable in the future. The matron of the maternity unit and the staff were involved in the pilot. It was found that the new record was easy to use and provided the required information.

The researcher and a matron employed a crude manual method of pre-ruling the books in an attempt to collect all the required details and information. Once the ruled pages ran out, the poor standard of documentation returned. The data collected over this thirteen week period will not be entirely accurate therefore. In spite of these inaccuracies it should still be possible to use this data to infer patterns and discern problems in various areas.

The new type of record collection included more information. However, compliance with changes in recording was difficult during periods when the researcher was not on the ward. N.B. The inclusion on both forms of 'location' is to enable the area of registration of residence of the patients to be ascertained, as the address is only a Post Office Box number, usually registered in the name of a male relative.

3.2.5. Using new forms for the main data collection

The Provincial General Hospital was surveyed for a period of thirteen weeks between 1st February 2000 and 2nd May 2000 to enable records to be made of all admissions to the maternity and obstetric departments, the nursery unit and the children's wards and to assess accurately the number of maternal deaths during the antenatal, intrapartum or postpartum period and the deaths of children below 5 years of age. The method employed for this purpose was to record the information as soon as possible after the deaths took place. This was carried out with a view to supplying an accurate picture of these deaths and their causes.

This period represents 25 percent of the year and it was during the rainy season when malaria is most prevalent. It is hoped that thirteen weeks, while not a long period for measurement, provides enough data to give some insight into the main factors that contributed to maternal and child mortality within the Provincial General Hospital, Nakuru during that time. However this period is too short to reflect seasonal trends. The relatively short period was decided upon to enable the researcher to carry out the data collection alone, and to cause minimal disruption to the routine of the wards involved. It was regarded as financially impossible to

extend the data collection period as the research was funded by the researcher as part of her degree study.

3.2.5.1 Maternity admissions

The information was collected at the wards' convenience, so as not to interfere with ward routine. Information was collected in the maternity department through the admission book. This book is not pre-printed and relies on staff to rule columns and record the necessary information. This record should include the in-patient number, woman's name, address, age, parity, ante-natal clinic attended, whether she has come from home or has been referred, her diagnosis, where she is sent, i.e. labour ward, main ward, obstetric ward, theatre or discharged home. The staff who admit the patient are also supposed to put their name and qualification. The recording of these details was very poor: many staff seemed unaware that they have a duty to keep clear and accurate records; most staff were also reluctant to put their names to admissions.

The new manual record as shown in Charts 3.1 and 3.2 was designed to overcome the weaknesses identified in the old method.

IP No	Date	Name Address & location	Age	Parity	Gravida	ANC	Came from	DX	Where to
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Chart 3.1 Maternity Admission form: original format

Date of Adm	Time of Adm	IP No	Pre print OBS	Name & Address location	Age	Parity	Gravida	ANC	1 st V Trim	Total Visits	Gestation	From Home if Ref from where	DX & Condition	Xfer to where lab wd main wd theatre home	Name of Adm staff please print and sign + designation
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Chart 3.2 Maternity Admission Record: new format

3.2.5.2. Obstetric admissions, morbidity and mortality data collection

The admission book in ward 4 (obstetric and gynaecological patients) was used to obtain information on obstetric admissions. Ante-natal patients below 28 weeks gestation and abortion patients are admitted to this ward, as are post-natal mothers who develop complications in the community.

Date of admission	IP No	Name and address	Age	Sex	DX	Date of discharge
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Chart 3.3 Admissions Record : original format

In the old books the column marked sex was filled in without fail, though all patients were female.

Date + time of admission	Name + address	Age	Marital status	Obs/gyn	Parity	Gest	DX	Admitted by	Procedure carried out	Condition on discharge	Date of discharge or death	No of days on ward	Discharged by
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Chart 3.4 Obstetric Ward Admissions Record :new format

In the obstetric ward the practice of recording patient details on discharge was also carried out and proved difficult to eradicate. This practice resumed when the matron in charge of the ward was rotated to another ward: the new matron refusing to record patients on admission until visited by the medical superintendent and the matron in charge of the hospital, after discrepancies were noted in daily ward reports to the administration office.

Maternal deaths were not recorded retrospectively in either the admission book or delivery book. These deaths were followed by the researcher through the wards they occurred on, and where possible, the patients' notes were obtained.

Patients' notes are not always traceable due to a number of factors. If the patient was never issued with an in-patient number, the records department refuse to accept loose papers, these then get put aside on a ward and end up scruffy and torn, then often they get lost. Notes sometimes mysteriously disappear and every department blames another for their loss. Missing files are often ones that need

investigating for reasons such as poor outcome or questions of correct management of care.

After the discovery of the disparity between reported and stored data in the district offices, the Provincial General Hospital, Nakuru, and the Ministry of Health, it was necessary to institute a new system of reporting. There was no system of reporting, as such in the Provincial Hospital, Nakuru, neither did many of the ward staff or managers appear to understand the importance of data collection. The new system was made possible by a few committed individuals, who recognized the need for, and the advantages of, having accurate data on which to base the use of the limited resources available at this hospital.

In the light of the statistical discrepancies amongst the sources used, some of the original intentions of the researcher could only be achieved if a more reliable and robust system of reporting morbidity and mortality was put into place. The data collected would then enable the researcher to discern trends, which could be used as the basis for interventions.

3.2.5.3. Delivery ward , admissions morbidity and mortality data collection

The next step was to collect details of the deliveries conducted in the department during the same period. This was done through the delivery book in the labour ward. It was impossible to connect the mother's admission to the outcome of delivery, due again to poor record keeping. This was aggravated by the fact that, at that time, in-patient numbers (the patient's hospital identity number), could only be obtained during certain hours. Files containing the numbers have to be purchased by the clients. Blame could not therefore be attributed entirely to the staff on duty.

During the period measured there were 1,728 deliveries, resulting in a total of 1,744 babies (some multiple births). Due to incomplete recording it was only possible to collect the age and parity of the mother, the mode of delivery, and the condition of the mother's perineum. The sex, weight and fate of the baby and

whether the baby went with the mother, to the nursery or to the mortuary were also recorded. In the case of still births, as far as possible, the type of still birth, whether fresh or macerated (dead >12 hours) was also recorded.

Obs No	Date and time	IP No	Name	Age	Parity	Grav	ANC Where	Time del TOD	Sex	Wt	Apgar	Eye oint	X fer to where	Delivered by
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Chart 3.5 Delivery Ward: original format

Date + time of admit	IP no	Name	Age	Parity	Gravida	ANC yes/no	Gestation	Date of del	Time of del	Mode of del	Reason for C/S	Perinlum state	Sex	Wt	Apgar Score 1/5/10	Eye ointment	Condition	Type of Still birth	Xfer to M/ INF	Any ab norm	Name of delivering staff
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Chart 3.6 Delivery Ward: new format

More information was collected with the new form of recording not all of which is relevant to this research. However certain data collected is presently being used for an on going project aimed at improving outcomes. The project has also attempted to get the actual apgar scores and the reason why a baby scores poorly recorded. Apgar is a score devised to measure a newborn’s vital signs, heart rate, respirations, colour, tone and activity at 1, 5,and 10 minutes; the maximum score is 10, as a baby will either score 2, 1 or 0 points, in the main, the higher the score the better the baby’s vital signs and condition. Knowing why a baby scored poorly should influence subsequent management. Initially the old method of recording found that staff often only put one or two scores such as 3 /1 and 4/5, with no indication of why the score was so poor.

3.2.5.4. Nursery , morbidity and mortality data collection

The babies admitted to nursery were impossible to document with any accuracy due to the practice of not recording a patient's details on admission but waiting until the day of discharge. Consequently any baby who died was never recorded as admitted.

The babies on the nursery unit were recorded by the researcher on a daily basis. It was impossible to know which babies were on the ward from the previous day, as no recording of the days on the wards was made at that time. This made it impossible to know how many babies were admitted over that period.

It was also impossible to know and measure the success or failure of the care given to premature infants, due to the fact that no record was made of the gestation at which they were born, only 'prem' being recorded and often no birth weight was recorded.

The deaths in nursery were found by using a crude manual method, searching the day and night reports in the ward report book. This method, though time consuming, ensured that all reported deaths were collected and therefore this section of the data should be accurate.

Date of admission	Mothers name	Sex of Infant	DX	Wt	Discharged date
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Chart 3.7 Admission details: original format

Date & time of admission	Mothers name + IP No	Mat. Condition	Sex of infant	Gest. born	Birth Weight	DX on admit	Age in days	Days on ward	Procedure treatment	Con on discharge	Dis to where	Date of disch or death
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Chart 3.8 Admission details: new format

Hospital notes are not issued for babies sent to the nursery so that no charge will be made to the family. The mother is charged for the days she resides on the main ward while she feeds and cares for her infant. Recently the ongoing project has

requested that baby notes be specially generated, as currently no records of babies admitted to nursery are available. Previously no record of the mother's in-patient number was made in nursery and without this number the notes cannot be traced. Other information that is being collected includes the baby's apgar score at birth and any relevant antenatal history of the mother.

3.2.5.5. Paediatric wards , morbidity and mortality data collection

On the children's wards, all admissions of children up to 5 years old were collected from all the wards concerned:

Ward 6 (0-2yrs. medical),

Ward 2 (2-12yrs. Medical),

Ward 14 (0-12yrs. Surgical).

All the causes for, and diagnosis on admission, together with all the known reported deaths occurring on these wards, were noted from the admission records and the notes on the wards.

Ward 6, which admits children from 0 – 2 years old, was the best ward in terms of recording the most details of patients admitted. Although this ward did not keep up to date and record children on the day of admission, they did complete records for all patients by the end of the same month, and would not return notes to the records department until they had done so. This ward had the largest proportion of admissions and the highest percentage of children who died. Details of all those who died often appeared grouped together in the admission book at the end of a month, together with their admission details.

The other two children's wards were efficient at eventually recording details of children admitted, usually on discharge, which often resulted in some long stay children having no record until a month or two after their actual admission. Unlike the maternity and obstetric wards these child wards did record deaths in the admission/discharge book.

3.2.6. Auditing of infection control and hospital management

3.2.6.1. *Infection control audit*

Infection control audit was carried out based on a list of 10 items. The purpose of this particular audit was to identify changes necessary

- 1) general ward hygiene
- 2) baby feeding equipment and milk in nursery
- 3) transport of patients' food to the wards
- 4) risk of cross-infection due to patients sharing beds
- 5) cleaning of beds after deliveries
- 6) disposal of clinical waste
- 7) safe, clean practice and a sharps disposal policy
- 8) placement and cleaning of the resuscitaire
- 9) wound care and aseptic techniques and procedures

3.2.6.2. *Management efficiency*

Management efficiency was audited by examining some aspects of efficiency of ward matrons in the maternity unit and the paediatric wards. For example, was the senior staff able to:-

- 1) organise efficient, effective and safe care provision for patients
- 2) organise the ward and available resources, human and others, to maximum efficiency
- 3) monitor which patients received what type of care and the standard of the care delivered
- 4) competence of staff under their authority
- 5) organize staff and tasks to ensure that appropriate care and recording of that care was completed
- 6) report staff and equipment that did not perform to acceptable standard
- 7) ensure that deaths were recorded and the necessary report written
- 8) ensure that staff reporting for the next shift were fully aware of the condition of patients present on the ward, being appraised of care and treatment given and care awaited

- 9) ensure that all staff know when to call for medical assistance and to record the request for medical help
- 10) recognise the importance of, and need for accurate recording
- 11) recognise the need for, and ensure that staff receive regular appropriate in service training and up-dating of their skills.

3.2.7. Interventions

In conjunction with ward staff and managers all the items listed for audit regarding infection control were discussed and solutions offered to the problems identified, this was to enable staff to suggest their own interventions to improve outcomes.

3.2.8. Evaluation

An intervention programme was designed in conjunction with team members. The programme was implemented initially for 12 months. A more detailed account of in service training and other activities are described in chapter 7. The progress of change was evaluated at various stages, initially monthly for 6 months thereafter at 3 monthly intervals for 12 months.

No other changes were necessary since the initial programme was implemented successfully with the desired results. For example, the infection control resulted in the unit becoming cleaner, the staff being more interested in, and understanding of their role, this led to improvements in the standard of care they provided, which in turn improved their morale. The regular review meetings on mortality took place, which resulted in better communication and a more informed ward staff.

The project was evaluated by means of focus group discussions using a semi-structured interview schedule (appendix vi) with all staff involved. The matron of the maternity unit produced her own evaluation report based on her own personal experience of being involved with the project.

During the preliminary investigation stage the researcher acted on her own using both non-participant and participant observation techniques. The initial findings

were shared with senior nursing managers and the medical superintendent in charge of the hospital with a view to engaging them in the process of problem solving and initiating action plans. More important, the involvement of the senior hospital staff offers ownership and that firmly establishes authority for the project. As a result the medical superintendent and the matrons of the maternity unit and paediatric units and the Provincial Matron became part of the research monitoring team. The medical superintendent authorised the setting up of a “research task force” giving appropriate authority to the project.

3.3. Limitations of the research

It should be recognised that this is an academic study leading to an academic award and it should therefore be regarded as a learning process. The activities undertaken could be seen as too ambitious. However, it was felt that the research findings would be immediately applicable to the work of the researcher as a health professional working in a developing country.

One of the problems is that the new admission and clinical records have not been subjected to more rigorous testing even though the results could be used for a short intervention study. Furthermore, the period of data collection could be subject to severe criticism as the causes of deaths in a three month period from two clinical areas cannot be said to reflect an annual pattern. Ideally, the new databases should be piloted for a longer period and the main data collection should be on-going. With the commitment of the medical superintendent and the research task force, the database has been revised and collection will continue until the year 2006.

Similarly, the extent to which the intervention programme will be able to achieve a sustained reduction in maternal and child mortality remain to be seen. The real benefit to the patient care cannot be fully evaluated until the end of Year 2006 when the data collection is completed. However, the researcher is confident that even though weaknesses exist the baseline data for mortality in these two clinical areas can be used for comparison.

There was a tendency for the researcher as she was a participant in the researched location to personally intervene in specific situations. Suspicion from staff about the researcher investigating clinical practice could have subverted the process of data gathering as in certain circumstance “Hawthorn effect” might have been experienced and might have prevented staff from being honest with the researcher. It was the impression of the researcher that matrons who were involved in the project, particularly the matron in charge of the maternity unit gave every support needed to the project and personally took part in various aspects of the project.

In spite of the possible criticisms cited above, it is believed that there has been an immediate impact on clinical standards and staff appears to have ownership of the project.

Chapter 4. Summary of findings

4.1. Introduction

This study was conducted in a major provincial general hospital in Nakuru, Kenya over a period of 2 years. The researcher was engaged as a participant as she was involved in data collection; planned changes included planning and implementing an in-service training programme for qualified nurses in the maternity and paediatric units. The researcher also took an active part in clinical audit meetings to monitor progress and to modify the programme of change during the studied period.

.This chapter reports on:

- (a) The effectiveness of the new record system as an auditing tool..
- (b) In addition, it will also report on maternal and child (0-5yrs) deaths during the period 01.02.2000 to 02.05.2000, based on a new system of recording piloted during the study period.
- (c) The organisational aspects of Nakuru Provincial General Hospital.
- (d) The causes of infection in the maternity wards including the infection control procedures in the same hospital.

Since intervention was part of the research, the results of the interventions will be reported in this chapter together with the evaluation data. Findings from non-participation observation during various stages of the project will also be summarized.

4.2. The new record system as an effective clinical audit tool

One of the research objectives was to address the need for a new system of recording, as it was found during my induction period that records were poorly kept; insufficient data was included and that staff did not understand the purpose of keeping records. It was found at the end of the main data collection period , the new system yielded some of the essential hospital data which did not exist in Nakuru, Provincial General Hospital previously.

In general the new system would enable the research team to understand the workload of the maternity unit. Based on the information obtained during the 3 month study period, 1835 women were admitted to the unit, of these 1835 women 1729 women delivered their babies, resulting in 1743 births (some multiple births). The remaining 106 women being either discharged home or transferred With these 3 months admission figures, if taken as average means that the unit would admit approximately 610 women monthly. This raises the question whether the unit is able to manage the number of deliveries safely. The admission records also help to predict the number of trained midwives that would be required in the future.

4.3. Deliveries and outcomes

	Type of delivery	Frequency	Percent	Valid percent	Cumulative percent
Valid	Spontaneous vertex	1310	75.2	77.7	77.7
	Caesarean Section	275	15.8	16.3	94.0
	Breech	50	2.9	3.0	97.0
	Born before arrival	34	2.0	2.0	99.0
	Face to pubes	15	0.9	0.9	99.9
	Compound	1	0.1	0.1	99.9
	Vacuum	1	0.1	0.1	99.9
	Total	1686	96.7	100.0	
Type delivery unreported	Total	57	3.3		
	Overall Total births	1743	100.0		

Table 4.1 Delivery pattern 01.02.2000 to 02.05.2000

Of the 1743 births reported, in 57 cases the type of delivery was not reported as shown in Table 4.1, leaving a total of 1686 deliveries where the mode of delivery was reported; there were 376 complicated deliveries: 275 women required a caesarean section, 50 were breech deliveries, 15 face to pubes and the remaining 2 were compound and vacuum deliveries.

Further, the information shown in Table 4.1 would enable the research term to ask questions at audit meetings. Legitimately one needs to raise the issues how complicated deliveries were managed by Nakuru Provincial General Hospital, how many deaths were associated with abnormal deliveries. The information contained

in the table also raises the question of how competent are the staff in dealing with abnormal deliveries, the correlation between clinical competence and death rate of mothers and surviving babies.

Further analyses were carried out on the relationship between age of the mother and survival and weight of baby. The age of the mother was given for only 1395 of the women admitted. These analyses are given in Appendix xiii, xiv.

The record of which deaths occurred during the period of data collection provided a means for checking the reliability of the new record system introduced at Nakuru Provincial General Hospital. For example, 8 maternal deaths occurred between 1st February and 2nd May 2000, (which is equivalent to 436 per 100,000) which would concur with the Kenya Demographic Health Survey. The research team is therefore confident that the new record system could be used in future. In addition the data obtained from the study allows the research team to locate where the deaths occurred in Nakuru Provincial General Hospital. For example, 2 women died in the intensive care unit caused by haemorrhage. Two others died post natally in the main ward following macerated stillbirths, one of these died of sepsis. These four deaths raise the problem of care management during delivery and help to identify issues whether these deaths could have been prevented. A further 4 deaths occurred 2 in the surgical ward (Ward 1) and 2 in the obstetric ward (4). In the surgical ward one of the women died 5 days post natal of anaemia and undiagnosed malaria, the other woman 8 days post natal of suspected thrombo embolism. The remaining 2 maternal deaths in the obstetric ward were due to serious complications such as septic abortion and eclampsia. The information obtained would necessitate further investigation of the competence of the doctors and nurses on these wards.

Although the record system proves to be a useful tool, some of the staff were found to be incompetent in completing the record. None of the deaths of these women was registered as a maternal death in the records department at the hospital. Only one death on the Intensive Care Unit and the two on Ward 4 were recorded in the admission /discharge books of the wards on which they occurred. No report of a maternal death was written for any of these eight women. This

shows that the staff were ignorant of the need and importance of collecting accurate hospital data.

The new system allows the research team to determine the outcome of the babies who were born to mothers involved in the study. For example,

Of the 1743 births recorded, 106 were stillbirths. As shown in Table 4.2 this is 6.1% of the total deliveries. Of these stillbirths, 25.5% (n=27) were macerated (dead more than 12 hours), 47% (n=50) were fresh and 27.5% (n=29) were not classified as to type of still birth.

Type of stillbirth	Frequency	Percentage
Macerated	27	25.5
Fresh still birth	50	47.0
Unknown	29	27.5
Total of all types	106	100.0

Table 4.2: Frequency and percentage of stillbirth types

The type of stillbirth was related to the mode of delivery, with fresh stillbirths being more common when the mode of delivery was by Caesarean section or breech. This is probably related to the fact that a Caesarean section would more likely be carried out on a mother who was experiencing problems intrapartum. A delay in delivery due to the time factor in either the mother or her family seeking help, or the delay at the health facility in taking appropriate action early enough, could result in a still born child.

The data allows the research team to further investigate the relationship between types of stillbirths and other variables such as parity, mothers' age and the mode of delivery it was found that:

a) the more babies the mother already had, the more stillbirths are macerated rather than fresh stillbirths as shown in Figure 4.1. Differences between parity groups are significant (P-value of 0.02 with chi-square test).

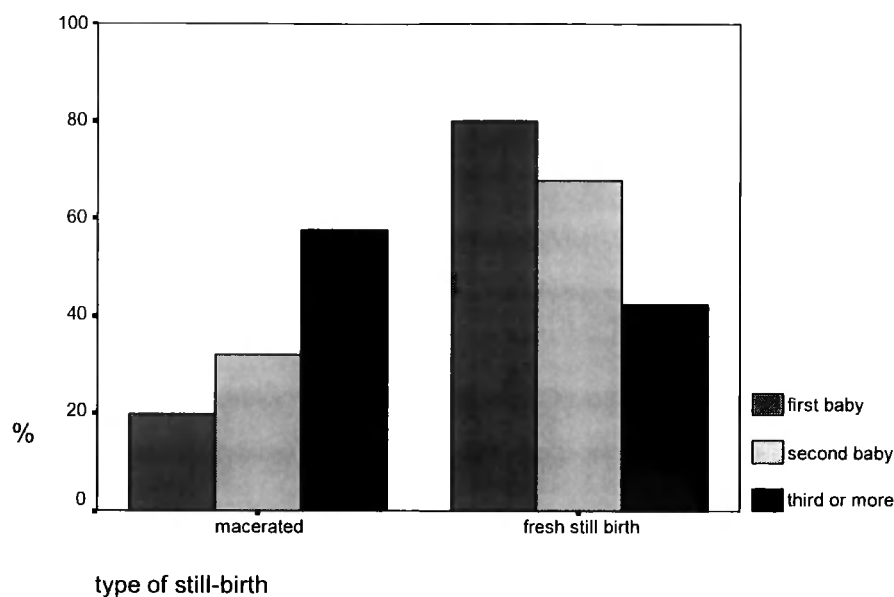


Figure 4.1:Type of still-birth v parity

As a macerated foetus has been dead for more than 12 hours, this could indicate that multiparous women are less likely than first time mothers to seek help at an early stage. It is possible that these mothers delay seeking help or attending a health facility more promptly due to lack of money, or other family responsibilities and commitments. For example, mothers with a number of other children may feel they do not have to attend antenatal clinic, may not be financially able to afford care as they will see as their priority the need to feed and care for their other children. Women need money to be admitted, and as it is common practice for husbands to work away from home the woman may have to wait for him to send money to pay for admission or care, this takes time to arrange. Women need to be educated on the importance of attending for antenatal care and how it can detect problems that may avoid poor outcomes for themselves and their unborn child.

b) It was found that the mode of delivery has a significant relationship to the type of stillbirth as is shown in Figure 4.2 and Table 4.3

Normal vaginal deliveries have almost equal numbers of both fresh and macerated stillbirths, while delivery by Caesarean section and breech births contributed to a much higher proportion of fresh rather than macerated stillbirths. As previously mentioned, the higher rate of fresh still-births occurring in the Caesarean section and breech groups could be explained by the mother experiencing complications intrapartum, at which point a delay in expediting delivery may well result in a poor outcome.

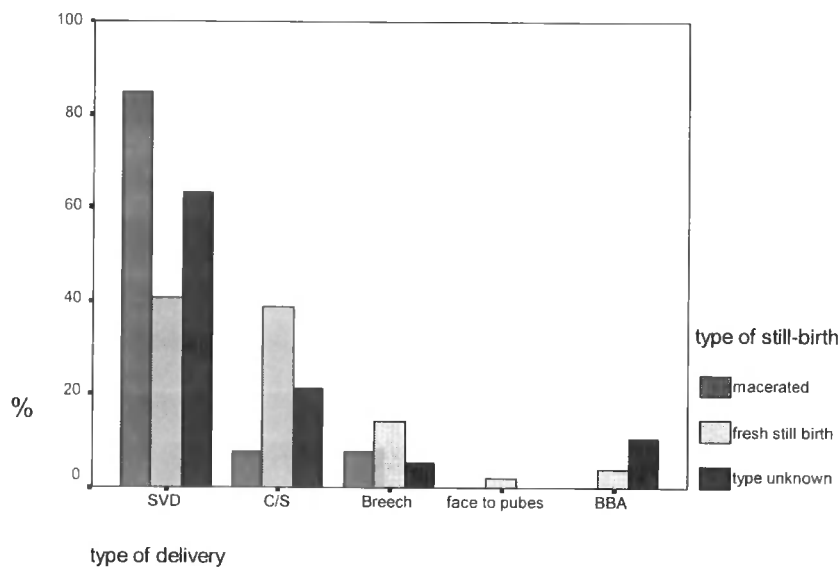


Figure 4:2: Relationship between type of delivery and type of stillbirth

Type of delivery	Type of stillbirth			Total
	macerated	Fresh stillbirth	Type unknown	
SVD	22	20	17	59
C/S	2	19	6	27
Breech	2	7	3	12
Face to pubes	0	1	0	1
BBA	1	3	3	7
Total	27	50	29	106

Table 4.3: Cross tabulation:type of delivery * type of stillbirth

This relationship between type of delivery and type of stillbirth can be used to audit the effectiveness of care that women receive from admission to delivery; fresh stillbirths should be interrogated to determine the standard of care and whether the hospital provided timely, appropriate and adequate care; if not at what point were the hospital negligent in provision of care. For example, at which point did the fetal heart show signs of distress or stop in the 20 fresh stillbirths that were SVD? Was this recorded, was there delay in attending to the mother, was any action taken to expedite delivery. In the case of the 19 fresh stillbirths delivered by caesarean section; why and at what time did the midwife call the doctor; how prompt was the doctors' response; was the operating theatre available, what was the time between the decision to operate and delivery. This type of interrogation is to determine where the fault lies and allows administrators to provide necessary care to correct deficiencies identified effectively.

The data obtained from this study could also be used for academic debate on inequalities in health care in both the developed and developing worlds. However, it is outside the limits of this thesis, it is proposed therefore to place some of the analysis in the appendix for those readers who are interested in this area of debate. Appendices xiii, xiv, xv.

4.4. Child deaths 0-5 years

A total of 1189 children aged 0-5 years were admitted to the 3 paediatric wards in Nakuru Provincial General Hospital between February and April 2000, as shown in Table 4.5 and Figure 4.7. The number of infants, 0-12 months of age, requiring hospital treatment was significantly higher than for any other age group.

	OUTCOME			
	Alive	Dead	Absconded	Total
Ward 2	169	13	9	191
Ward 6	885	145	0	1030
Ward 14	135	8	1	144
Total	1189	166	10	1365

Table 4.5: Number of children admitted by ward

Ward 2 is a medical ward which admits children from 2 years old. Data for children up to 5 years of age was collected

Ward 6 is a medical ward admitting infants and children up to 2 years old.

Ward 14 is a surgical ward which admits children from birth upwards. Data for children from birth to 5 years of age was collected.

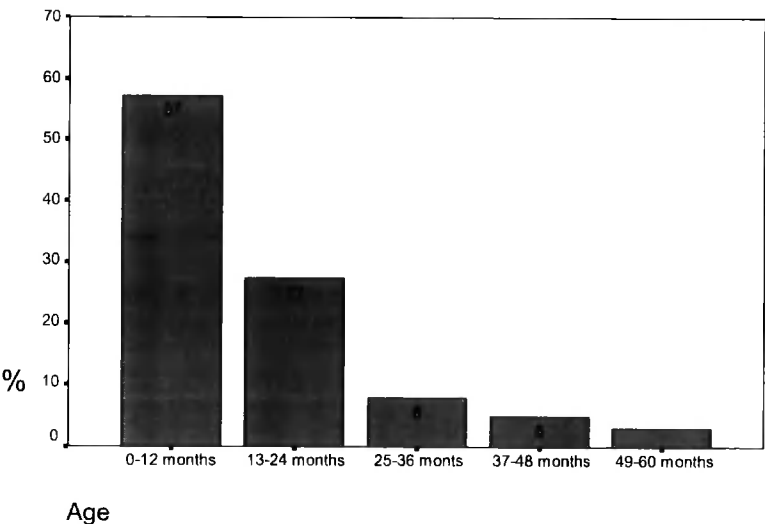


Figure 4.7: Admission v age of child in percentage

Of the children admitted, the majority were male (53% against 47% females)

There is no evidence that the gender of admitted children is associated with age (Chi-square test, P-value=0.29) There was no significant difference found between age and gender for the admissions.

The mortality for Ward 6 is the highest: 145 (16%) infants died on the ward during the period studied whereas the mortality rates for Wards 2 and 14 are 7.7% and 6% respectively. The collective mortality rate for Ward 6 is 14% as shown in Figure 4.8

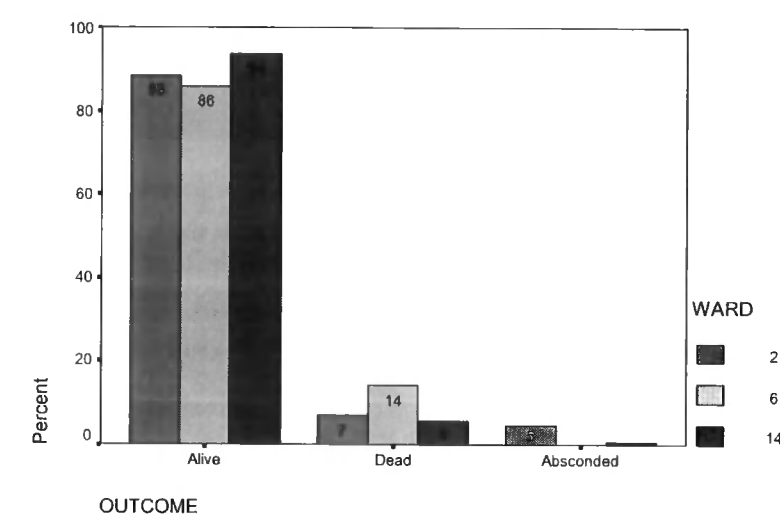


Figure 4:8: Percentage of alive/dead for the different wards

Figure 4:8 demonstrates the survival of children ward by ward. The higher number of deaths in Ward 6 provides evidence of the increased vulnerability of the children in this age group (birth – 2years).

Figure 4.9 shows that if the mortality of children between 0-12 months is added to that for children aged 13-24 months, nearly 30% of all children admitted to the ward died during the period under review. This is shown to be statistically significant with a p-value of 0.001.

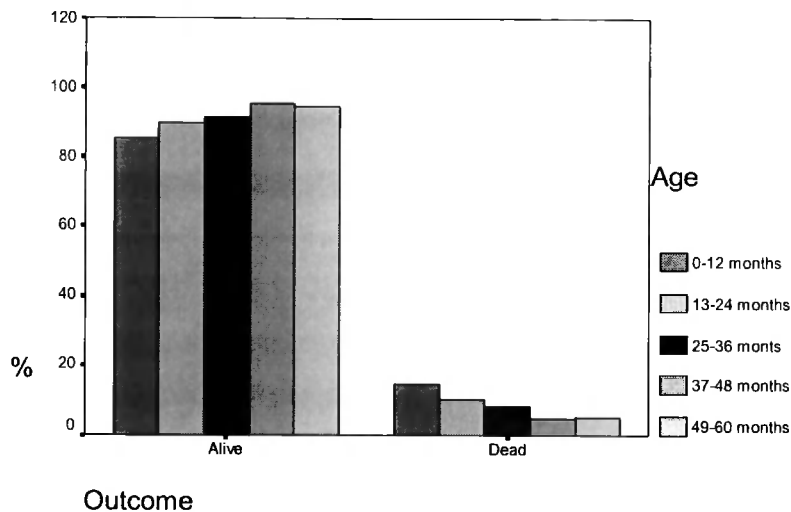


Figure 4.9: Relationship between age of child and survival rate

It can be said that the most vulnerable group is the youngest, i.e. those below 12 months of age. This is clearly shown in Figure 4.10 when comparison is made between the figures for children of 0-12 months and those of 13-24 months.

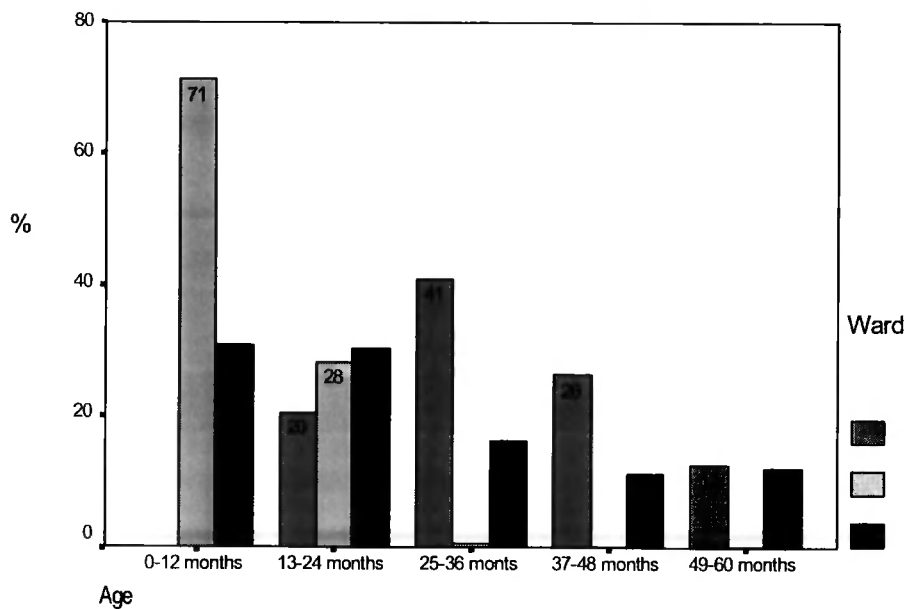


Figure 4.10: Percentage of deaths in each age group

The survival rate was further examined and revealed that males are more likely to survive than females. The association between gender and survival rate is significant (Fisher's exact test, P-value=0.04) as shown in Figure 4.11. More males than females were admitted, though more females than males died, which could indicate that males are admitted with less serious conditions than females, hence their better chance of survival. Another explanation would be that greater effort is made when seeking help and treatment for males than for females.

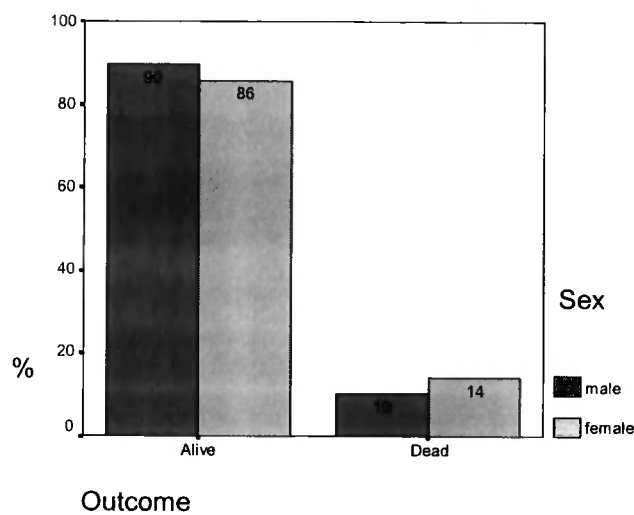


Figure 4.11:Comparative death rate in percentages between male and female

Of the children who died, 30% were admitted with malaria, 32% with bronchial pneumonia. Of the children who were alive, 45% were admitted with malaria, and for example, 2% were admitted with malnutrition. Malnutrition is a cause of admission resulting in relatively more deaths, while malaria is a cause of admission resulting in relatively fewer deaths.

The five most frequent reasons for admission of children were malaria with bronchial pneumonia (172 admitted), bronchial pneumonia (170 adm.), malaria (146 adm.), malaria with gastro-enteritis (68 adm.) and burns (47 adm.)

The following Figure 4.12 concerns the relationship between illness and age. For each age group the percentage of children admitted with malaria, bronchial pneumonia, gastro enteritis malnutrition and other reasons is shown.

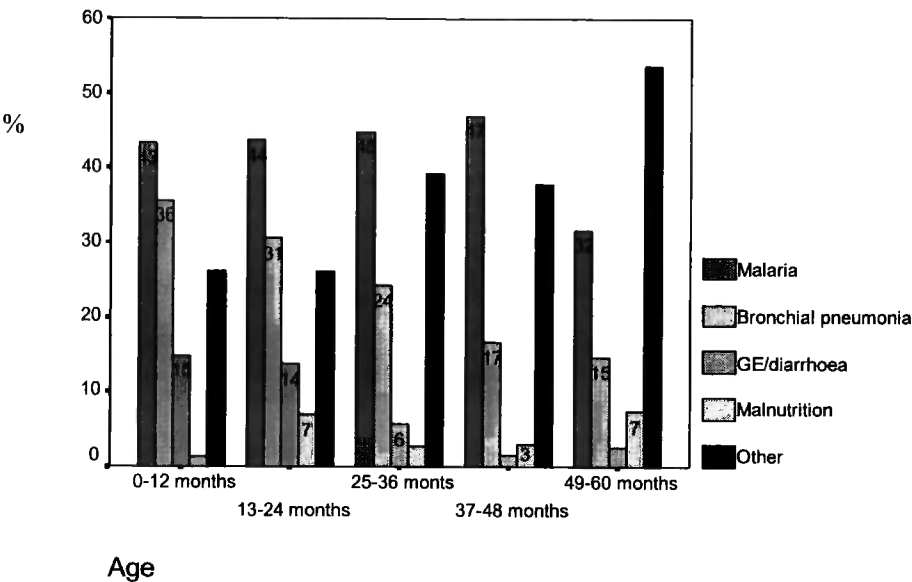


Figure 4.12: Relationship between age and reason for admission in percentages.

The occurrence of malaria is similar over different age groups. Bronchial pneumonia becomes a less common reason for admission as children get older. For children under 2, gastro-enteritis is more common than among children over 2.

Figure 4.13 shows the survival of children admitted, divided into the five categories malaria, bronchial pneumonia, Gastro-intestinal/diarrhoea, malnutrition and other causes. These categories are the conditions the children were admitted with. The actual cause of death is not reported on the wards involved, as no autopsies are carried out.

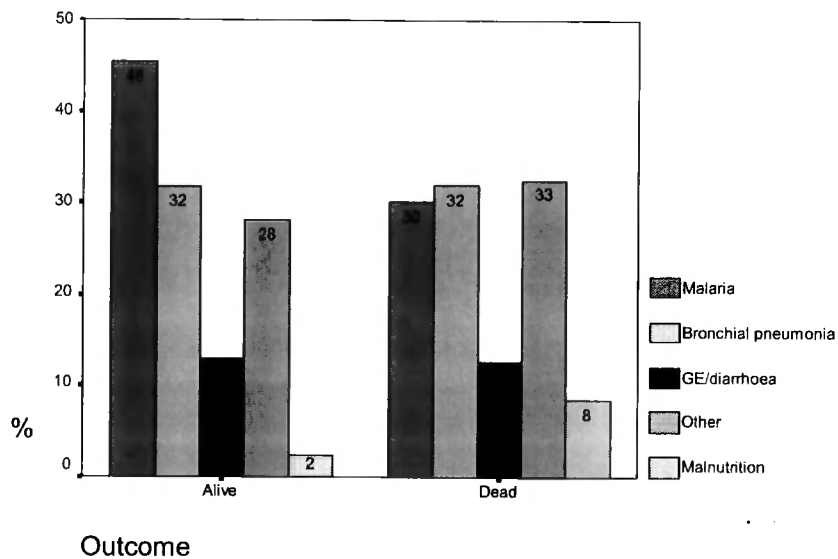


Figure 4.13: Percentage of survival in each age group

4.5. Management standard of care in maternity and paediatric units

As indicated in a UK publication *Why mothers die* it is not possible to investigate the standard of care associated with maternity care when individual case notes are not traceable.

One cannot compare the standard of equipment and fabric of hospital buildings in developed and developing countries. The basic minimum is provided for patients in Nakuru Provincial General Hospital: a bed but without bed linen; home made incubators for premature babies; rusty bedsteads; buckets for carrying water, waste material and excreta.

4.6. Infection control

There are a number of practices which might be directly related to the problems of the survival of mothers, babies and children. Among those observed by the researcher are:

- dirty wards with walls smeared with blood and excrement
- dirty beds
- the location of infant resuscitation equipment situated next to the sluice
- failure to clean and sterilize resuscitation suction tubes after use
- failure on the part of doctors and nurses to observe aseptic techniques
- the use of the same sinks for hand washing and for the disposal of waste and clinical matter

Many of the failures in clinical practice could be eliminated without additional expenditure. Lack of supervision from the senior staff to ensure safe practice played a significant part in the poor standard of care.

Chapter 5. Analysis of maternal deaths in Nakuru Provincial General Hospital

“A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of the pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.”

WHO:ICD-10 (1992).

5.1. Maternal deaths in Nakuru

Having adopted a definition, what are the causes and why should it be necessary to measure maternal mortality? The WHO considers it is important to measure maternal mortality for the human and social development it reflects, as it is considered “a particularly sensitive indicator of inequity.” It provides a picture of the status of women, their access to health care, and the adequacy of the health care system in responding to their needs.

Exactly how many of these deaths occur in Nakuru is not possible to say with any accuracy, as no definite details are available. However, it is possible to determine with a degree of accuracy how many of these deaths occurred and the causes of those deaths, at the Provincial General Hospital during the period measured by the researcher; 01-02-2000 to 02-05-2000. The deaths that are known to have occurred during that period will be analysed and discussed.

The most common direct causes of maternal deaths in Kenya, (Figure 5.1) are haemorrhage, sepsis, hypertensive disease in pregnancy and abortion which shows some similarities with the global picture. (Figure 5.2) Anaemia and malaria are shown to be major indirect causes of death in the rural hospitals of Kenya. (Figure 5.1). The data obtained from my study appear to reflect some of the official records published by the DoH in Kenya in 1997

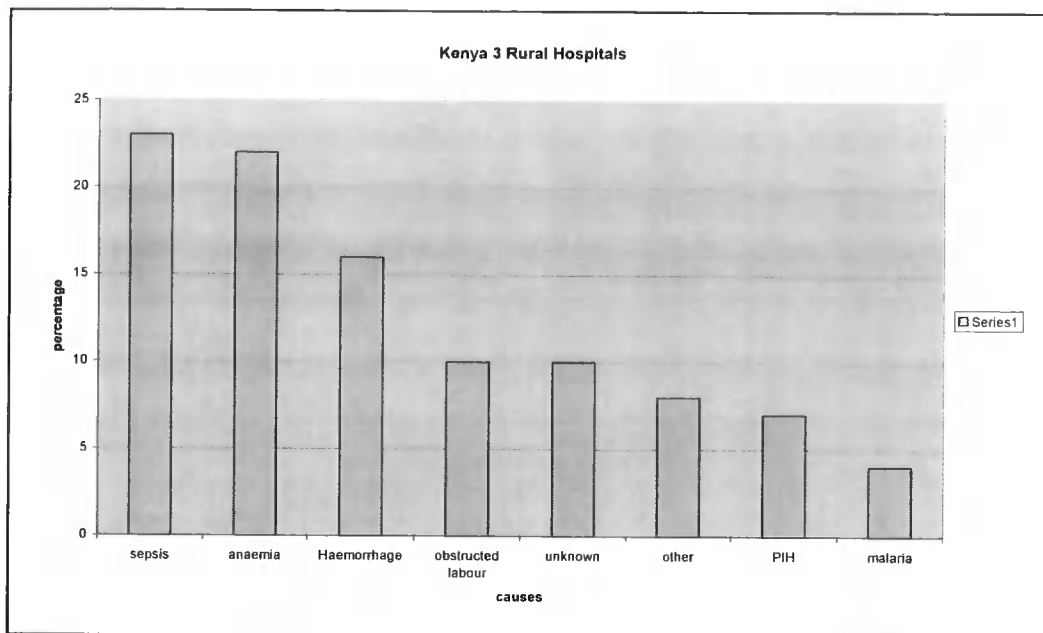


Figure 5.1: Causes of deaths in 3 rural hospitals in Kenya for 1989-90

Review of Safe Motherhood. M o H Kenya 1997.

Note that Figure 5:2 does not include abortion in the causes of death. Abortion is illegal in Kenya. This cause is probably included with sepsis and haemorrhage

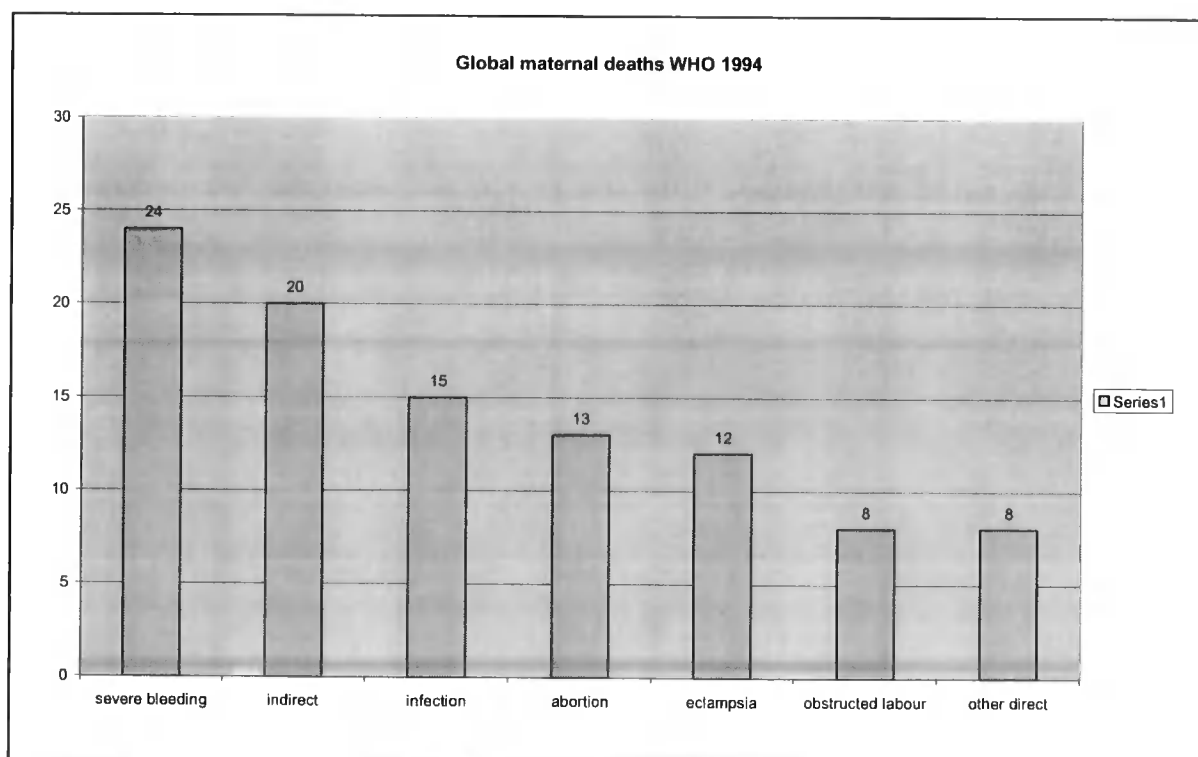


Figure 5.2: Global maternity death

WHO 1994

5.2. Maternal deaths and standards of recording in Nakuru

As Kenya does not have a robust central system of national statistics and registration in regard to cause of death, it is not possible to give numbers and causes of maternal deaths with any accuracy. There have been attempts to gauge or measure these deaths in certain areas of the country, at specific sites and geographical areas. These reported or estimated causes of maternal deaths from three sources in Kenya were used by the researcher to see if any of these sources show the same patterns. Different methods of calculation were used to derive these estimates. The method used to collect the estimates and causes from the 3 rural hospitals is not known. Boerma and Mati derived their estimates from 'networking' and Juma and Odiyo collected their estimates from a retrospective examination of patient notes within Nakuru Provincial General Hospital covering the years 1994-1998.

Although the researcher criticizes the records kept by Nakuru Provincial General Hospital, the pattern of maternal deaths in the hospital does not show major differences from the figures in the report of the Ministry of Health, Kenya for 1997 (Figure 5.1) and the global analysis by the WHO. (Figure 5.2) Juma and Odiyo show that haemorrhage is still the major cause of death in Nakuru (Figure 5.3) which corresponds with the composite graph shown (Figure 5.4)

Adequate resources to provide safe care for pregnant women, which is available in the developed world, is not within the grasp of Kenya. The data gathered by the researcher during the 13 weeks highlights additional issues. Many pregnant women admitted to the labour ward were anaemic and a high proportion of these women also suffered from malaria. As a result the probability of surviving a haemorrhagic complication during childbirth and immediately afterwards is considerably reduced. If a programme of antenatal care is provided, such illnesses and chronic conditions can be treated, thus reducing mortality. The value of such interventions needs to be investigated.

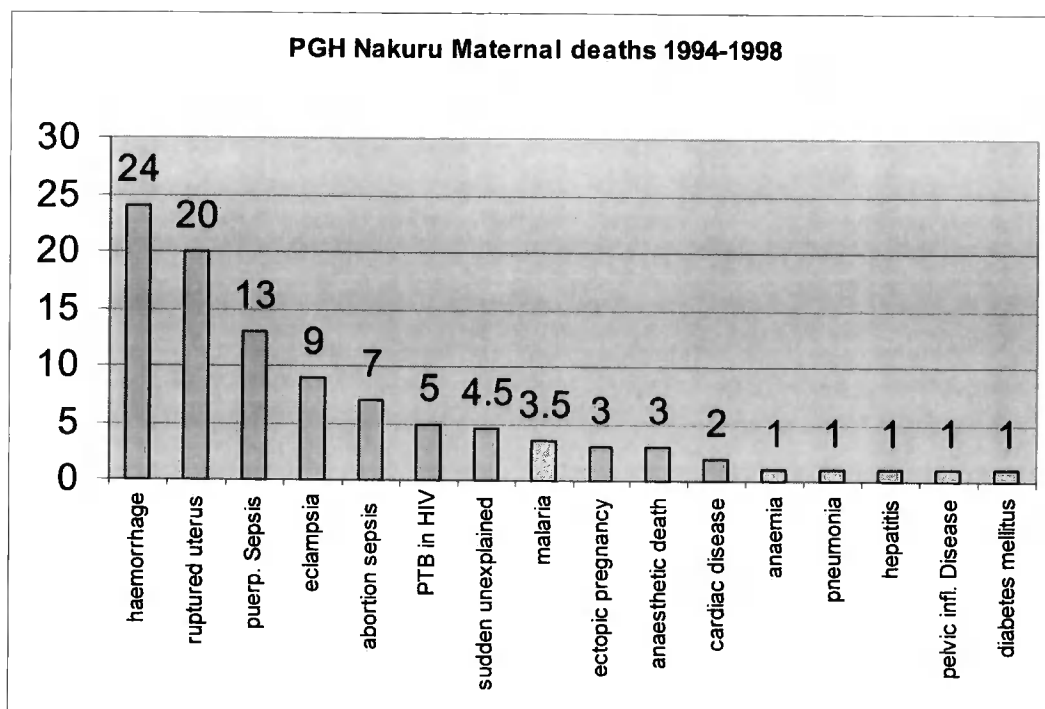


Figure 5.3: Maternal deaths. Provincial General Hospital, Nakuru. (1994 - 98)

Retrospective study by Juma and Odiyo. 1999

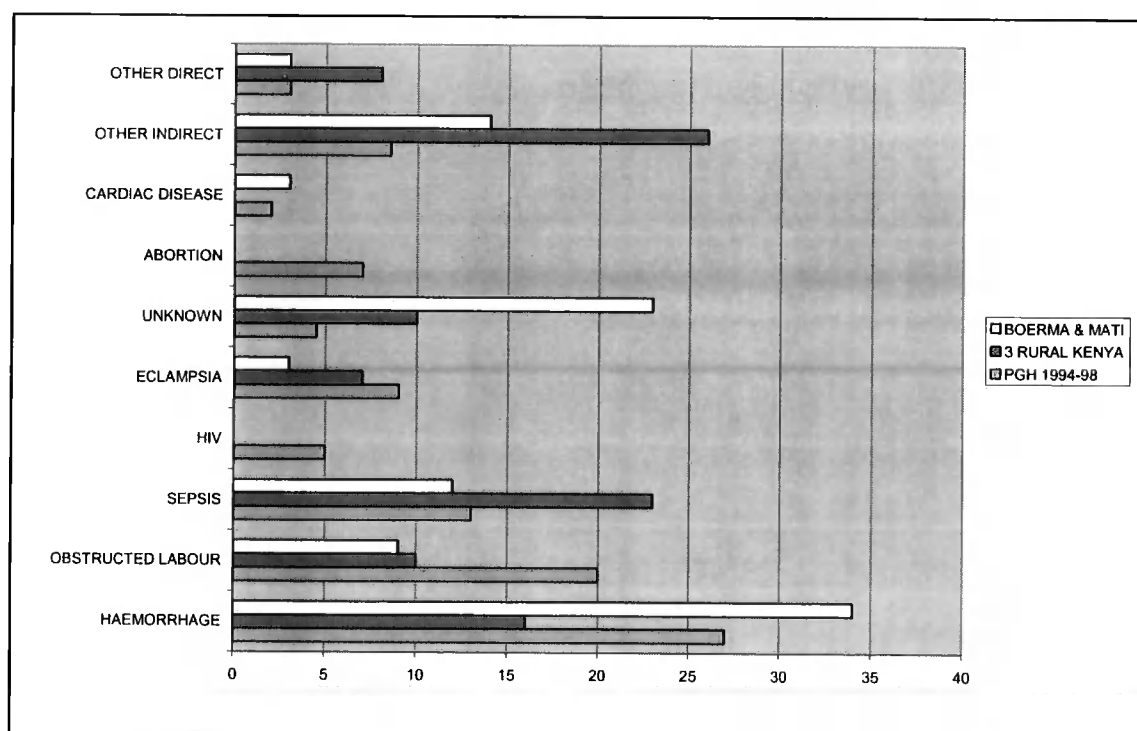


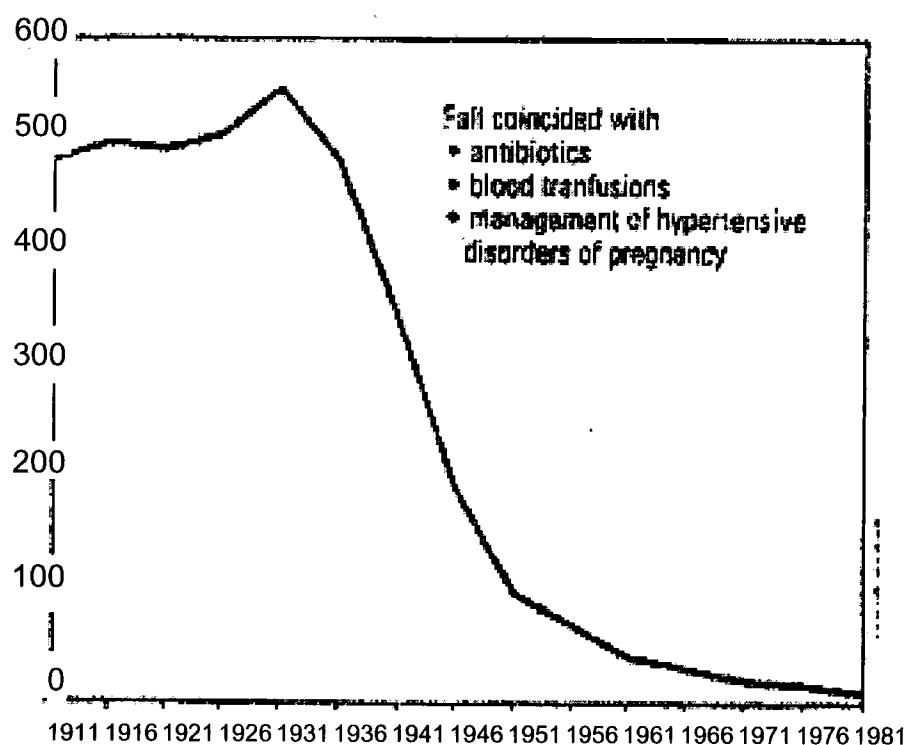
Figure 5.4: Comparison of causes of maternal deaths.

Boerma, Juma and MoH Kenya

5.2.1. Can maternal deaths be prevented

If the UK trends in maternal mortality between 1911 – 1981 are examined it is clear that many causes leading to maternal deaths can be eliminated. (Figure 5.5) For example, during the 1940s the introduction of antibiotics and the use of blood transfusions continued to bring down death rates. Medical advances in recent years together with improved management of maternity care have sustained the lowest death rates for many years. Currently in the UK 6 women in 100,000 die in childbirth per year.

Figure 5.5. Trends in maternal mortality, England & Wales, 1911- 81



Adapted from Macfarlane A & Mugford M. Birth counts, statistics of pregnancy and childbirth. HMSO London 1984

In Kenya the situation is completely different. The availability of antibiotics may have helped reduce the incidence of sepsis but the evidence is not available due to insufficient data. Likewise, major issues like underlying problems such as chronic malnutrition and how it affects the health of women in Kenya can not be fully assessed.

While the lack of resources in the Kenyan health system plays a significant part in the survival or otherwise of women during childbirth, careful examination of maternity services and practices within a large district general hospital might provide an action programme to save lives. For example, sepsis was the third most prevalent problem among women who died in the Nakuru Provincial General Hospital between 1994 and 1998.(Figure 5.4) A similarly high incidence is recorded in the 13 week data gathered by the researcher. i.e. 12.5% of women died from puerperal sepsis and 12.5% died as a result of septic abortion. (Figure 5.6)

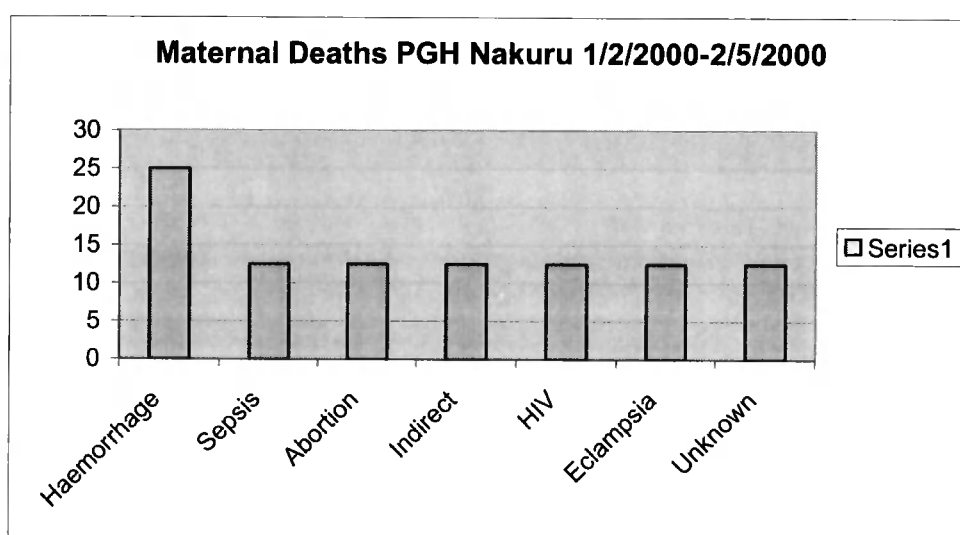


Figure 5.6: Causes of maternal deaths in % Feb. 2000 to May 2000

There is a paucity of information regarding the number of women who have died due to their pregnant state at Nakuru Provincial General Hospital. This study will therefore use the only other available source specific to maternal mortality in the same hospital for comparison; the retrospective study carried out by Juma and Odiyo, 1999. (Figure 5.3)

As can be seen in Figure 5.6, during the period measured by the researcher from February to May 2000, two women died of sepsis, one of post natal sepsis the other of septic abortion, this is equal to 25% of the total deaths occurring which appeared to concur with the retrospective study carried out in Nakuru between

1994-1998 as shown in Figure 5.4, it can be seen that puerperal sepsis and abortion sepsis accounted for 20% of the deaths examined. Death from puerperal sepsis has by and large been eliminated in developed countries mainly by the use of good aseptic techniques by health professionals. One of the possible explanations for the 2 deaths caused by infection between February and May 2000 is failure on the part of nursing and medical staff to observe the basic principles of aseptic procedures.

5.2.1.1. *Analysis of preventable deaths in Nakuru*

Quantitative analysis has been presented in chapter 4. During the study period, 8 women died in the maternity unit at Nakuru Provincial General Hospital. In addition to the quantitative analysis presented in chapter 4, I propose to examine these 8 deaths qualitatively which will highlight some of the clinical management problems in Nakuru and the need for change.

Of the 8 deaths in Nakuru, 6 of them died from clinical complications, and only two deaths were caused by underlying conditions, one untreated malaria and anaemia the other, tuberculosis secondary to HIV. The factors referred to by the WHO should be taken into account when analysing the causes of maternal deaths, but the causes of the majority of deaths in the maternity unit in Nakuru could have been prevented. I propose to give a brief analysis of these 8 deaths.

2 deaths occurred in each of 4 wards.

In the Intensive Care Unit (ICU)

ICU both deaths were due to haemorrhage.

CASE ONE -Placental abruption

The patient was a 27 years old woman, who had made two antenatal clinic visits to an unnamed clinic in Nakuru during her 4th pregnancy.

She was admitted to the maternity unit with acute abdominal pain and bleeding, she was 34 weeks pregnant. The time of her admission was not recorded. The patient was seen by a doctor on the same day. The amount of time spent on the ward not recorded. Later the patient developed pallor and breathlessness. She was then transferred to ICU. The time of transfer was not recorded. The patient's condition deteriorated as bleeding became more severe. Blood was grouped and cross matched no details were given whether the patient was transfused. The patient died 14 hours after her transfer to ICU. No monitoring of the foetus was recorded as being carried out on the maternity ward or ICU.

Ideally this woman should have been seen immediately on her arrival and her vital observations such as blood pressure, pulse and blood loss recorded. If a blood transfusion was necessary, an infusion of plasma expander should have been administered while this patient was awaiting her blood being grouped and cross matched for a transfusion. Her observations should have been carefully monitored, to detect any changes in her condition. The foetus should have also been monitored. This woman's death was preventable.

The care given to this woman was negligent, in particular the nursing staff appeared to be incompetent. If timely and appropriate care was given as described above both the mother and possibly her child could have been saved. No record was made of the doctor informing the consultant and being advised on correct procedure. No record was made by midwives regarding emergency treatment provided to this woman who was in a life threatening situation, one can therefore assume none was prescribed. Due care was not given to both the mother and the child.

CASE TWO - Prolapsed uterus.

An 18 year old married girl was admitted after delivery of her first birth which was a full term infant delivered at the municipality maternity at 11.30 am. She had been given an episiotomy which was sutured. The patient had 100 mls blood loss during delivery. At 12.15 pm the patient started bleeding heavily. An injection of oxytocin was given prior to the patient being transferred to PGH; the municipal

maternity has no doctor on site. She was admitted to the maternity ward and seen by a house doctor 30 minutes after arrival. This doctor ordered blood and 4 units of whole blood were transfused. The doctor also attempted to return the inverted uterus back into its normal position and left the patient on ward. At 6pm the patient was found to be in a collapsed state and was transferred to ICU, she died 3 hours later as she could not be resuscitated.

The municipal maternity behaved correctly and the patient was transferred in good time. The junior doctor at Nakuru Provincial General Hospital was not competent in managing this case and neglected to inform his consultant regarding this patient. The patient was not managed well on the maternity unit as nurses had only carried one set of observations. This patient should have been transferred to ICU immediately on arrival at the hospital and seen by the consultant, she would have required a hysterectomy if the bleeding could not be arrested. The patient should also have been prescribed intravenous antibiotics. She was transfused and then suffered inadequate nursing care and poor medical management. This patient was not recorded as being admitted at the maternity unit until 2 days after she died and she was never given a hospital number, therefore no record will be held in medical records department. The delay in treating this patient as an emergency and the inadequate nursing and medical care she was given led to this woman's death.

Blood for transfusion is not always available, surgical patients for planned surgery usually have to supply donors for the units they require, but this was an emergency and blood was made available from the blood bank. Plasma expanders for use until blood can be obtained are not available in the Government hospitals in Kenya. Treatment to prevent death from haemorrhage requires prompt, available blood for transfusion, equipment and competent staff available to provide necessary care. Neither of these women needed to die.

Deaths in the obstetric ward, 1 died of septic abortion, the other of eclampsia.

CASE THREE - Septic abortion

This patient was 17 years old and admitted with a high temperature of 39.6, semi-comatose and complained of severe abdominal pain. No indication was given of

when she became sick and the relatives who brought her to the hospital could give no information regarding when she had aborted or gestation of the pregnancy. The patient was given intravenous penicillin antibiotics and relatives given details of a combination of intravenous antibiotics to purchase. The patient failed to respond to treatment and died after 30 hours on the ward. No tests were carried out to ascertain infecting bacteria or culture and sensitivity to determine the most appropriate antibiotic for treatment.

Ideally, a greater range of intravenous antibiotics should have been available to administer as soon as prescribed and the effects of treatment monitored. Patients have to pay for their hospital stay and for drugs other than available first line drugs, e.g. septrin, penicillin, flagyl, etc. The fact that abortion is illegal leads to patients and relatives being reluctant to admit what has happened. Appropriate drug treatment may have saved this young woman if treatment had been sought earlier. Few details were recorded, whether this was due to relatives not actually knowing or being reluctant to give information or to the admitting staff not asking relevant questions is not known.

This case highlights that the socio-economic status of patients is compounded by the fact that health care is not free in Nakuru. As a result, people who need care tend to defer seeking medical help until it has become really necessary or when the condition has become critical as seen in this case.

CASE FOUR - Eclampsia patient

This patient was 28 years old, very little details were recorded on admission. No record of any previous pregnancies or gestation. No indication was given of how the diagnosis of eclampsia was made, it is usual for any two of the following to be present to make such a diagnosis; 1) raised blood pressure, 2) oedema, 3) proteinuria, 4) frontal headache with visual disturbance or 5) epigastric pain.

No treatment was recorded as having been administered; most of the appropriate drugs would not have been available and would have needed to be purchased by the relatives from a private pharmacy. Laboratory tests like urinalysis also have to be paid for though, if this had been ordered by the doctor the test would have been carried out and the charge added to the patient's bill.

Ideally, this patient should have been monitored closely and tested to ascertain which 2 of the 5 conditions mentioned above were present to make a diagnosis of eclampsia. Then appropriate drugs could be administered, thus ensuring that the most appropriate treatment regime could have been followed. This patient appeared to have been given a poor standard of care by both nursing and medical staff.

This case demonstrates that doctors on duty should have been supervised by either a senior registrar or a consultant to ensure a correct diagnosis was made when the patient was admitted as an emergency. This patient was misdiagnosed resulting in inappropriate treatment being prescribed. This case also raises a general question of whether patients with serious emergency illness could be exempt from drug charges. If not, lives would be at stake.

Deaths on Ward 1 surgical - obstetric ward

CASE FIVE

The first patient was age 36 years this was her 5th pregnancy and she had delivered a first twin at home and was admitted with a retained 2nd twin, which was delivered alive by caesarean section, 45 minutes later at 6.15pm. At 11.30 pm the same night she was running around the ward chattering and singing. A diagnosis of puerperal psychosis was made and the patient given a sedative. The patient suffered periods of being incoherent and delusional over the next three days. On the 3rd day post natal a blood test was taken, the patients haemoglobin was found to be 4mmols/dcl (normal range 12-16mmols/dcl) and the blood sample was found to contain a high concentration of malaria parasites. An intravenous infusion of quinine and dextrose was commenced, the patient did not respond, lapsed into a coma and died 2 days later.

This patient was not managed correctly; the diagnosis of puerperal psychosis was incorrect as it was manifesting too early, the most likely diagnosis being cerebral malaria. If a blood slide was taken on the first day, it would have meant this woman could have commenced treatment earlier, before she became anaemic to such an extent. In addition this case highlights the inadequacy of primary care in

Nakuru. Malaria should have been routinely screened particularly during May and November/December, which are wet seasons in Nakuru.

CASE SIX

The second patient was 34 years old and it was her 4th pregnancy, the patient was depressed as her husband had died 6 weeks previously, cause probably due to HIV. Caesarean section was performed due to breech position. The patient was discharged home on 5th day and due to return on 8th day for removal of sutures. The patient returned to the hospital on the 8th day, in a collapsed state and died shortly after arrival. The medical superintendent concluded from the records available that the most likely cause of death was thrombo-embolism.

The notes of this patient were very difficult to trace and the report of her death was impossible to obtain, her notes were found on the top of a high cupboard on the ward, they were incomplete. The casualty department said she was dead on arrival and the mortuary had no record of her body being taken to their department. This patient had been admitted under one name however her ID name was different and it is possible some of the discrepancies were due to these various names. No death notice or certificate was ever issued in either name and the researcher was unable to trace the 'dead on arrival' body from casualty. This case highlights the poor quality of record keeping in sections of the hospital.

The problems shown in this case are that: (a) the after care following a major abdominal surgery was inadequate due to poorly provided primary care. Ideally, the patient should have been visited by a community midwife to ensure the patient was not developing surgical complications, (b) the incompetence of nursing staff in keeping accurate clinical records and (c) the medical care given in hospital and in the community was poor.

Deaths in the maternity ward.

Both women had delivered a macerated stillbirth, this may well have contributed towards the poor outcome. As a macerated fetus left undelivered increases the risk of the mother developing disseminated intravascular coagulation (DIC).

CASE SEVEN

The first patient was 33 and it was her 5th pregnancy. This woman had been on the antenatal ward for 3 weeks, she was suffering from pulmonary tuberculosis secondary to HIV. After the delivery of her still born child her condition deteriorated and she died ten days post delivery.

Ideally this woman's case management could have been improved, anti retroviral drugs were not available without charge. The tuberculosis was managed as per regime. Being on an open ward meant this woman was at risk of further infection, especially as ward hygiene and infection control was so poor. The staff was negligent in their care of this woman as she was left to deliver a macerated still born child, though she was on the ward as a sick antenatal patient and her foetus should have been monitored on a regular basis. No record of when the fetal heart failed to be heard was found in the notes, yet this woman was present on the ward and in bed for 3 weeks prior to delivery. The patient was left to go into labour and deliver.

CASE EIGHT

The second patient was 27 years old and it was her 3rd pregnancy. This patient came in with no fetal heart present and was left to go into labour spontaneously. No details of time only the date was recorded of when this patient first presented with a high temperature or complained of abdominal pain. The patient was prescribed oral penicillin and flagyl on the same day. Notes were incomplete as no observation sheet could be found in her file. The patient died on the 5th day post natal.

Ideally this patient should have been given intravenous antibiotics when the sepsis was first suspected. The patient's vital signs were not recorded in her notes and no

observation chart was present, it is not known if it was misplaced. A record of her observation and details of effect of treatment should have been demanded by the doctor attending this patient. No changes in medication or care were recorded as prescribed in her notes.

This case also demonstrates the inadequacy of antenatal care in Nakuru. The nursing staff in the unit were incompetent and that senior managers should have imposed discipline in the unit ensuring that nursing practice is of a high standard.

In summary, the analysis in this chapter shows that 6 out of the 8 deaths that occurred during the study period could have been preventable. The factors attributed to these deaths were:

- Poor recording of vital information

- Lack of communication and lack of monitoring the standards of care delivered

- Poor case management by nursing and medical staff

- Delay in informing medical staff of admission and condition of patients

- Delay in commencing appropriate treatment

- Questionable competence of nursing and junior medical staff

The issues cited above can be addressed without incurring extra costs to departments, by making more efficient use of available resources and monitoring behaviour to assess and identify shortcomings in care provision; then assessing outcomes of any interventions or strategies adopted to address the problems identified.

The remaining 2 deaths were related to the socio-economic status of the patients, the in appropriate health service structure and the lack of appropriate care for women during pregnancy and the postpartum period.

Chapter 6. Child death in Nakuru Provincial General Hospital

“The death of your child kills the future and decimates the past.”

(George. 1999 p.290)

6.1. Introduction

The definition of child death can be given as the death of a child from any cause if it occurs before the 5th birthday. Child deaths are divided into categories by age.

- perinatal, which means around the time of birth, up to 7 days after birth.
- neonatal is the period for the first 28 days after birth
- infant generally refers to a child from 28 days old until the child's first birthday.
- child refers to ages 1 to 5 years

(Balliere. 1983.)

6.1.1. Perinatal deaths

The national estimate for perinatal mortality in Kenya in 1995 was 45 per 1,000 live births. The causes of these deaths include poor maternal health, inadequate care of the mother and child during pregnancy, inappropriate management of complications during the pregnancy and the critical period after the birth and the poor hygiene practised during the delivery. It was felt that most mortality in the perinatal and neonatal period is caused by conditions that are preventable by the application of available and effective public health actions and inexpensive clinical interventions. (MoH. Kenya. Nov. 1996:28) This suggests that as early as six years ago the health service providers in Kenya were aware that improvements in the perinatal mortality rate were possible at little or no extra cost.

6.1.2. Neonatal deaths

The DHS survey for each of the three countries, Kenya, Uganda, Tanzania, were unfortunately carried out in different years, 1998, 1995 and 1996 respectively, with the impact of HIV/AIDS on each of these countries an unknown quantity at present. It is possible that in Kenya the true extent and the impact of those deaths

will never be known until there is a functional recording and reporting system and improved registration details. The figures for child deaths generally for the years quoted are:-

	1998 <u>Kenya</u>	1995 <u>Uganda</u>	1996 <u>Tanzania</u>
Neonatal	28 per 1000	27 per 1000	32 per 10
Infant	74 per 1000	81 per 1000	88 per 1000
Child 0-5	115 per 1000	147 per 1000	137 per 1000
<i>Risk of dying before 5th year</i>	1 in 9	1 in 7	1 in 7

Demographic Health Survey for the respective countries.

Table 6:1

In 1960 the infant mortality rate in Kenya was 120 per 1000 and by 1996 it had dropped to 61:1000. (UNICEF 1998 (B) The figure for 1998, 74:1000, when compared with the UNICEF figure for 1996 of 61:1000, indicates an increase in infant mortality for Kenya of 21 % between the two years. In Uganda, the DHS suggests a decline of 16–18% from 1980 until 1995. Tanzania has also shown an improvement, though less marked than in Uganda.

Even though child mortality rates in both Uganda and Tanzania were higher than in Kenya, both the former have managed an improvement in their rates, while Kenya's figures have worsened. These rates are possibly tied to the economic decline in Kenya, which would impact negatively on the absolute poor. The mortality rate for children below 5 years is higher in Nyanza Province, where 199 per 1000 die. The rate was found to be lowest in Central Province, where the risk was reduced to 34 per 1000, six times less than Nyanza. (Kenya DHS 1998) (Tanzania DHS 1996) (Uganda DHS 1995) As shown on the scale of poverty (Appendix i) the areas of Nyanza Province reflect this rate: 57% (Kisii), 58% (Siaya), 65% (Kisumu) as the percentage of population in absolute poverty, while the areas in Central Province range from 25% (Kiambu), to 39% (Muranga). This suggests that the poverty indicators play an important role in child survival between the highest and lowest incidence of child mortality in Kenya.

6.2. Causes of death in children

6.2.1. General health issues

Malnourished, underweight, sickly and stunted children are likely to become malnourished and sickly adults, if they survive childhood.

African children are affected by many diseases due to geographical location as well as economically for example malaria, amoebiasis and a number of diarrhoeal diseases.

The World Health Report 1998 states that there were 10 million deaths in 1997 of children under five years old and that 97% of these deaths occurred in the developing countries. Most of these deaths were due to infectious diseases such as pneumonia and diarrhoea, combined with malnutrition. The report goes on to say that most of these deaths of children below five are preventable; and at least 2 million of these deaths a year could be prevented by existing vaccines. (WHO 1998 (A) The Report for 1996 was dedicated to ‘fighting disease and fostering development’. (WHO 1996)

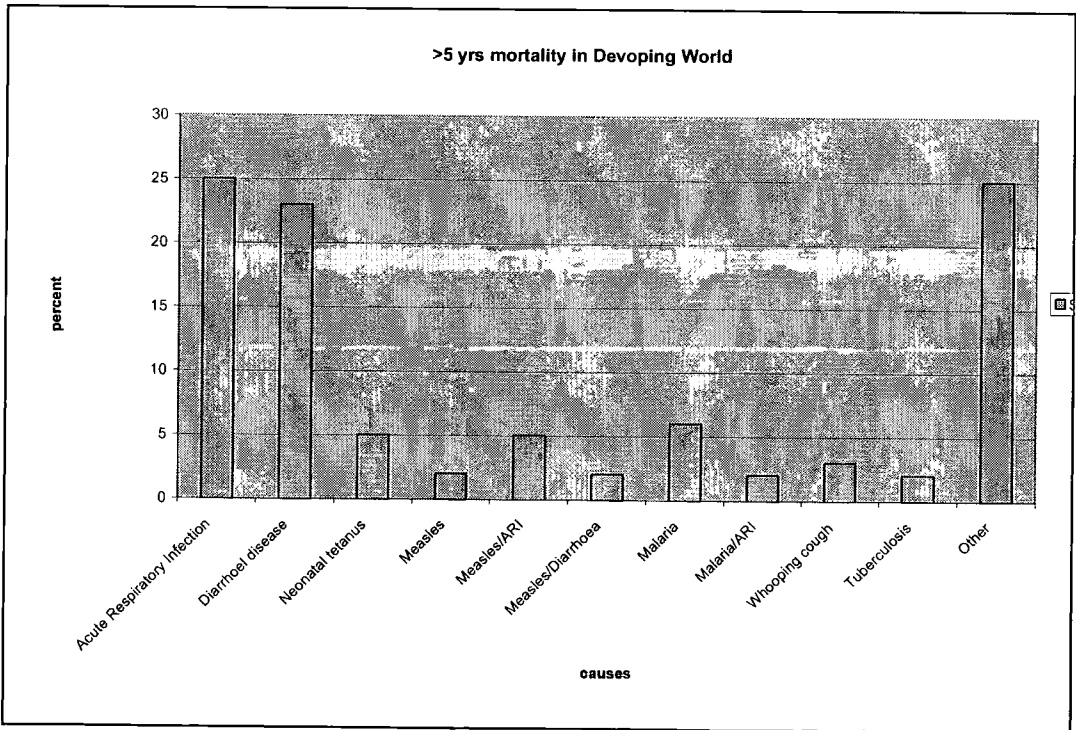


Figure 6.1: Causes of death in children under 5years WHO Report 1995

6.2.2. Socio-economic factors

Many African children live in unfavourable socio-economic conditions. Some of these circumstances predispose African children to many life threatening diseases, which do not threaten their contemporaries in the UK to the same extent. Diseases like neonatal sepsis, pulmonary tuberculosis, rheumatic heart disease, malaria and malnutrition, are rarely present in children and babies in the UK.

Ignorance leads to poor health, poor nutrition and increased morbidity. Ignorance, on the part of mothers and other care givers, in any geographical location, can lead to poor general health, poor nutrition and increased morbidity among children.

Poverty leads to poor health and poor nutrition, due to lack of money to provide basic needs. This also increases the period of illness experienced before seeking medical help, due to the inability to pay for medical care.

A dirty environment contributes to increased health problems. Malnutrition and overcrowding do nothing to enhance the condition of children (or parents), often leading to increased infection and longer periods of recovery, if the illness is survived.

These types of poor environment were common in Britain more than fifty years ago, and were some of the 'Giants' that Bevan sought to conquer through the introduction of the National Health Service to provide 'health for all' regardless of status. However, establishing a Health Service similar to that of Britain in 1948 is an unrealistic target, not only economically but in respect of the basic poor infrastructure in terms of electricity supply, provision of clean water and basic sanitary conditions.

Many families cannot afford to send their children to school. As a result the problem of not being able to read and write is perpetuated. The success of health

promotion and health education to a large extent relies on the population being able to understand the message in both written and oral forms..

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6.2.3. The impact of HIV and AIDS

The impact of HIV/AIDS is impossible to determine at present but cannot be ignored in terms of child health or maternal health. From information available at the present time, it is recognized that mother to child transmission is a possibility, though not a certainty, and, for reasons, not yet fully understood, pregnant women seem to have an increased vulnerability to HIV/AIDS.

The Human Development Report 1999, states that AIDS will reduce life expectancy by 17 years in nine Sub Saharan countries, reducing life expectancy from 64 years to 47 years by 2010 in Botswana, Kenya, Malawi, Mozambique, Namibia and Rwanda. (UNDP 1999)

At a seminar in January 1999, Doctor Ruth Nduati, Lecturer in Paediatrics, at the University of Nairobi, revealed that 33% of antenatal mothers tested at clinics in Nakuru, tested HIV positive; and out of the 100,000 babies born each year to HIV positive mothers, 30-35% acquire the virus, which usually kills them before their fifth birthday.

6.3. Child deaths in Nakuru

There were 1189 admissions to 3 paediatric wards in Nakuru Provincial General Hospital between the beginning of February and the end of April 2001. The admission rate was shown to be significantly higher in Ward 6 which is a medical ward for children up to 2 years of age. The number of admissions on Wards 2 and 14 did not show a major difference: 169 and 135 respectively.

During the period reviewed 166 children died, which is equivalent to 14 in every 100. Children aged 0-2 are most vulnerable . In this study 160 children in every 1000 died, which is below the reported Kenyan level of 250 per 1000 but is still

unacceptably high. When the Kenyan figures are compared with those for the UK stark differences are revealed:

- A child in Kenya stands a 1: 9 chance of dying before his 5th birthday.
- A child in the UK stands a 1: 3700 chance of dying between their 1st and 5th birthday.

6.4. Causes of child death in Nakuru

When comparing the child deaths that occurred at the Provincial Hospital during the period measured between 01/02/2001 and 02/05/2001 with the above graph it is worth noting that malaria related deaths comprised 30% of deaths, compared to 10% for Nakuru District and 8% Worldwide. Respiratory disease compares more closely with 32% in the hospital, 40% in Nakuru District and 30% Worldwide. Malnutrition accounted for 8% in the hospital, 2% in Nakuru District and does not appear in the worldwide figures. No measles related deaths were reported during the 13 weeks measured at the Provincial General Hospital, Nakuru, 2000.

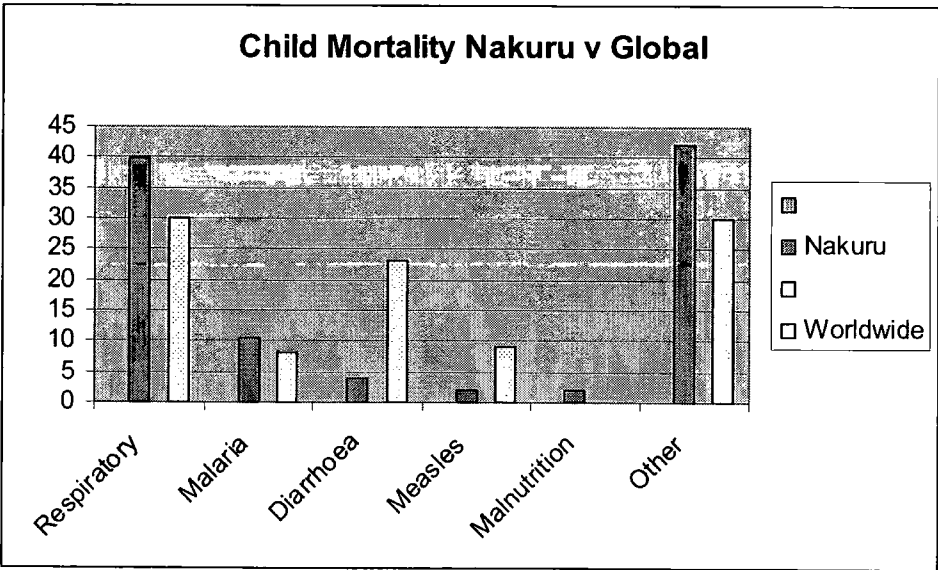


Figure 6.2: Causes of child deaths: global and Nakuru

Cause	PGH 2000	Nakuru District 1998	Worldwide
Respiratory	32%	40%	30%
Malaria	30%	10%	8%
Diarrhoea	13%	4%	23%
Measles	0	2%	9%
Malnutrition	8%	2%	0
Other	33%	42%	30%

Table 6.3: Main causes of mortality below 5 years of age from 3 sources

The deaths at PGH in 2001 total to more than 100% as certain deaths occurred with a combination of two main causes of admission leading to death given and therefore appear in both data. To some extent this may explain the differences in the malaria and malnutrition reported deaths.

The Permanent Secretary for Health stated in a speech in August 1999, that 70% of child deaths in Kenya of under 5 year olds are caused by, malaria, pneumonia, diarrhoea, malnutrition and measles. A report announcing the measles campaign for 2002 states that measles contributes to 20 per cent of deaths among Kenyan children below the age of 5 years. (Okwemba 2002)

The previous study by the researcher found the reported causes of child deaths below 5 years of age in 1998 were as follows:-

Pneumonia	802 cases	39.7%	
Malaria	209 cases	10.3%	
Diarrhoea	80 cases	3.9%	
Measles	44 cases	2.1%	
Malnutrition	41 cases	2.0%	
Total		58%	

Table 6.4: Causes of child deaths 1998

District Registrars Office, Nakuru.

These figures do not appear to reflect the same trends as those mentioned by the Permanent Secretary for Health, in his speech (5/8/99), nor do they reflect a 20% incidence of measles as reported by Okwemba, 2002. The incidence of malnutrition is also far less than that quoted by UNICEF (1998 (B)). This could be because malnutrition may have been the underlying cause, or, the actual cause of death was an opportunistic disease or infection which took advantage of a compromised immune system. It is also possible that signs of malnutrition were not documented when the child was admitted or was certified dead.

6.4.1. Poor professional practice as a cause of child deaths

Lack of resources is not always due to lack equipment: many innovations could be made by the use of existing materials and equipment in different and more flexible ways. In the nursery there is only one oxygen face mask so it is used for the most needy infant and moved from infant to infant when a number of infants require oxygen therapy. When the researcher pointed out that a simple plastic funnel (cost Ksh.7/-) or an improvised paper funnel would suffice, staff remembered having seen this idea before. Four infants died that week due to respiratory distress syndrome who might have survived with a simple paper funnel

Cross infection is a constant danger due to the practice of putting infants together in the same incubators. At the time of re-checking nursery practice in January, February, March and April 2001, the putting of two or three unrelated infants in one incubator was still happening. Two wooden incubators in the nursery each held three infants. It makes sense to only heat a minimum number of incubators to save heating costs but what was disturbing was the absence of any partition between the infants and the fact that they all lay on a common sheet. These conditions and practices could be seen as contributing towards sepsis in neonates during the period measured.

The risk of cross infection is heightened by the fact that some staff do not wash their hands between handling different infants. Some of the doctors admitted that they do not always wash their hands between babies giving as excuses the lack of time or absence of paper towels.

Infants who are not in incubators, are in wire mesh cots which were originally painted. At some stage damage to the paint has exposed bare metal, now rusty in some parts of the cot. This would appear to be an added risk of infection to the infants, as well as creating difficulties in achieving adequate standards of cleanliness between the change of infants occupying the cots. There is the added risk of injury or cross infection to staff, who may infect themselves or carry infection home to their own families.

Mothers are encouraged to leave their slippers (flip flops), outside the nursery door. As they are not allowed to enter wearing them, they enter barefoot. Used needles were lying on the floor, also shards of broken glass from drug vials presenting a real risk of injury to mothers. In addition to posing a risk of injury to barefoot mothers, this presents a very real health hazard for whoever cleans the floor. As in other wards, needle disposal is not very well managed, as there are no used sharps containers available. There also appears to be no routine policy and protocol for sharps and broken glass disposal. Needles and cannulae are thrown into the general rubbish, together with used dressings, faeces and used rubber gloves and anything else to be disposed of. This type of waste is in open plastic containers without lids or bin liners. A personal observation was made of the same foul dressings, used intravenous giving sets and other clinical waste being left in a bin outside the casualty department for a period of three whole weeks. This bin was left overflowing with all this foul waste right next to the pathway that people had to follow if they needed laboratory, x-ray, drugs dispensing or out-patient clinic services.

The floor in the nursery is uneven, cracked and broken in places, this must mean that it is impossible to clean the floor efficiently presenting a perfect site for all types of bacteria and micro-organisms to flourish.

An open electric ring is used for heating cows milk for infants that are not breast fed. Syringes and plastic cups are used to deliver the feeds to the infants. Mothers and staff all handle the utensils and remove what they require, re-covering the containers with covers that do not match the containers. This practice must leave the feeding equipment open to extra risk of contamination.

Lack of gowns for use by care givers to wear when handling individual babies, means that any contamination on nurses' uniforms can be passed on to the vulnerable infant. Nurses' uniforms here are often worn on and off the ward, also on and off the bus and around the shops. Staff must supply their own uniforms, so a variety of styles and shades abound. No set style and a broad interpretation of colour results in multi shades of uniforms, often with inappropriate decorations such as fancy buttons with decorative metal or plastic attachments which can pose a risk to infants.

Another possible route for infection is the migratory staff: paediatric staff who wear the same footwear and clothing on all wards, nursery, ward 6 (0-2years medical), ward 2 (2-12 years medical), ward 14 (0-12 years surgical). Once again lack of gowns for handling infants in the nursery poses a further risk of cross infection.

Cleaning materials for the nursery are kept in a room on the shared passage way next to the labour ward. There is no access from the nursery except this communal passage. An extra sink for the washing of hands has been put into the nursery in the past two months.

The resuscitaire has suction tubing and a jar to collect secretions sucked out of new born infants. This jar is cleaned once per week and the same disposable suction tubing is used for all infants. This is not a proper soft round ended suction catheter, but a piece of intravenous giving set tubing, the infants are therefore likely to suffer local trauma due to the sharpness and hardness of the tubing. The usual practice to avoid cross infection in a hospital nursery is that each baby should have a new suction tube. As this is not possible at the Provincial General Hospital, Nakuru, the suction tubing in use is supposed to be put into a jug of

bleach solution between uses. The tubing was often observed trailing on the floor, and then used on the next unfortunate infant. The resuscitaire itself is not cleaned on a regular basis, when asked by the researcher no one knew for sure when it was last cleaned, if at all.

Staff knowledge in regard to local practices that contribute to infection and death within the hospital itself were unable to be assessed by the researcher.

Many of these hygiene problems are generated by the staff themselves. It is not known for certain if the staff fully realized that, they themselves as well as the patient are at increased risk of infection due to the unsafe disposal of waste and contaminated equipment and poor standard of hygiene they practice.

Improvements in these areas are free of cost and only require a change of practice and attitude on the part of staff as well as supervision of behaviour by the ward managers of all staff under their authority.

Chapter 7. Implementing clinical and management changes in Nakuru

7.1. Introduction

The project adopted an action research approach, allowing the researcher and her associates at the Nakuru Provincial General Hospital to take appropriate actions to improve standards of health care services, ultimately saving lives. There are many important issues, such as basic human needs, which have a significant influence on health and the services provided for the population, but are outside the limit of this project. The programme of change was based on findings described in previous chapters. For example, chapters 5 and 6 highlight the reasons why women and children died in the maternity unit, obstetric ward and in the paediatric wards. The causes of maternal and child deaths have been taken into account when planning for change. However, the clinical causes of deaths cannot be taken independently of other equally important factors associated with nursing and medical leadership within the hospital. For example, experience has shown that there is a strong relationship between management leadership and clinical standards. If the hospital is not managed effectively by nurses and doctors, then good standards of clinical practice cannot be maintained.

Before describing the action programme to be implemented in detail, it is appropriate to recapitulate some of the non-clinical problems identified by the research. The factors which inhibit good practice in Nakuru will be briefly described here and the findings that were used to formulate the action programme in Nakuru.

Major problems identified included;

The medical superintendent failed to institute autopsy enquiries after each maternal death; procedures were not followed by nursing staff, particularly in the area of infection control; clinical standards were not monitored by nursing and medical management resulting in deaths; malpractices were ignored by senior nursing staff.

7.2. The process of change

Initially, staff was resentful of criticisms made and resistant to change. It was necessary to present the findings to senior medical and nursing colleagues and convince them of the fact that some management issues prohibited progress. These factors have detrimental effects on good clinical practice aiming at reducing mortality. However, once the significance of the research and the seriousness of the preliminary findings obtained by the researcher were acknowledged by the hospital management, the hospital staff was willing to participate in the process of change.

The Medical Superintendent of the hospital called a consultative meeting in July 2001 involving the researcher, the hospital matron, the matron for the gynaecological and obstetric unit, the matron of the maternity unit and all gynaecology and obstetric consultants, to discuss the findings obtained since October 1999. Nine recommendations were made:

- i) There was an urgent need to improve documentation and storage of patients' records to make disease surveillance, clinical audits and future studies to improve care easier.
- ii) Facilities in the units involved needed to be improved.
- iii) The antenatal clinical services should be improved. The providers should take all aspects of antenatal care seriously. All women should be counselled and prepared physically and psychologically regardless of parity.
- iv) High risk clinics for adolescent women should be established as their needs differ greatly from the needs of other antenatal clients.
- v) Antenatal care support facilities such as the laboratory, and the pharmacy should be refurbished so that complications of pregnancy and other underlying problems can be adequately investigated.
- vi) The sub-standard emergency obstetric care should be improved. Delays due to the inability of the staff to cope with demand and the lack of suitable facilities must be minimised. Supportive services such as blood transfusion, laboratory and

operating theatres should be available. Staff should be equipped to deal with obstetric emergencies.

- vii) All staff must familiarise themselves with infection control policies and must all follow procedures.
- viii) Autopsies must be performed on all maternal deaths to identify accurately the causes of death.
- iv) Staff should be motivated to improve standards of care. Training should be provided as part of the process.

7.2.1. Instituting clinical governance in the maternity unit and paediatric unit

7.2.1.1. Midwifery supervision

Supervision originated as a mechanism to control midwives and their practice in the early 1900s in the UK. Up-dating of professional knowledge and skills for midwives in the UK has been a statutory obligation since the early 1950's. Midwives are supervised at practice level in the UK by managerial or peer appraisal of their professional performance annually. Individual hospitals set a minimum acceptable level of professional skills and knowledge up-dating; this is in addition to the statutory obligations.

Lack of supervision and monitoring can lead to staff providing and delivering a poor standard of service, as they do not feel either the service they provide, or they themselves are valued. There is a feeling of lack of appreciation of self and service and therefore no feeling of fulfilling a role that is of value to those they serve. This can then lead to a feeling that the role is meaningless and that standards are therefore not a priority.

As no level of supervision existed in the maternity unit at Nakuru, a management meeting was held to discuss the possibility of using the UK model in the unit. It was decided to use a modified version of this model as certain essential components were not in place at Nakuru Provincial Hospital.

The negative aspects and effects of poor supervision are difficult to overcome. Clinical supervision is not a single, nor an easy task; it requires individuals with certain and particular skills to carry it out effectively. (RCM, 1998) Whether these skills are present, or the need for them understood, within the setting of the Provincial General Hospital, is not clear to the researcher.

7.2.1.2. Maternal death enquiries

The superintendent of a large district general hospital should be fully apprised of the number of women dying during labour but this assumes that the superintendent has the necessary qualifications, standing and commitment to good hospital administration and management. For example, if, as a means of evaluating the standard of midwifery and paediatric practice, the hospital management were to require routine investigations of maternal and child deaths, any unexpected death would be thoroughly investigated and a report prepared. The report would then be discussed with the hospital committee and administration. Furthermore, the report would include the time and cause of death and any actions taken that might have contributed towards the outcome. All staff, nursing, midwifery and medical, who were involved in the care of the patient, would be required to be present at this meeting and all questions asked would be answered.

These types of meeting do not seek to lay blame on any one individual, they do however, aim to expose any acts or omissions which may have contributed to the death and highlight where a change in the management of care might have improved the outcome. These are not blame apportioning but learning exercises, which seek to avoid unnecessary deaths in the future, by learning from the experience of a poor outcome that has already occurred.

The use of this rigorous type of investigation into maternal deaths in the United Kingdom since 1952 has resulted in women all over the country and further afield benefiting from the findings of these Confidential Enquiries. Many maternal deaths are now prevented in the UK because of what has been learned from past deaths and

the circumstances which accompanied, as well as led to the death. This has only come about because these deaths were investigated from every angle. Some deaths are of course unavoidable. However, maternal mortality meetings appropriately carried out

would separate those which were avoidable from those which were not. This should allow for mechanisms to be employed to effectively prevent many poor outcomes from occurring in the future. In Kenya, the cost of autopsies if performed, usually has to be met by the relatives. As maternal deaths are relatively rare occurrences in this hospital, it would not seem unreasonable to expect the hospital to bear the cost of this procedure; this would allow identification of the actual cause of death and assist in identifying cases of negligence, incompetence and sub-standard care.

7.2.1.3. Disciplinary procedures

Disciplinary procedures for those who failed to follow policies has been difficult to introduce; senior managers having to be given guidelines regarding their role in this matter as this responsibility has previously been ignored. Change in this area will be slow to take place, as many senior staff lack management skills and have not taken a lead role in exercising their authority to curb negligent behaviour and enforce accountability in the staff they oversee.

7.2.1.4. Investigations into circumstances of paediatric deaths

Neonatal deaths taking place in the nursery should routinely be investigated with a report submitted to the administration and committee, to ensure that the care given was of an acceptable standard. This type of investigation cannot be expected to take place in the other paediatric wards as the death rate is much greater. However a more detailed account of a child's general health, nutritional state, previous admissions and home environment, together with parental understanding would give a broader picture of the individual needs of children admitted. Failure of the establishment to scrutinize actions and subsequent care that resulted in the loss of a life, plus their lack

of investigation into what was possibly an unnecessary death, indicates that the institution has failed to carry out the function it was employed to provide.

7.2.2. Instituting infection control practice

- a) infection control measures to be introduced as there have been no policies and procedures in place to audit standards of practice.
- b) the practice of women sharing beds during labour should stop at once as it will reduce cross infection, in particular preventing the HIV virus from being spread among women during labour
- c) the practice of premature babies sharing one incubator to be stopped
- d) the standards of cleanliness and ward hygiene to be improved and constantly monitored
- e) provision of basic facilities, such as sterilisation equipment, adequate supplies of beds and incubators, etc. contributing to a better standard of care
- f) procedures to be instituted for the disposal of used needles to avoid needle stick injuries causing hepatitis and HIV infection
- g) the types of infections contracted by women and children to be carefully investigated and documented. Clinical staff will be notified of patients with hospital acquired infections so that they are constantly kept up to date with this aspect of clinical work. Treatment protocols and outcomes will also be documented for auditing purposes.

7.2.3. Re-establishing nursing management

- a) a clear chain of command to be established to ensure that instructions are followed by nursing staff of all grades. It was recommended by the team that enrolled nurses in these units should be closely supervised by registered nurses. Student nurses on placement should be closely monitored by suitably qualified nurses. The line of command is then upwards, i.e. sisters who are

responsible for the management of wards will report directly to the matron of each unit.

- b) a new admission records and clinical records system will be instituted. A programme of in-service training will be given prior to the introduction of the new record system to ensure that nursing staff understand the importance of keeping accurate records for monitoring and planning purposes
- c) all aspects of nursing practice will be audited to ensure instructions from the hospital are carried out satisfactorily
- d) the responsibility for in-service training would be defined with a clear line of communication to senior staff within the hospital. Additional personnel would be offered to the continuing education department to ensure the agreed programme of training can be implemented adequately. The training programme will include data collection on the ward and in the hospital, infection control measures, planning care in response to individual needs.

7.2.4. The management of admission and clinical records

- a) The Medical Records Officer would be delegated the responsibility for introducing a new epidemiology database and for ensuring records are used effectively. The new database will eliminate the deficiencies identified by the researcher at the beginning of the project. Morbidity and mortality data is therefore centralised and can be further investigated for the management of public health and for use in predicting future development and determining resource requirement.

7.3. Setting up a task force with specific terms of reference

In the light of the recommendations put forward by the Consultative Committee, chaired by the Medical Superintendent of Nakuru Provincial Hospital, a task force was established comprising the researcher, the unit matrons of maternity, gynaecology

and obstetric nursing, the Admissions Record Officer and the In-Service Training officer of the hospital. The terms of reference for the task force are as follows:

The research team was charged with the responsibility for:

- identifying deficiencies within the current system of record keeping throughout the hospital, in particular in the maternity, gynaecology and obstetric units and the paediatric units responsible for children from 0-5 years of age.
- improving standards of ward hygiene
- establishing infection control procedures

The research task force held regular meetings from August 2001 to December 2001 to determine appropriate strategies to translate the terms of reference into practice.

During the said period the following tasks were carried out by the research task force headed by the Continuing Education Officer:

- a) Audit of infection control policies, procedure and practice
- b) Audit of nursing practice in the units involved
- c) Audit of nursing management, chain of command and system of supervising nursing practice
- d) Assessment of the current recording of hospital admission with a view to designing a new and more reliable system
- e) Assessment of admission and clinical records kept by units involved in this project

7.3.1. Reducing maternal and child mortality – a programme of action

The proposed programme of action devised by the task force goes beyond the period of the degree registration. It should be recognised therefore that the full impact of the proposed programme cannot be described. The results of some immediate actions will



be presented in this thesis to give an impression of the types of problems which have been managed by the team and show what has been achieved within the timeframe of the MA project.

A five-year action research programme was devised based on the deficiencies identified from the audits listed above. The objectives of the programme are as follows:

7.3.2. Evaluation of the changes implemented

Since the duration of the action research programme was for a period of 5 years, it was appropriate to assess annually what targets have been met. The action programme was introduced in August 2001. The method of evaluation is shown below:

First year:

- Assessment of ward conditions
- Assessment of staff behaviour and standards of practice
- Monitoring of maternal and child deaths
- Staff perceptions of the project and the proposed changes
- Progress report from the Matron of the Maternity Unit
- Researcher's perception of the project

Second year:

- Audit of conditions in maternity and paediatric units
- Comparison of death rates in these areas
- Assessment of staff competence and degree of compliance in using the new record system
- Perception of the project by the participants
- Task Force perception

Third year:

- Assessment of ward conditions
- Measurement of maternity and child mortality during the last 3 years

Perception of the project by the participants

Task Force evaluation

Fourth year:

Assessment of ward conditions

Assessment of project outcomes

Assessment of level of involvement of staff in the project

Perception of the project by the participants

Task Force evaluation

Fifth year:

Assessment of overall outcomes

Task Force evaluation

Researcher's evaluation

For the purpose of this thesis, the instruments used for assessment are not detailed here, being beyond the scope of this thesis. However, the first year evaluation data, i.e. August 2001 – July 2002, is described here as it falls within the time span of the thesis.

7.4. Views of ward staff and project participants

The activities of the first year were evaluated using focus group discussion and semi-structured interviews. The discussions with the staff were based on a set of questions.

Focus groups were conducted with ward nurses in the maternity and paediatric units whereas the senior staff involved in the project were interviewed individually. In addition the matron of the Maternity Unit produced her own evaluation report.

The overall impression of the project was that it was worthwhile and that it would to a large extent reduce mortality in women and children.

The views of the staff and other participants are tabulated (Table 7.1)

Question	Maternity response	JN Admin response	IW Admin response	GO Manager response	Children Response
Your impression of the project, how far have we gone and what else do we need to do?	Project to continue data collection is improving	It is making staff more committed to work in maternity department	It is a most useful project	Project is doing well data collection and storage have improved and this has had a direct impact on pt care	It is having a positive impact in the ward
Are staff aware of project and aims?	They need to update about project	Staff need to update and keep informed	Staff were informed	Raise awareness of project and keep informed	to improve care of patients
What is your understanding of the project	To get correct data + mortality rate	Improve MCH and Paediatric Services in PGH Nakuru	reducing maternal and child mortality	Make staff aware of importance of records, info and their uses	To improve patient care and reduce mortality
What is the difference between old and new system of record keeping	Now patients all get numbers and books now used are better	Previously staff were not concerned now they are able to discuss any unusual cases	Record keeping is becoming more organized and meaningful	Record keeping has improved, quality of books is better + more information now available	Previous system was tedious and data hard to get - now improved
Have changes improved or damaged	Fewer patients now missed on admission	Have improved	There is a lot of improvement	They have improved on previous practices	They have improved
Have changes had a positive or negative impact	Positive work load has reduced we do not have to rule books	Positive in that we are all committed to project as we own it	Has had a positive effect in changing attitudes	Positive proper records taken and kept well also able to be retrieved	Improved now pts records can easily be traced
Since start of project has care improved or deteriorated	Remained the same	Improved we hope to reduce mortality and have already counseled peripheral unit	Improved ante-natal care and record keeping	Improved we are able to follow cases and management + outcomes and deaths	Improved in areas like ward 6 (0-2yrs)
How do you envisage being able to utilize the new data	Referring to the data in discussions and see what improvements can be possible	We are not going back to the old method we can only improve	By getting a safe room for storage and also use of a computer to analyse data	Knowing admissions deliveries management and final outcomes data	To follow up patients and know their fate
Which improvements would you find most useful at PGH Nakuru	Use of computers	Commitment and documentation	Flow of maternity pts and a maternity theatre	Accurate figs. + reports on admissions and discharges deaths referrals and trends	The new method of data collection

Are there further ways you wish to improve the new system of record keeping and data collection	Maternity unit to have records kept within the unit	Improved documentation in other units has already been implemented	Not at present first implement the current safe motherhood format – then review	Putting all the data information on computer for analysis to give correct reports and pin point faults	Yes to be able to computerize this information and then retrieving it will be easier
Are there ways in which maternal and child mortality outcomes can be improved. Can this project help achieve it?	Yes by training staff on the need for accurate data and records to be collected	Through case presentations (weekly) reviews of work performance and continuing education	Active participation by all concerned	Yes by getting correct information on causes through mortality meetings and correcting areas identified where possible and necessary	Yes by keeping good records from birth and details of subsequent admissions
In service training. In relation to the project why has re-education met such resistance	There is no resistance to re-education	Staff find it to be more committing and it was easier for them to be monitored by a supervisor	All need to be trained negative attitude towards project and resistance to change	People are resistant to change some feel threatened +attitude to being taught basics	Would be very helpful people fear change but once introduced recognize its benefits
How will data collected be used in future?	Have a clerk to record data	To improve records in all areas of the hospital	In this institution plus other facilities	To improve outcomes in this hospital and others	To improve information and outcomes
How do you wish to share data findings with staff and let hospital improve car delivery	Avoid mistakes that have been made and re-educate staff	Through case presentations and through nurses AGM involve teaching staffs at KMTC	Not commented on	Through meetings we are able to share ideas, identify problems and decide how to correct them	Other areas will benefit from copying what our ward has achieved
Do you feel it is possible to improve medical records and make +ve changes?	Yes make use of computers. Use computers and re-educate staff	Yes	Yes with co-operation and commitment from the departments	Yes accurate data collection and safe record keeping	Yes teach staff the importance of better data collection
Do you feel it will be possible to achieve the research goals i.e. reduce maternal and child mortality in the present environment?	To some extent- but the environment requires improvement	Yes we are part of the environment and when we change we can also change the environment	Yes though not 100%	Yes	Yes

Table 7.1:Focus group responses

It is interesting to note that the maternity department saw the objective of this research as data collection, while all others saw it as data collection that could affect care delivery and the ward. Regarding staff awareness, both maternity and administration saw the need for reminding and updating, while those on the children's ward were aware of how the project could serve patients. Responses to understanding of the project intentions were partially understood by all respondents with administration and children's wards appearing to exhibit broader understanding of intended outcomes.

The children's wards have viewed the changes made in a positive light and accepted and recognized the benefits, whilst acknowledging that initially the changes were feared, whereas administration recognized that change is threatening and the old order gives a feeling of security.

The majority of the respondents felt it was possible that the reduction of maternal and child mortality could be managed in the future if financial resources were available and if information obtained from the new database could be applied and the hospital environment improved.

The new system of record keeping appeared to be viewed positively by all departments questioned: all seemed to agree that the new changes were regarded as improvements and that these changes had resulted in a positive impact on the original system. When asked if care had improved or deteriorated, maternity felt it was the same while all others agreed there had been improvements. The responses to whether the new data would be useful all showed limited awareness of its value; these ideas may possible change and expand when increased information is available and its usefulness recognized as being applicable for other purposes.

The need for accurate documentation appears to be fully understood by the other respondents, as is the need for commitment. The response for improved patient flow is understandable as the flow has no direction and no logic, this no doubt adds to the

confusion of care in this department. The fact that all have a different perspective on this question could be viewed as positive and healthy.

In response to recording systems, maternity had a rather narrow view, wishing for a clerk to record data and reduce their paperwork. The others wished to make use of the information collected for this institution and others, the children's ward seeing it as able to improve information and outcomes.

In response to further ways to improve the new system and what else to do, maternity here responded with an idea that is vital to success in improving patient care through access to the notes by way of records being kept within the unit. When and if implemented, this should allow access to notes and reduce the risk of lost notes, which is a huge problem at present.

When it came to sharing the data findings, maternity seemed to recognize that there was a need to re-educate staff and avoid future mistakes; administration saw the need to involve the teaching staff at the training school; the children's ward staff wished other areas to learn from their achievements. In regard to medical records and possible changes, it was not possible to ascertain if maternity wanted the staff educated to use the computers they asked to make use of. The staff appeared to think the computer was capable of doing 'everything' and did not appear to realize that it is only a tool to be used. The others appeared to recognize that records and data have a purpose and can be put to use.

The views on resistance to re-education on documentation and in-service training were varied, again maternity had fixed ideas that there is no resistance, some staff gave their opinion off the record "that their training taught them everything they needed and the changes were just so I had a job".

7.5. Progress Report from the Matron of the Maternity Unit

A number of forms were introduced as part of the new system of recording clinical information. For example, the new maternity record includes some essential items of information such as the gestation period on admission, antenatal history, parity, previous medical and pregnancy histories, type of delivery, reasons for Caesarean section if relevant, length of stay after delivery, information about the new born including gender, birth weight, abnormalities, any associated clinical conditions at birth. These additional items of information are incorporated into the new database.

A separate maternal death report was introduced detailing actions and treatment given prior to death, the names of staff involved and the decisions made by individual staff. Similarly, many new and essential items of information were included in the new databases for the special care baby unit, obstetric ward and the paediatric units (Appendices viii, ix, iv).

As these forms are pre-printed, data collection has improved since staff are relieved of the chore of ruling the pages themselves and are more willing to use the forms. All the data required for a patient can be entered in one book which contributes to a more complete record.

New folders for baby notes have been introduced so that each has a separate record from the mother which can then be added to if necessary as the child grows up.

Weekly meetings of staff to examine circumstances surrounding perinatal and maternal mortality have been instituted and are leading to improvements in practice. Workshops on particular aspects of obstetric care are held on a regular basis. The matron has conducted training sessions with nurses from health centres and clinics to help them in early detection of possible complications in pregnancy enabling earlier referral to hospital.

7.6 .Further action

The evaluation data appears to suggest that the programme for the second year needs to incorporate the following activities:

- a) Staff need to be regularly updated on the progress of the project and directed to any specific areas of concern.
- b) Staff should be encouraged to learn computer skills to help dispel misconceptions about the usefulness of computer technology. There is a need to emphasise the role of ingenuity.
- c) Staff need to be taught the importance of thoroughness in data collection
- d) Interim findings from the epidemiological records should be shared as part of the updating process, highlighting the areas of improvement and those needing attention.
- e) The maternal mortality and child mortality figures should be regularly circulated to remind staff of their key task.
- f) Examples of good practice should be incorporated into the re-education programme.

7.7. Can change in Nakuru be sustained?

One of the hidden objectives of this project is to implement changes which are long lasting and can easily be transferred to other districts in Kenya or to other poor regions of the world if shown to be effective and practicable. When the changes were to be introduced the researcher was aware of the tendency for a country such as Kenya to want to mirror the West and expect unattainable outcomes. For example, in the West advanced information technology is used for data collection. Most African countries, because of their economic position, cannot afford such technological advancement. Their expectations should not be raised resulting in disappointment.

It has been suggested by the Research Task Force that a computer with internet access should be installed in the research office. In principle this would be considered as an

advancement in data base management. Communication via Internet is taken for granted by many industrialized countries. The problem is that Kenya faces power cuts on a regular basis and by night fall electricity is not available in many of the rural areas. Transferring and accessing health data via Internet between districts and between district and the central health government is therefore made almost impossible. There are no easy solutions as far as this is concerned unless the supply of electricity can be made more reliable. It has been shown that manual record keeping with understanding and diligence will achieve the same results, although a basic computer with the necessary software package would have speeded up the analysis of health trends. The manual system of recording introduced during the project remains a reliable mode.

There is also a belief that money would solve all problems in the developing world.. For example, in the premature baby unit, staff relied on donations without using their ingenuity to improvise using local raw resources to produce more incubators. Additional funding does not in fact solve the problems of poor clinical and ward management including essential ward hygiene.. People in the developing world have shown themselves to be extraordinarily resilient, creative and with a determination to survive under extreme adverse living and environmental conditions. Therefore, staff in Nakuru should be encouraged to be innovative in their approach to change. The progress report submitted by the Unit Matron of Maternity shows that sufficient progress has been made and there is commitment on her part to drive the change programme forward. This indicates that leadership is an important element for change. It does not incur additional expenditure.

However, the motivation of the staff has to be maintained. They could become demoralized if progress is seen to be slow combined with the fact that staff have to make do with limited resources and poor physical environment. The application of industrial psychology is of paramount important. Senior staff who drive change forward need mentoring so that problems and success can be discussed openly with someone who is not intimately involved in the project. An academic centre in a

developed country can serve this purpose as it can provide moral support as well as advice at a distance. In fact, the Centre for Comparative Public Health at Durham University has provided this form of support.

Over time, one can be confident that the staff in Nakuru can achieve some of the objectives set for themselves particularly those within their own control, e.g. improving hospital hygiene, nursing leadership, hospital environment in various units reducing mortality in both clinical areas.

7.7.1. Obstacles impeding progress and sustainable change

Although the staff in Nakuru are making improvements by hard work and improvisation, there are many obstacles to surmount when thinking about long term plans. For example, the cumbersome health service structure at national and district level might be difficult to change or it may not be possible to change. There is a need to examine the possibility of improving the level of primary care provision as this is significantly related to maternal death and the health status of infants and children.

Currently, maternity services are not available free of charge, they have to be paid for by clients. This section of the population exists on thirty-three Kenya shillings per day. For each ante-natal clinic visit a woman would need thirty Kenya shillings and four hundred Kenya shillings to deliver in a rural health centre. To deliver in the Municipal maternity hospital one thousand Kenya shillings, plus a bottle of bleach and 2 or 3 pairs of sterile gloves are required. The Provincial General Hospital charges are one thousand one hundred and sixty Kenya shillings for a normal delivery, plus one hundred and twenty Kenya shillings per night for the bed. The charges for Caesarean section are three thousand Kenya shillings for the theatre, plus one hundred and fifty Kenya shillings for a file and one hundred and twenty Kenya shillings per night for the bed; the usual period of stay in the ward is 7 days, which results in a total of three thousand nine hundred and ninety Kenya shillings. (Table 7:2 and Table 7:3.) These charges must suggest that women are denied their basic rights

in regard to essential and accessible health care in Kenya, through their inability to pay. This is therefore a denial of one of their basic human rights.

Service Offered	Facility type used	Charges made	Extras to be provided	Days allowance equivalent
AN clinic	Rural HC	Ks.20-30	lab tests	1 day
AN clinic	District	20-30	lab tests	1 day
AN clinic	PGH	30	lab tests	1 day
AN clinic	Municipal	30	lab tests	1 day
AN clinic	Private	100-300	lab tests	3-10 days
AN clinic	Mission	50-100	lab tests	1.5-3 days

HC = Health centre. PGH = Provincial General Hospital

Table. 7:2 Charges for Antenatal care at certain facilities.

Information courtesy of clinics and health facilities in Nakuru District and Municipality.

Service Offered	Facility Type used	Charges Made	Extras to be Provided	Days allowance Equivalent
Normal Delivery	Rural Health centre	Ks 400	Drugs	13 days
	District Hospital	Ks 800	Drugs	26 days
	PGH	Ks 1,160	Drugs	35 days
	Municipal Maternity	Ks 1,000	Bleach and gloves. Drugs	35 days
	Private Clinics	Ks 4,500- Ks 10,000	Drugs	157 days to 350 days
Caesarean Section	District Hospital	Varies	Drugs and bed charge	Not known
	PGH	Ks 3,990	Drugs	132 days
	Private	Ks 10,000- Ks 40,000	Drugs and physiotherapy	350 days to 1,400 days

PGH = Provincial General Hospital

Table 7:3: Delivery Charges for delivery at certain facilities

Information courtesy of Clinics and health facilities in Nakuru District and the Municipality

The above demonstrates the difficulty encountered by many pregnant women in regard to access to basic care.

7.8. Factors outside the control of Nakuru Provincial Hospital

Although one might be confident that sustainable and inexpensive changes can be introduced in the Provincial General Hospital in Nakuru, there are many factors which inhibit progress in the longer term. Without addressing some of these issues in this chapter, a wrong impression might be given to the readers that these equally important factors are ignored by the researcher.

7.8.1. Harmful cultural practices

Cultural norms that exist in Kenya could be a major inhibitory factor for sustainable change in health care and practice in Nakuru. Female genital mutilation is practised in some communities which can result in injury to many women in childbirth.

“Infection related to female circumcision can also contribute to infertility, while scarring of the genitalia may cause difficulties in labour and thereby lead to increased risk of maternal and perinatal morbidity and mortality.”

(MoH Kenya. Nov. 1996:8.)

Another harmful practice is the starving of pregnant women by the Maasai, one of the minor tribes in Kenya, to stop a large baby developing, as they believe that may lead to a difficult birth, a belief that at times forces pregnant women in this community to go for two days without feeding. (Wangulu E. 1999)

Early marriages in many communities in Kenya resulting in early childbearing, coupled with malformation of the pelvis due to poor diet causes permanent damage to the young women and increases the incidences of neonatal deaths and retardation of physical and mental growth

7.8.2.. Social issues that impede health of women and children

7.8.2.1. *Women's position*

Certain cultural and social behaviours can also conspire to bring about maternal deaths. Many of these harmful practices and the conditions that lead to poor outcomes could be preventable for future mothers through education now in regard to key areas, such as, the important role of the girl child as the mother of the country's future population, the need for adequate nutrition, the importance of female education.

In many parts of Africa, land title acts and traditions keep women from ownership of property. Globally, women are the sustainers of family life and in developing countries typically produce 60 to 80 percent of the food. Until women are empowered, instead of being marginalized, until economic life is equitable, inclusive and human centred, no nation can thrive. (CEDAW 2000).

This implies that without equity for women, any developmental progress is likely to be hampered and severely restricted. Others have echoed this theme in the past in relation to other cultures and traditions, in Africa and elsewhere. Christian Aid (1998), in their report *Distant Targets*, comments that one of the main stumbling blocks to development in all spheres is poverty. If poverty were to be reversed, then the woman's position in Africa must change. President Nyerere said:

“Women of Africa toil all their lives on land they do not own, to produce what they do not control and at the end of the marriage through divorce or death, they can be sent away empty-handed.”

Julius Kambarage Nyerere, Founding President Tanzania.

7.8.2.2. Education for women and girls

A poor standard of literacy amongst females can lead to ignorance of needs pertaining to diet, health and hygiene, both for themselves and for their families. This lack of education impacts in turn on their ability to claim any social status, as they are unaware of any rights they may have within a community. Education is widely accepted as playing a part in whether or not a mother is more likely to attend antenatal clinic. The Demographic Health Surveys, for all three of the east African countries, Kenya, Uganda and Tanzania, have shown, that the mother's educational status impacts either positively or negatively on the survival chances of her child. (Kenya DHS 1998:97:92.) (Uganda DHS 1995:106:101.) (Tanzania DHS 1996:107:99.).

In Kenya, pregnancy forces 10,000 girls out of school each year. Education gives girls the ability to make choices and acquire confidence in their own abilities in other spheres. Education increases the female's status in the eyes of her husband, her family and her community. Educated girls have more employment opportunities, increased decision making skills and power, her awareness of herself and society in general is also enhanced. (UNICEF 1995). Education also impacts on her parenting abilities as is illustrated elsewhere in this paper.

If these inherent societal problems cannot be resolved, sustainable change in the health status of women and children in Nakuru will be impossible. How these changes can be made is a global issue and is beyond the scope of this thesis.

A poor standard of nursing practice and poor management leadership could be contributory to some of the preventable deaths reported in this study. Local concerns have been addressed in this project and some success has been achieved. It is believed that the approach used for change is inexpensive and can be sustained in Nakuru. Even if the intention to reduce the morality rate in both childbearing women and children cannot be accomplished, the improved standard of clinical practice will have benefited many people in the future and the job satisfaction of the staff will also have

improved. The new epidemiological database could be used for health trends prediction and for the planning of health care provision.

Sustained improvement in the standard of care and mortality rate can only be achieved if some of the key determinants such as accessibility to health care, the inequality suffered by many Africans, the economic status of the country, social attitudes, and political willingness to change as a country, can be addressed adequately and effectively. There is also a need for donors to be more responsible in funding future projects ensuring that funds are directed at the root causes.

Chapter. 8 Conclusion – the need for long term sustainable change in Nakuru

8.1. Introduction

The aim of the project was to identify the extent and cause of maternal and child mortality in a provincial hospital in Kenya and to introduce a programme of change which was affordable and manageable by the hospital staff in the units concerned.

Initially, the researcher encountered resistance to any suggestion of change. However, the medical superintendent recognised the significance of the findings from the 3 months data collection on admission, mortality rate and cause of death initiated by the researcher. The action taken by the medical superintendent gave the researcher and the task force the necessary authority to implement change.

To some extent the three objectives set out in chapter one were achieved but any interventions introduced during the study are considered temporary. Sustainable changes will depend partly on the commitment of the staff at Nakuru. Staff in Nakuru in their evaluation of the project realised change was necessary but the long term changes are prohibited by finance and the current health service structure in Kenya. If these external factors cannot be addressed satisfactorily, then they have adverse effects on any temporary change which has taken place in Nakuru.

8.2. Key issues in Nakuru

In my view, within the constraints of finance and other factors outside the control of the researcher, the key problems identified at the beginning of the project were solved satisfactorily.

A new record system was successfully introduced and a data base is now available and it is shown to be a very useful auditing tool for efficient and effective planning for future health needs. However, a considerable amount of in-service education is

required to promote awareness of the need to keep accurate hospital and clinical records. The senior staff of the hospital became aware of the need to monitor this aspect of hospital function effectively and that staff who disobey instructions should be counselled and managed appropriately.

8.2.3. Hospital and clinical records

The data collected only reflects a 3 month admission period in both the maternity and paediatric units, nonetheless the death rates in these 2 units were shown to be unacceptable. It is shown in chapter 5 that many of these deaths in the midwifery unit could have been prevented. The issues highlighted in chapters 5 and 6 provide new sources of material for further investigation by Nakuru staff.

8.2.4. Infection control

The effort of conducting a thorough infection control audit proves to be beneficial. As a result, a number of wards became cleaner and more hygienic. The maternity unit has been painted and new curtains are in place. Walls are now cleansed on a regular basis. The floor remains a problem due to cracks and holes in various places.

More specifically, bad practices which were potentially harmful to patients and staff have now ceased. For example, a simple no-cost device using a large plastic container for the disposal of sharps such as blades and used needles was introduced in the units involved. Staff are instructed to follow hospital policy. Clinical waste disposal still poses a problem, however, the hospital committee have earmarked funds to repair the incinerator. This should be operational very soon.

One nursing officer attached to the continuing education department has attended a course on infection control and has been appointed to be responsible for educating staff on this subject.

The nursery has a new rubber tiled floor laid and the unit has fitted a second sink for staff washing their hands, the new floor is easier to clean effectively and staff is more able to practice clean and safe handling of neonates and equipment.

The paediatric medical ward for children of 2 years and above has been sponsored by the local Lions Club and the ward has been painted, and some new furniture and a small television supplied.

8.2.5. Effective intervention

Staff morale has improved to a small degree, the fact that the changes were made by consultation with staff and their opinion and suggestions sought, has made staff feel ownership. More importantly, at the end of the study, staff acknowledged the hospital environment and nursing practice needed critical examination and the changes made by the task force was necessary and beneficial to patient care.

Matrons of various units and the matron in charge of the hospital became more authoritative in their approach to hospital management.

One can therefore conclude that the research objectives were achieved in so far as possible. It is hoped that the on-going 5-year project when completed will help to elucidate further the nature and causes of maternal and child deaths and appropriate action to be taken. The findings of the 5-year study will be presented to the department of health for funding purposes.

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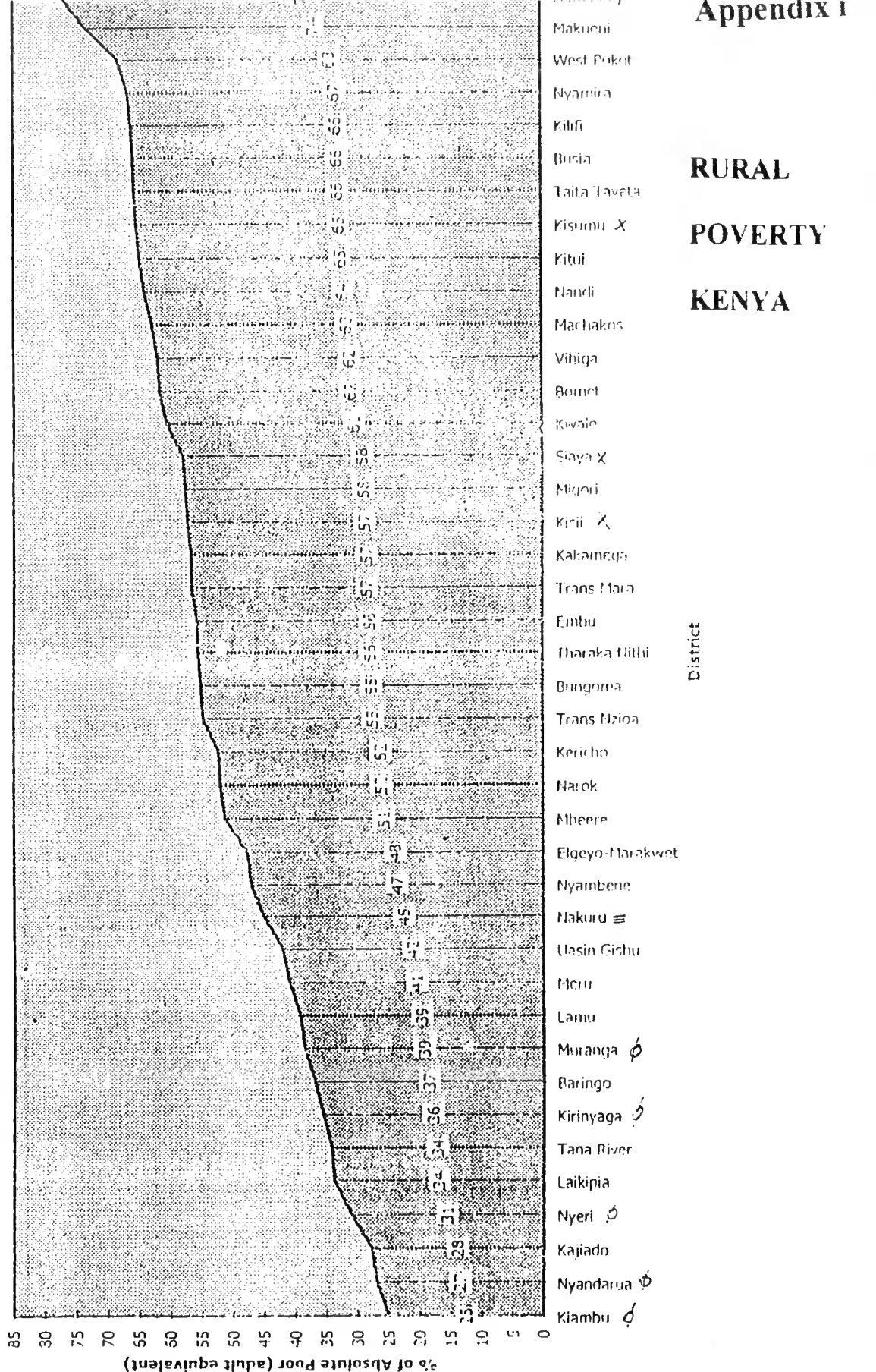
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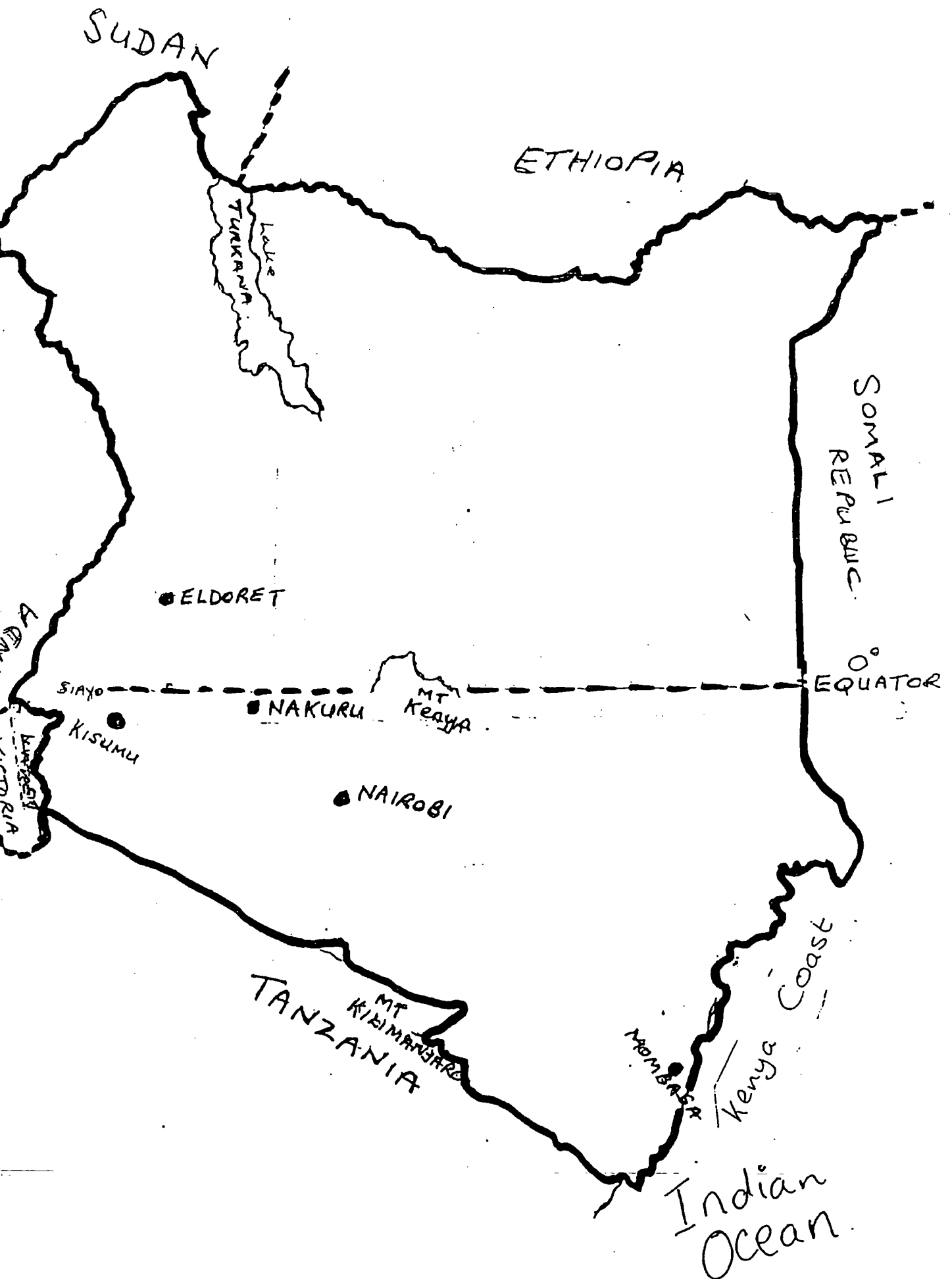
Appendices

Fig. 15.1: The Mountain Range of Rural Absolute Poverty in 1997



X NYANZA PROV.

Ø CENTRAL PROV.



Hygiene

[illegible]

DIADRIC UNITS

Month of2001

[illegible]

Appendix v

Staff training scheme on information and records

Staff training scheme on information and record keeping.

The research carried out for this paper exposed gaps that indicated the need for a number of improvements, which included information collection and record keeping. For the ongoing Safe motherhood project was to be able to start it was necessary to introduce a number of changes in the way which data was recorded at the hospital. This involved deciding which extra information was to be collected and the continuing education department choosing the best method of training the staffs in the various wards.

Initially, the project coordinator and the researcher were asked to design books which would enable the collection of sufficient information to set up a basic data bank for use by this Provincial General Hospital. The changes in documentation decided upon were based on the changes introduced in the wards involved in the research; these are shown in detail in Chapter 3 compiled from the admission and delivery books and the outcome on the wards the mother is transferred to. This is the first time that ante-natal, intrapartum and post-natal information has been collected and the records of women from admission to outcome become available at this hospital. Prior to this type of data collection the previous recording system did not allow the connection to be made between these events on a regular basis.

Training to cover the following topics;

- The reasons for accurate recording and reporting.
- Explanation of the new record books and data sheets, also how they need to be used correctly for reporting.
- How to use the data to improve care in maternity and paediatric units.
- How the new recording system will be monitored.
- The involvement and roles of the research task force.

Draft Interview Schedule.

What is your impression of the project so far?

What is your understanding of the intentions of the project?

- 1) What, if any, are the differences observed between the previous system and the new one in regard to record keeping and data collection?
- 2) Have these differences improved on the original practices or damaged them?
- 3) Have changes had a positive or a negative impact and in what ways?
- 4) Has the delivery of care improved or deteriorated in any areas? If so which areas?
- 5) Do you envisage being able to utilize the new data available? If so how?
- 6) Which improvements would you find to be most useful to the PGH Nakuru?
- 7) Are there further ways you would wish to improve the data collection, and if so what are the ways you would wish to make use of the information collected?
- 8) Are there ways in which the maternal and child mortality outcomes can be improved? To what extent can the current project help achieve this objective?

In service training programme for staff.

In relation to project, why has re-education met such resistance in your opinion?

Recording system, in which way should the data gathered be used in future?

How do you envisage sharing the data findings with the hospital staff to enable the hospital to improve the care delivered to patients.

Medical records department

Do you feel it will be possible to improve medical records department?

If so what is necessary to achieve the improvements?

Do you feel it will be possible to achieve objectives in the present environment?

Objectives were to reduce maternal and child deaths at PGH through making appropriate use of accurate data being collected and changes introduced in response to the findings

Questionnaire for staffs in maternity and paediatric wards PGH Nakuru. Q (1)

Please help us to assess the level of understanding in your department by filling in this questionnaire. Please note this is NOT a test, you will be helping to assist the continuing education department in planning for in service training needs in certain departments within the hospital. This questionnaire is anonymous, please state Ward.

1) What is your understanding of the correct standard of record keeping and documentation in regard to patients?.....

2) Are you satisfied with the standard of documentation and record keeping in your department?

If your answer is NO please give the reasons why not.

3) Are you satisfied with your own standard of record keeping or would you like the opportunity to improve your standard in this area?

4) Do you have any suggestions for improving record keeping in your area of practice? We would welcome your suggestions.

5) What do you think is the best method of offering education to trained staff to update their knowledge in this area and (documentation and record keeping)

Thank you for taking the time to fill in this questionnaire, when it is completed please return it to Mr. John Njoroge, Head of Continuing Education. PGH Nakuru.

Please return this questionnaire before the 31 January 2001. Thank you once again.

[illegible]

Obs/ Gynae ward data sheet (2001)

Durham / pgh (nakuru) safe motherhood project

OBSTETRICS

Month of2001

[illegible]

The Newspaper that serves the Youth

November 21, 1999

Do Kenyan children have rights?

Rights of the children

Life and Survival

Children have the right to adequate living standards i.e proper nutrition, shelter, clothing and health care.



Development rights

Children have the right to education, the right to play and leisure, the right to take part in cultural activities, the right to freedom of thought and religion and the right to get access to information, social security and parental love.



Protection rights.

Children have the right to protection from exploitation (being used for somebody else gain), cruelty, and protection against being separated their family.



Participation rights

Children have the right to freedom - to express their opinions and have a say in matters affecting their lives.

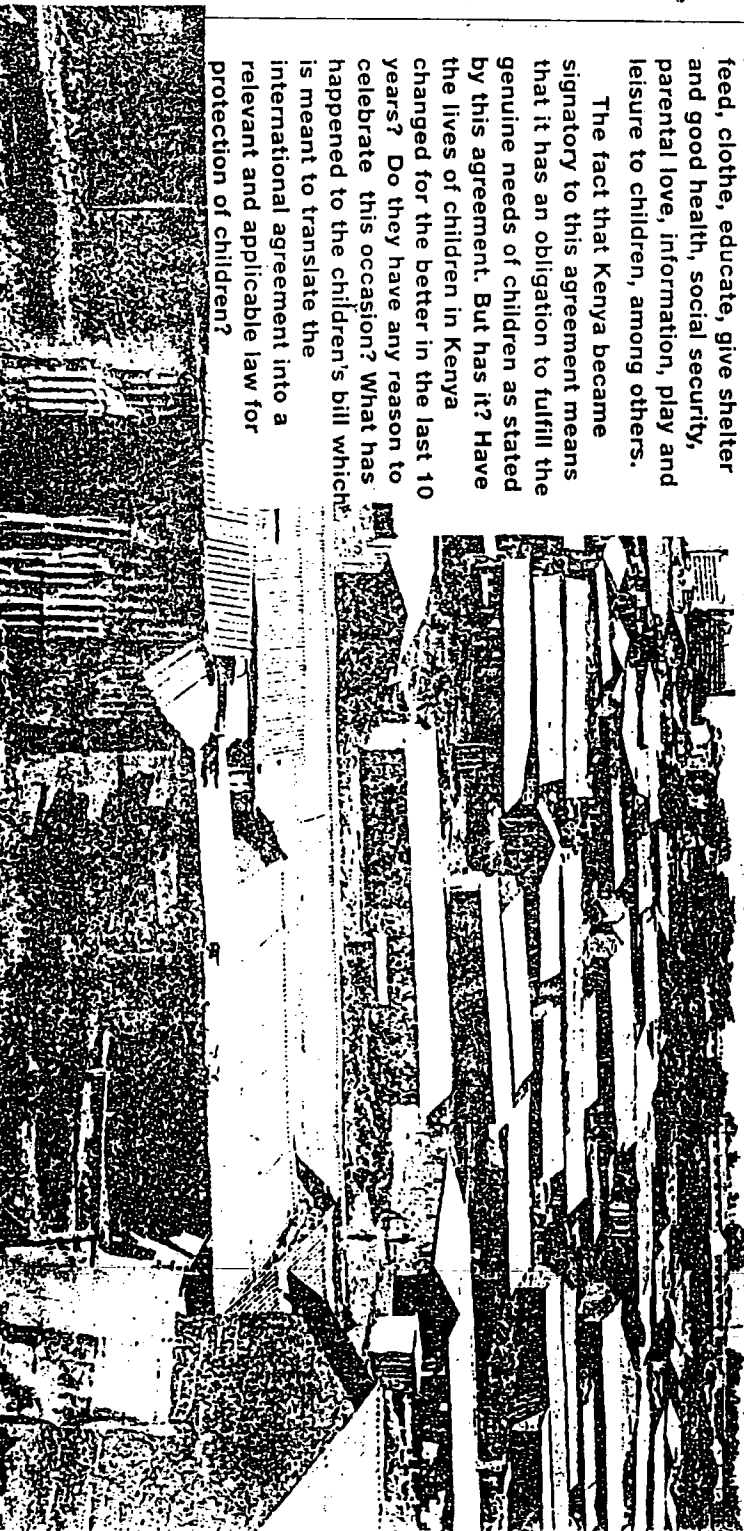


Kenya like most United Nations members is celebrating a decade after signing the Convention on the Rights of the Child, (CRC).

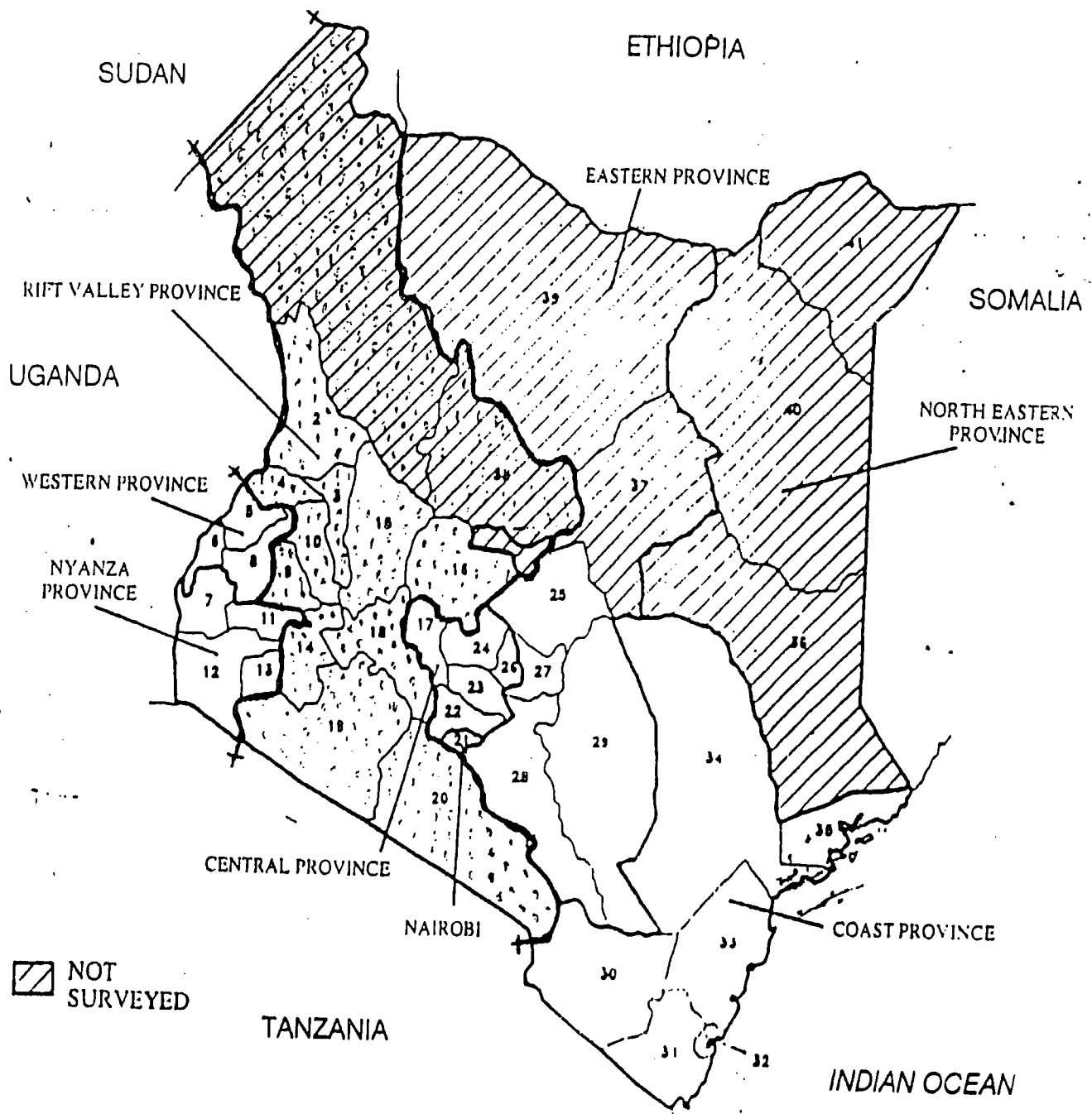
This international law or agreement points out the importance of children as rightful citizens of their nations who are entitled to all rights including the right to survive, to develop, to be protected and to participate. These four basic rights make it critical that parents and governments should feed, clothe, educate, give shelter and good health, social security, parental love, information, play and leisure to children, among others.

The fact that Kenya became signatory to this agreement means that it has an obligation to fulfill the genuine needs of children as stated by this agreement. But has it? Have the lives of children in Kenya changed for the better in the last 10 years? Do they have any reason to celebrate this occasion? What has happened to the children's bill which is meant to translate the international agreement into a relevant and applicable law for protection of children?

Nairobi
many Kenyan children
Slums home for



KENYA



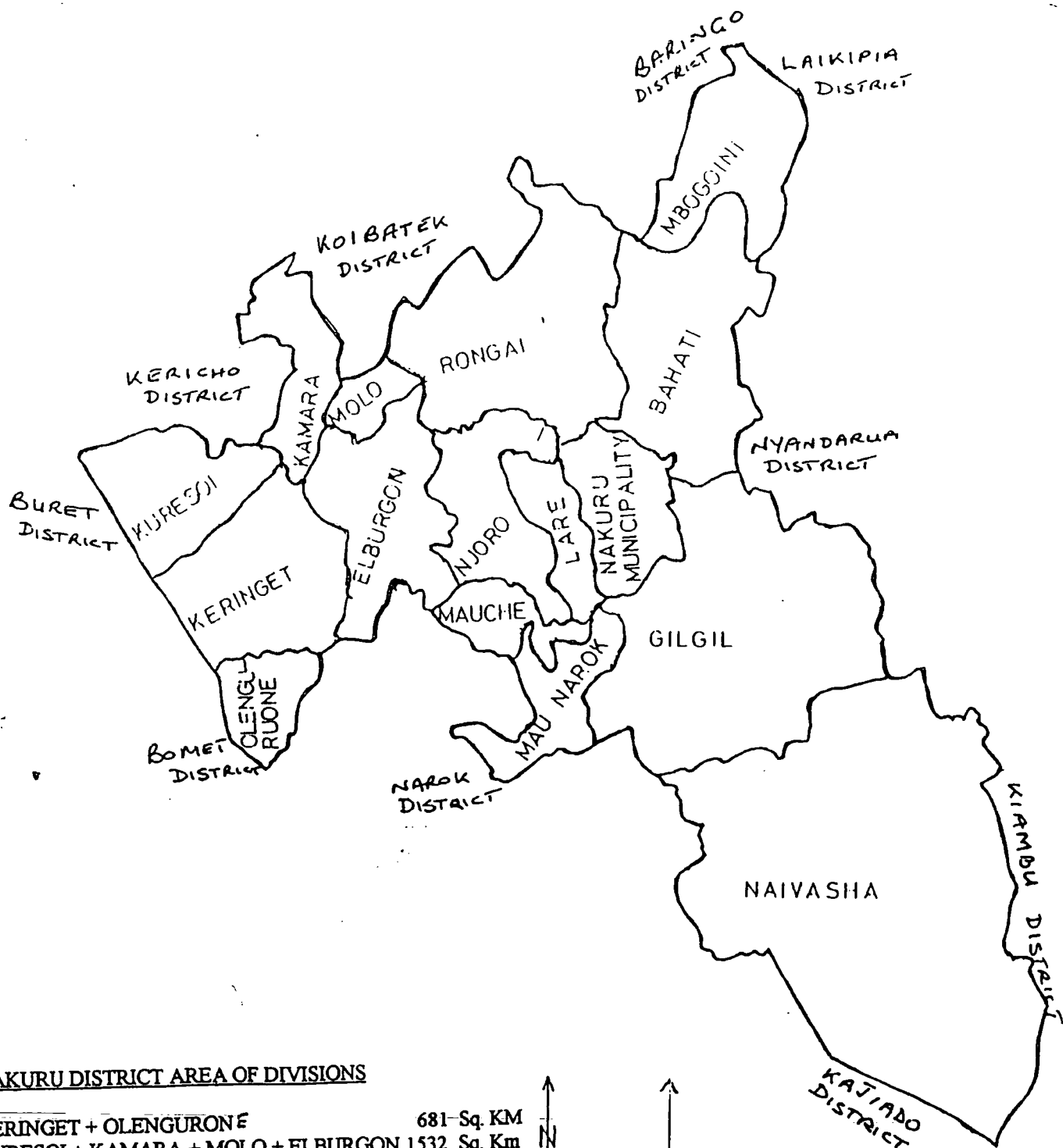
MAP KEY

21 Nairobi	EASTERN PROVINCE	RIFT VALLEY PROVINCE
CENTRAL PROVINCE	27 Embu	15 Baringo
22 Kilambu	37 Isiolo	3 Elgeyo Marakwet
28 Kirinyaga	29 Kitui	20 Kajiado
23 Murang'a	28 Machakos*	14 Kericho*
17 Nyandarua	39 Marsabit	16 Laikipia
24 Nyeri	25 Meru*	18 Nakuru
COAST PROVINCE	NORTHEASTERN PROVINCE	8 Nandi
33 Kilifi	36 Garissa	19 Narok
31 Kwale	41 Mandera	38 Samburu
35 Lamu	40 Wajir	4 Trans Nzoia
32 Mombasa	NYANZA PROVINCE	1 Turkana
30 Taita	13 Kisumu	10 Uasin Gishu
34 Tana Rivor	11 Kisumu	2 West Pokot
	7 Siaya	WESTERN PROVINCE
	12 South Nyanza*	5 Bungoma
		6 Butia
		8 Kakamega*

* Note: Each of the six districts marked with an asterisk was recently subdivided into two or more districts. The former boundaries are shown here since they were used in this survey.

Nakuru District by sub district/division
9 new sub districts and areas in legend in left hand corner

NAKURU DISTRICT



NAKURU DISTRICT AREA OF DIVISIONS

KERINGET + OLENGURONE	681-Sq. Km
KURESOI + KAMARA + MOLO + ELBURGON	1532 Sq. Km
RONGAI	682 Sq. Km
NJORO + MAUCHE + LARE + MAU NAROK	744 Sq. Km
MUNICIPALITY -	266 Sq. Km
MBOGGONI -	392 Sq. Km
BAHATI -	554 Sq. Km
GILGIL	1029 Sq. Km
NAIVASHA	1793 Sq. Km



Relationship between newborn survival and age of mother

In the sample of 1395 deliveries where the age of the mothers is known, 97 babies died, which represents 695 deaths in every 100,000 births or 7 in every 100 babies.

Figure 4.4 shows the percentage of babies dying is higher in the 34-38 year old group. A chi-square test resulted in a P-value of >0.09 , which implies that there is only weak evidence that the survival rate depends on the age group.

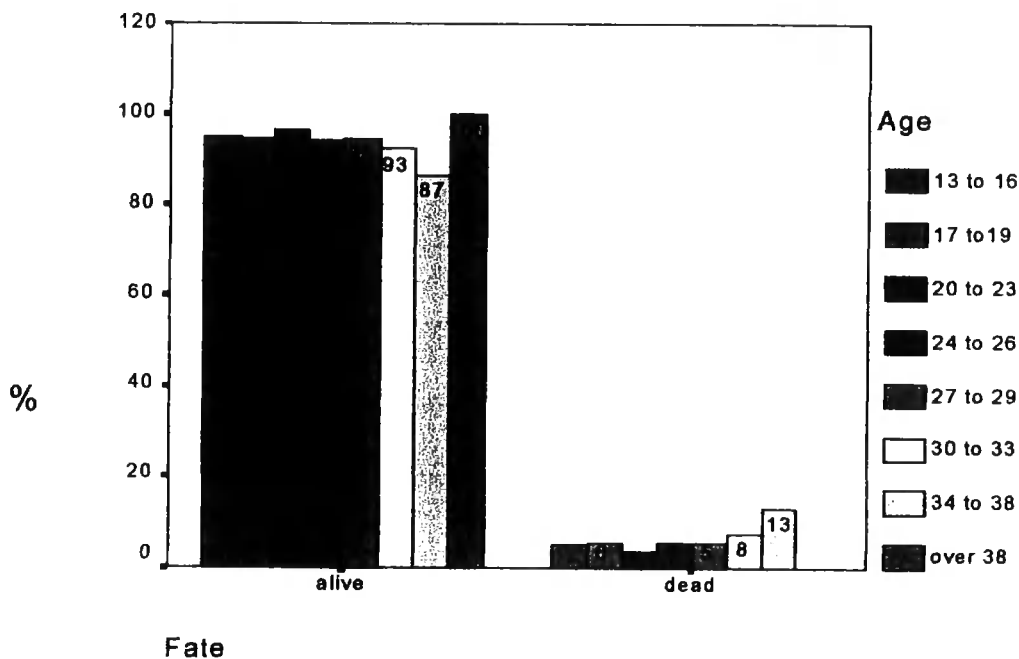


Figure 4:5: Baby's fate v mother's age

Relationship between age of mother and weight of those babies who survived

The chi-square test shows that there is a significant difference in the weight of the baby for the different age groups of the mothers. It is not known if this is due to the mothers between 20 and 29 years being better nourished, better educated and more likely to understand the need for antenatal care and a healthy diet. However this would not explain why older mothers delivered a higher percentage of babies of 3.6 Kgs and above.

Of the total number of 1298 live births, where the age of the mother was known, almost one third (32%), were born to mothers aged under 20 years; more than 53% of the women were between the ages of 20 and 29 and the remaining 15% were more than 30 years of age. (Table 4.4)

Of the group where the weight of the baby's was recorded, a total of 257 babies, (nearly 20%), weighed in the range of 1.9-2.5 Kgs.; 905 weighed between 2.6-3.5 Kgs.; 136 babies weighed over 3.6 Kgs. Assuming the average birth weight of African babies to be 3 Kgs -3.5 Kgs nearly 80% of all the live births would not be regarded as underweight. The chi-square test shows that age has no effect on birth weight.

Age of mother	Baby weight 1.1-1.8kg	Baby weight 1.9-2.5kg	Baby weight 2.6-3.5kg	Baby weight Over 3.6kg	Total births
13-19	24 (5.75%)	67 (16.6%)	292 70.85%)	32 (6.8%)	415 (31.97%)
20-29	40 (5.97%)	88(12.17%)	493 (72.93%)	64 (9.66%)	685 (52.77%)
30+	11 (5.3%)	27 (13.55%)	120 (60.6%)	40 (20.5%)	198 (15.25%)

Table 4:4: Distribution of baby weights against age of mother

Survival rate of babies and other factors

In the 1743 infants delivered at the unit, including the 97 who were born dead, the weight of the baby was found to be related to its sex (Chi-square test, P-value=0.04), female babies were generally smaller than male babies. (Figure 4:5)

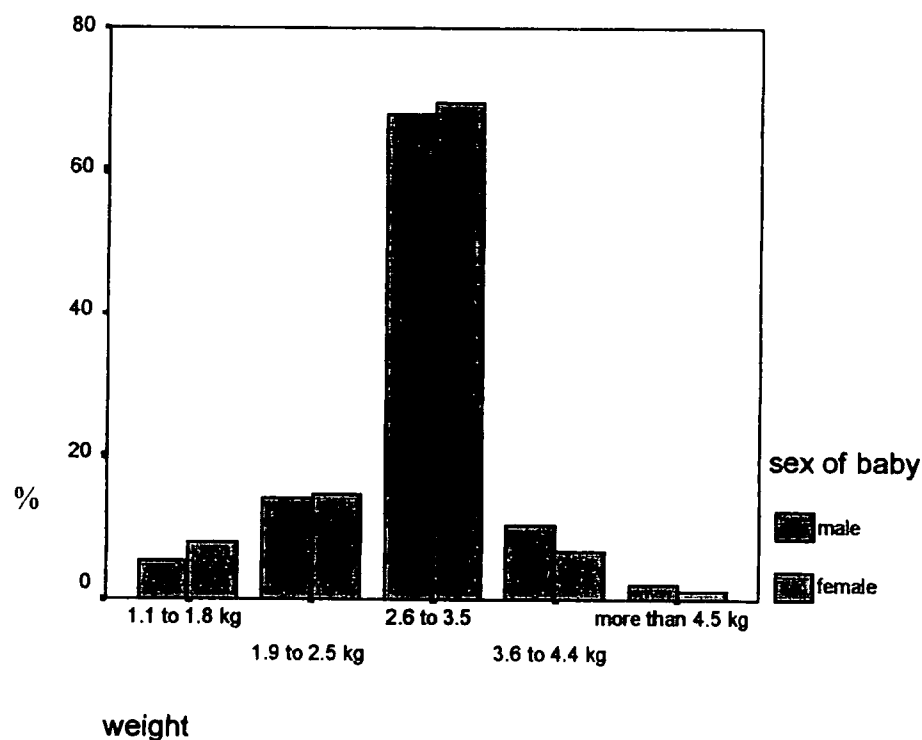


Figure 4:6: Association between sex and weight

Physiologically weight at birth should have an effect on the survival rate, however no significant difference was found in the survival rate between male and female babies. (Chi-square test, P value > 0.10)

Obstetric admissions 01/02/2000 – 02/05/2000.

In the period 1st February to 2nd May 2000, there were 277 obstetric admissions to the ward (63 in February, 111 in March and 103 in April). 2 maternal deaths occurred on this ward, one due to septic abortion and the other due to eclampsia.

Abortion related conditions were the most common reason for admission, as can be seen from Figure 4.6.

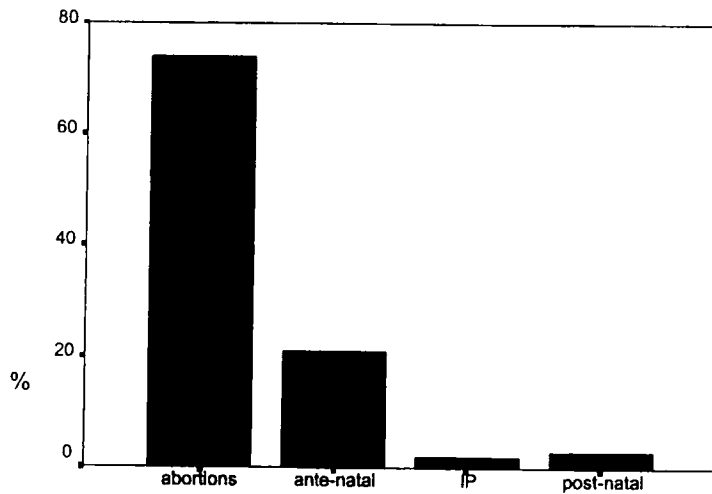


Figure 4.1: Reasons for obstetric admissions in percentages

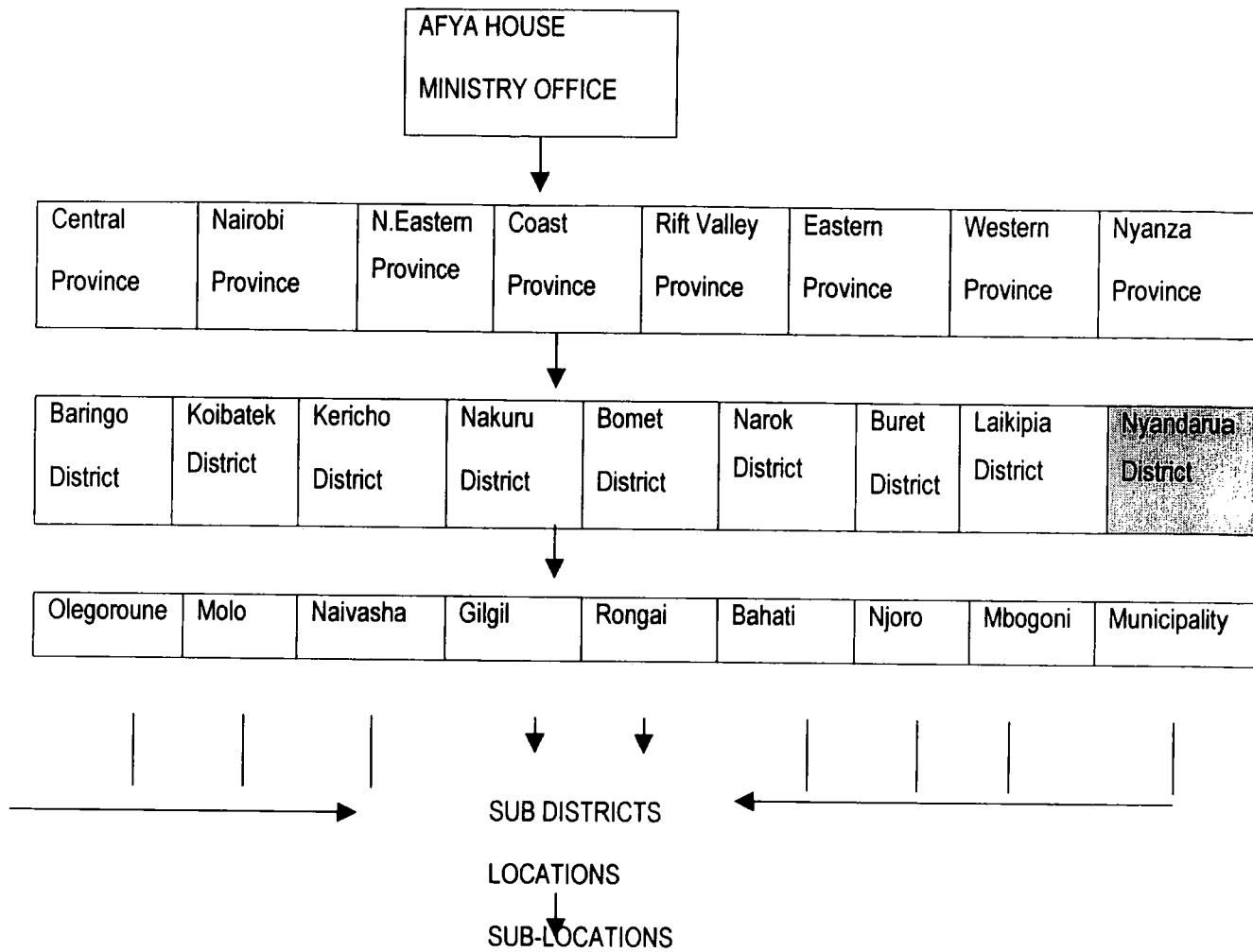
The percentage of abortions in March and April is significantly lower than in February (Chi-square test, P-value=0.05). In February, the percentage of abortions is 85.7%, while in the next two months the percentages are just over 70.

Structure of the health service in Kenya

In principle, the health service in any country is established for the needs and convenience of individuals in society. The structure of the health service should be simple, efficient, economical to run and easily accessed by all. In reality, the reverse is often experienced.

In order to understand the existing conditions regarding the provision of health care, it is necessary to examine the structure of the health services in Kenya generally and Nakuru in particular. The health service in Kenya is, in part experiencing a period of change in the way it is administered. At the present time the health services, personnel and institutions are run from Central Government through the Department of Health. The headquarters being AFYA House Nairobi, (Afya means health). Each of the eight Provinces in Kenya has a Provincial Headquarters, where the administration of the Province is in the hands of the Provincial Commissioner. Each Province is then divided into Districts, of which there are 18 in the Rift Valley Province, where Nakuru is situated. Each district is then divided into Sub Districts for the purposes of health services, these are called divisions in other parts of the administration system. Sub Districts and divisions are then further divided into locations and then into sub locations. Sub locations are then split into estates and villages. This system may seem complicated at first, but it must be borne in mind that Kenya has a population of 28.9 million and the country is 582,644 square kilometres; which is roughly two and a half times as large as Great Britain. Therefore to administer a country and population of this size requires a different system to say that of a European country, which may be only one third of the size with one fifth of the population.

The structure and administration of the health service in Kenya is as follows:-



NOTES: Hierarchical order within the health service in Kenya: Afya House, the Permanent Secretary for Health and the Minister for Health

Provincial offices a Provincial Medical Officer and a Provincial Matron are in charge. In Provincial Hospitals the Medical Superintendent and Hospital Matron are in charge.

District offices the District Medical Officer and District Public Health Nurse are in charge. In District Hospitals there is a Medical Officer and Sister in charge.

Sub Districts there are some Hospitals which have Medical Officer and some Health Centres which have Registered Clinical Officers and nurses.

Locations have Health Centres staffed by Registered Clinical Officers and nurses.

Sub-Locations have Dispensaries which are staffed by nurses, or in some cases a trained subordinate staff only.

Structure and function issues of health service

There is a tendency for countries in the poorer regions of the world, particularly those which were under the colonial regime in the past, to mirror the structure and function of their past masters irrespective of whether the structure would serve the needs of the population. The health structure cited above is the one which is still being used by the National Health Service in the UK. The ease of such a hierarchical and cumbersome structure currently operating in the UK has never been evaluated. The structure appears to be costly to administer and makes communication between central health government and other functional units, e.g. district hospitals, rural clinics, etc. extremely difficult. This might be one of the contributory factors in health statistics being inappropriately reported and recorded.

