USING SISTERHOOD METHOD IN ESTIMATING MATERNAL MORTALITY RATE IN KYELA DISTRICT

BY

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DEDICATION

This work is dedicated to my beloved wife Violet Ndossi for her encouragement in pursuing this master degree and to my daughters; Anneth, Nancy and Irene for their tolerance of my absence for that time they wanted to be with me.

ABSTRACT

A cross-sectional study was conducted in Kyela district Mbeya region, to determine maternal mortality rate in the district using the sisterhood method. Kyela district council has 2 hospitals, 2 health centres and 19 dispensaries, which conduct MCH and ANC.A total of 1027 respondents consisting of women in the reproductive age were interviewed by using a structured questionnaire. Maternal and Child Health Aides and Public Health nurses B collected data included information from the respondents about the surviving of all their adult sisters.

Majority (30.4%) of respondents were in the group of 20-24 years, followed by those in the age group of 25-29(24.9%). Age group of 45-49 years constituted the least (2.8%)group. Respondents reported a total of 662 deaths of adult sisters of which 41(6.2%) were maternal deaths. Estimate of the maternal mortality rate was based on total of sister units at risk exposure, total adult sisters(number of respondents plus number of alive adult sisters reported) and total fertility rate. Maternal mortality rate was found to be 628 per 100,000 Live births and ranges from 440 to 816 per 100,000 live births as 95% confidence limits.

The study revealed that most (48.6%) of deaths reported by respondents were due to indirect obstetric cause, which included fever (36.6%), anaemia (7.3%) and others (17%). Direct obstetric causes accounted for 39.1% whereby 14.6% were due to haemorrhage, 7.3% due to prolonged labour and 7.3% due to eclampsia. The results also indicate that 26.7% of reported deaths occurred at home while 23.6% occurred in

health facilities. Place of death for 46.4% deaths could not be accounted for since respondents could not remember.

On assessing the feasibility of applying this indirect demographic technique of the sisterhood method under routine supervision of the Council Health Management Team, the results of this study suggest that; it is generally possible for Council Health Management Team to apply the technique.

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ABBREVIATIONS

AIDS	-	Acquired Immunodeficiency Syndrome
ANC	-	Antenatal Clinic
CEDAW	-	Convention of Elimination of Discrimination Against Women
CHMT	-	Council Health Management Team
ERP	-	Economic Reforms Programme
HIV	-	Human Immunodeficiency Virus
HMIS	-	Health Management Information System
HNP	-	Health and Nutrition Project
IPH	-	Institute of Public Health
MCH	-	Maternal and Child Health
MMR	-	Maternal mortality Ratio/Rate
MoH	-	Ministry of Health
NPERCHI	-	National Package of Essential Reproductive and Child Initiative
NRCH	-	National Reproductive and Child Health
RAMOS	-	Reproductive Age Mortality Survey
SAP	-	Structural Adjustment Programme
TBAs	-	Traditional Birth Attendants
THs	-	Traditional Healers
TDHS	-	Tanzania Demographic Health Survey

TFR	-	Total Fertility Rate
UNICEF	-	United Nations Children's Funds
WHO	-	World Health Organisation
WHD	-	World Health Day
WB	-	World Bank.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND INFORMATION:

Every minute of every day, somewhere in the world a woman dies as result of complication arising during pregnancy and childbirth. The majority of these deaths are avoidable. The tragedy is that these women die not from disease but during the normal, life-enhancing process of procreation. Most of these deaths could be avoided if preventive measures were taken and adequate care was available. Maternal mortality is an indicator of disparity and inequity between men and women and its extent a sign of women's place in society and their access to social, health and nutrition services and to economic opportunities. Maternal mortality is not merely a "health disadvantage" it is " social disadvantage". It is also yet another indicator of disadvantaged within and between the developing and developed countries (WHO 1999). In developing countries, high level of maternal deaths, combined with high level of fertility rates set the problem among the first priorities for health intervention (Ministry of Health - National package of health intervention), Reproductive and child health is the first priority.

An African woman has 1 in 21 chance of dying of pregnancy-related cause during her reproductive life (Paul B.K 1993), compared with 1 in 10,000 in western countries. At least half a million women die from causes related to pregnancy and childbirth every

year: 99% of these deaths occur in developing countries which account for 88% of World's births (WHO 1991).

Safe motherhood Initiative (SMI) is in place to tackle the problem; therefore they need reliable estimate of maternal mortality in the community (WHO 1998). In 1987, the first international Safe motherhood conference took place in Nairobi with the goal of a 50% reduction in 1990 level of maternal mortality by year 2000,and what is needed to accomplish the goal is the political will and strong concerted action (Abou Zahr 1998). Information on the level of maternal mortality is crucial but difficult to get for public health planners and policy-makers (Graham et al 1997). Being one major constraint on planning, management and evaluating of programmes aimed at reducing levels of maternal mortality is reliable and timely population-based data. The deficiencies in information system of many developing countries are well recognized (Graham W et al 1989)

For many years the district have the figures which are usually based on hospital data: they may either overestimated mortality (Walraven et al 1994) because of the many high risk referrals and emergency cases or underestimated it (Oosterhuis JWA 1993) where the coverage of hospital care provision is limited. More reliable community-based estimates are extremely limited due to well-known deficiencies in the health facilities and vital registration. The shortfall of vital registration system is that; they are normally incomplete, selective samples, diverse and practically unreliable, it is also non-existent

in some parts of Tanzania. This does not mean that the system should be discarded; instead it should be improved to remove these errors (Makwaya CK et al 1997).

The sisterhood method is an indirect demographic technique developed at London school of hygiene and Tropical medicines offering a simple, cheap and useful way of getting community-based estimates of maternal mortality. It uses the proportions of adult sisters dying during pregnancy, childbirth, or puerperium reported by adults during a census or survey (Graham W et al 1989). The method does not provide an estimate of current maternal mortality level and therefore does not reflect changes that may have occurred over the recent past. However it is considerably more cost-effective than household surveys using direct estimation and can provide a good starting point for detailed investigation at a later stage (WHO 1996).

1.1.1OTHER INDIRECT METHODS OF ESTIMATING MMR.

Prior to development of sisterhood method, three indirect methods were available to measure mortality: -

1. **The orphan hood method: -**

Based on questions about the survival of the respondents' parents. Often severely underreported by young adults owing to the adoption effect (Hill K et al 1977).

2. The Widowhood method: -

Involves questioning ever-married adults about the survival of their first spouse. This method is likely to produce biased results in polygamous societies, since the death of subsequent and often-younger wives are ignored. Also husband misreport the death owing to the sensitive of the event (Hill K et al 1977).

3. Sibling survivorship method: -

Based on question asked of adults on the survival of their brothers and sisters ever born. The major drawbacks to the method is the assumption that no relationship exist between the number of siblings and their survival probability (Hill K et al 1977).

1.1.2 Direct methods of estimation of maternal mortality rate

1. Vital registration: -

Derives deaths by cause. Even where coverage is complete and all deaths medically certified in the absence of active case finding, maternal deaths are frequently missed or misclassified (WHO 1999)..

2. RAMOS (Reproductive age mortality survey): -

This method has been successfully applied in the countries with good vital registration system to calculate the extent of misclassification. It is considered to be the "GOLD STANDARD" for estimating maternal mortality BUT such

methods are complex and time-consuming to undertake, particularly on a large scale (WHO 1999).

3. **Census: -**

Census produces high quality data and generates both national and sub national figures and it is possible to undertake analysis according to the characteristics of households. Sampling errors would be eliminated or greatly reduced. It is expensive and needs larger sample size (WHO 1999).

4. **Demographic and health survey (DHS): -**

It requires large sample size and the information generated is considerably more complex to collect and to analyse (WHO 1999).

5. **Verbal autopsy: -**

The reliability of verbal autopsy for identifying maternal deaths has not been established. The method may fail to correctly identify a proportion of maternal deaths particularly in ectopic and abortion-related (WHO 1999).

Why is it important to measure maternal mortality?

The reduction of maternal mortality reflects significantly a measure of human and social development: -

- Is an indicator used to compare level of development between countries, regions and districts.
- It offers a litmus test of the socio-economic status of women, their access to health care and the adequacy of health care system in responding to their needs (UNICEF and WHO 1996).

1.1.3 Magnitude of the problem

Fourty percent of pregnant women may experience acute obstetric problems during pregnancy, childbirth and postpartum period, 15% develop life-threatening complications. About 25% of maternal mortality caused by Haemorrhage, 15% by Sexual transmitted Disease, puerperal sepsis, 13% by Eclampsia, 7% by prolonged labour or obstructed labour and 20% by indirect obstetric causes (Anaemia and unsafe abortion). Only 53% of deliveries in developing countries take place with assistance of skilled birth attendant (doctor or midwife), 35% of women receive no Antenatal care, less than 30% receive postpartum care, in very poor countries and regions 5% of women. Sixty five percent of women have access to adequate care during pregnancy (Abou Zahr1998). In most rural areas, one in three women live more than five kilometres from the nearest health facility and 80% of rural women live more than 5kms from the nearest hospital. In Malawi 90% of women wanted to deliver in health facility but only 25% delivered. In rural Tanzania 84% of women who gave birth at home intended to deliver at a health facility but did not due to inadequate birth preparedness (Abou Zahr 1998).

Delivery at facility was 44%, by trained nurse-midwives 28.4%, by doctor 7.4%, and home delivery was 56%, by relative 29.4%, by Traditional Birth Attendants 17% and alone 7%(TDHS 1999). Almost half of all postpartum deaths take place within one day of delivery, and 70% within the first week.

1.1.4 Efforts imposed to reduce the problem

Global health and poverty oriented reduction goals: -

- Reduction by ¾ maternal mortality ratio by 2015.
- Provide reproductive health services to all individuals of appropriate age no later than 2015 through Primary Health Care.

On its side Tanzania took initiative of developing country strategy. Tanzania uses four strategies to reduce maternal morbidity and mortality: -

- Policy and Advocacy.
- Capacity Building
- Performance and
- Quality improvement (MoH-NRCH 2000).

The risk approach model of Antenatal care adopted make up to 90% of the women in Tanzania to have at least one Antenatal visit to a trained Health provider, this will facilitate to achieve safe pregnancy outcomes and reduce maternal morbidity and mortality (MoH- NRCH 2000). Seventy one percent of women had visited four times antenatal clinic (TDHS 1999).

Emergency obstetric care: -

All pregnant women are at risk of obstetric complications. Prenatal screening does not identify all of the women who will develop complication (Rooks et al 1990). The closer emergency obstetrics services are to where women give birth, the better the chance of survival if complications occurs (NPERCHI 2000).

Current situation on maternal health: -

Twelve percent Tanzanian women use modern Family Planning, 24% of married women want to postpone or stop childbearing. Missed opportunities 87% of non-user Family Planning have not been visited or counselled (TDHS 1999).

ANC Performance: -

Coverage of attendance of ANC is 98%. About 60% attend before 24 week of gestation. Average number of visits has declined from 6.5 in 1992 to 5.5 in 1999(TDHS 1999).

1.2 STATEMENT OF THE PROBLEM

Maternal death can be defined as " a death of woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of pregnancy, from any cause related or aggravated by the pregnancy or its management but not from accidental and incidental causes." Thus regards time of death rather than cause of death (Graham W et al 1989). Therefore maternal mortality remains one of the major public health problems nowadays (De Groof D et al 1993). Maternal deaths are divided into direct and indirect obstetric deaths. Direct obstetric deaths result from complications of pregnancy, labour or postpartum (within 42 days of termination of pregnancy), they are usually: haemorrhage, sepsis, eclampsia, obstructed labour, unsafe abortion and incorrect treatment.

Indirect obstetric deaths results from previously existing disease or from disease arising during pregnancy i.e. Malaria, HIV/AIDS, Anaemia and cardio vascular disease. Many of the above-mentioned factors can be attributed to low socio- economic status of women, which is a fundamental determinant of maternal mortality in many developing countries. Low socio-economic status limits the access of women to education and good nutrition as well as to the economic resources needed to pay for health care services. Only 53% of pregnant women in developing countries deliver with the help of a skilled attendant (WHO 1999). With Kyela district it is only 43% institutional deliveries (Annual District report 2000). At the moment, information on the level of maternal mortality is based on hospital data (i.e. on conventional statistics). Data from such

sources can overestimate or underestimate maternal mortality rate (Walraven et al 1994) and make it difficult to get reliable data for public health planners and policy-makers to accomplish their duties. In Kilombero (a rural district), maternal mortality ratio was estimated to be 448 per 100,000 live births. But by using sisterhood method it was found to be between 364 and 534 per 100,000 live births as 95% confidence limits (Font F et al 2000). These data show that sisterhood methods tally with those of conventional statistics. Kyela District health management team has always quoted maternal mortality ratio of 240/ 100,000 live births (District HMIS 2000) using health facility statistics, this figure is likely to be an underestimation of the reality, since it appears to be much lower than even the national average.

RESEARCH PROBLEMS:

- What is the level of maternal death in the community in Kyela District?
- Can the sisterhood method be incorporated routinely in the supervision by CHMT
- What are the factors, which causes maternal deaths in Kyela district?

1.3 RATIONALE

The figures, which are used usually based on hospital data, may either overestimate mortality (Walraven et al 1994) because of the many high-risk referrals and emergency cases or underestimated it (Oosterhuis JWA 1993) where the coverage of hospital care provision is limited, in quantity and quality. In Bolivia the hospital-based data of death during pregnancy was 69%, which was significantly lower thus were underreported (Stecklov G 1995). In Mozambique health institution failed by 86% in recording maternal deaths and other official sources registering only 9% of maternal deaths (Songane F 2002).

More reliable community-based estimate are extremely limited due to well-known deficiencies in the health facilities and vital registration. The shortfall of vital registration system is that they are normally incomplete, selective samples, diverse and practically unreliable in the districts. This does not mean that the system should be discarded; instead it should be improved to remove these errors and install where possible so as to obtain records of mortality and births (Makwaya CK et al 1997). Pregnancy—related death in the first trimester are almost universally underreported, particularly in the case of abortion—related deaths. Our HMIS book 6 for pregnancy monitoring requires a pregnant woman to be booked at twentieth week of pregnancy. Hence it is possible that a comparatively proportion of maternal deaths occur to women who were not known by their relatives to be pregnant or recently pregnant.

Millions of women every year have unwanted pregnancy. Some unwanted pregnancies are carried to term. Others end in spontaneous abortion. Millions of abortions however are performed outside the legal system often by unskilled providers (TBAs and THs) and these abortions are unsafe. The number of maternal deaths of abortion-related are increasing sharply 20 per 100,000 live births (WHO 1997). Mortality risks associated with pregnancy and illegal abortions in developing countries is estimated to be 100 to 1000 per 100,000 live births (WHO 1997). An abortion may not be mentioned to protect the family and all references to pregnancy may be avoided, particularly for unmarried woman. There is no reliable data for maternal mortality at the district level of Kyela and while other methods of collecting such data are expensive and complex, sisterhood methods seems to be a simpler alternative. Using indirect technique researchers are able to deduce indicators of maternal mortality based on deaths also from abortions (WHO 1997).

1.4 LITERATURE REVIEW:

Total mortality rates are important indicator for development in both developing and developed countries. These deaths can then be attributed to particular causes. The database for estimating child mortality is unquestionably much better developed than that for adult mortality in this context maternal deaths (Graham et al 1994). Maternal mortality rate in industrialised societies have generally been reported to be below 30 per 100,000live births, in Scandinavian countries 5 per 100,000 live births. An urban hospital based study in Zambia reported to be 1.2 per 1,000 live births.

The WHO report in 1995, the estimated number of maternal deaths for the World was 515,000. The country with highest estimated number of maternal deaths is India (110,000), Ethiopia (46,000), Nigeria (45,000), Indonesia (22,000), Bangladesh (20,000), DRC (20,000), China (13,000), United Republic of Tanzania (13,000), Kenya (13,000), Pakistan (10,000) and Uganda (10,000). These 12 counties account for 65% of all maternal deaths(Abou Zahr C et al 1998).

Over 99% of estimated 500,000 maternal deaths that occur annually take place in developing countries with ratio to 100,000 live births ranging from 700 in West Africa, 55 per 100,000 in East Asia to 530 per 100,000 in Tanzania (WHO 1986a). Studying the subject of maternal mortality in developing countries like Tanzania is commonly confronted with a number of serious problems related to methodology and study design. Accurate vital registration system containing detailed information on causes of death is unlikely to exist. Thus accurate information on death to reproductive aged women as

well as data on live birth and pregnancies that preceded such deaths, are unlikely to be available. While hospital based studies represent an alternative to this problem, in most developing countries relatively few deliveries take place in such setting and most health care remains outside of this formal sector (Ross DA et al 1986).

In Uganda the national estimate of maternal mortality rate is 500 per 100,000 live births but in Gulu district maternal mortality rate was estimated to be 662 per 100,000 live births. By using sisterhood sample it was found that; 65% of the mothers delivered at home, 50.6% had been attending to untrained Traditional birth attendants (TBAs) and maternal mortality rate was found to be 324 per 100,000 live births which is lower than the conventional statistics of 662 per 100,000 (Orach CG 2000). While in rural Zambia the estimate bringing the institutional maternal mortality from 548 to 1,179 per 100,000 live births; but with sisterhood method derived maternal mortality rate of 1,238 per 100,000 live births. Official Hospital data tend to underestimate maternal mortality in the community due to underreporting i.e. non-existent of vital registration (Vork FC et al 1997). In Kenya among pastoralists living in remote area maternal mortality rate for this population is 599 per 100,000 live births estimated using sisterhood method (Mace R et al 1996). Maternal mortality is an important indicator used to assess the level of development of the country and particular the coverage of health services. In Mozambique the figures officially used are derived from the data of some hospital in the main cities, this leaves out the 60% of the pregnant women who do not attend health facilities. The community-based study revealed gross under registration: Health institutions failed by 86%in recording maternal deaths, other official source (Civil

register and Funeral services) registering only 9% of the maternal death (Songane F 2002). In South Africa Maternal deaths differs markedly along racial lines. Estimate are unreliable due to poor reporting. Official figures range from 2/100,000 live births for Indians to 58/100,000 live births for African women. However a study conducted during 1992/3 using sisterhood method revealed maternal mortality rates of approximately 400/100,000 live births (CEDAW part 4). The sisterhood method was also tested in Niger in rural area with difficult access to primary health care. They noted a maternal mortality ratio of 1,050 per 100,000 live births. This practical and simple method of estimating maternal mortality in a given area, at a relatively low cost, could readily be incorporated into routine medical activities (De Groof D et al 1993). The pregnancy - related mortality rate can be estimated by assuming that non-pregnancy related risks are constant, irrespective of whether women are pregnant or not. In Bolivia hospital-based estimate of death during pregnancy may be pregnancy- related was 69% thus the result is significantly lower than that obtained using the traditional sisterhood method (Stecklov G 1995). In Tanzania the method was applied in Kilombero in 1999, a rural district where maternal mortality was estimated to be 448 per 100,000 live births. By using the indirect sisterhood method, the late was found to be between 363 and 534 per 100,000 live births as 95% Confidence limits. Indirect techniques are an attractive cost-effective tool to provide estimate of orders of magnitude for maternal mortality especially in countries without an adequate vital registration system (Font F et al 2000). The official reports from Iringa District give level of maternal mortality rate of 492 per

100,000 live births. By using sisterhood method 946 per 100,000 live births maternal mortality rate was recorded (Francesconi P et al 2000).

The sisterhood method is effective for estimating maternal mortality in small sample, with no previous information about this indicator. The method proved to be useful for identifying a priority health problem, and generating awareness, support planning and intervention strategies (Shiferaw T et al 1993). With sisterhood method the Solomon Islands were able to estimate the maternal mortality ratio and assist health planning and implementation of effective intervention. The sisterhood method cuts down the required sample size drastically, because women generally have several sisters who could have been exposed to the risk of maternal mortality, each time when they were pregnant. The method has been used to estimate mortality with some success in African population (Ross DA et al 1995). In Tanzania the maternal mortality rate is high 770 per 100,000live births (World Bank 1993), 530 per 100,000 live births (TDHS 1996) and 529 per 100,000 live births (MoH TDHS 1999). Source of information available on maternal deaths are largely from health facility statistics and very little contribution from vital registration and community-based surveys, are often only complete for a small usually urban proportion of the population.

CHAPTER TWO

OBJECTIVES

2.1 BROAD OBJECTIVE

2.1.1 To measure maternal mortality level using the sisterhood method and assess suitability of the method for use in a rural set-up.

2.2 SPECIFIC OBJECTIVES

2.2.1 To estimate the magnitude of maternal mortality rate using the indirect sisterhood method.

2.2.2 To describe factors which cause maternal deaths.

2.2.3 To assess feasibility of using sisterhood method by Council Health Management Team.

CHAPTER THREE

METHODOLOGY:

3.1 DESCRIPTION OF STUDY AREA:

The study was conducted in Kyela district, which is among eight districts in Mbeya region. It covers an area of 965 sq. km land and 357- Sq. Km water (Lake Nyasa, rivers Mbaka, Lufilyo and Songwe), with estimated population of 168,537 (projection from 1988 census). There are two divisions, 14 wards and 82 villages, total households by projection 32,110 Health facilities: There are 2 hospitals, 2 health centres and 22 dispensaries. MCH—clinics are been conducted in 23 health facilities.

HEALTH INDICATORS

Total fertility rate 7/ woman,

Infant mortality rate-92/ 1,000.

Maternal mortality ratio 240/100,000.

Under five mortality rate 166/1,000.

Growth rate 1.7%

Women at reproductive age 29,965

Education institutions: -

Primary schools 91

Secondary schools3

Communication: -

Tarmac roads 45 kms. Gravel roads 101 kms and earth roads 419 kms.

3.2 Study design: -

A Cross-sectional study involving a random sample of women of reproductive age (15-49 years) in the community.

3.3 Study population: -

Women aged 15 - 49 years old in the community in Kyela district.

3.4 SAMPLING AND SAMPLE SIZE:

From the 14 wards in two divisions, 7 wards were selected at random.and 20 villages were picked. All the villages in the selected wards were listed and random sample of women of reproductive age in the community were interviewed.

SAMPLE SIZE

The sample size requirements are addressed in relation to the desired statistical precision of the survey estimate, the maternal mortality rate and the upper age limit of the respondents to be surveyed. The researcher is required to make an educated guess as to the prevailing maternal mortality rate in the study and choose an acceptable margin of error.

1) Statistical precision of the maternal mortality rate depends on the size of the standard error which depends on the number of reported sister deaths (r)
2) Maternal mortality ratio in the study of 240 per 100,000 live births would yield sister deaths amounting to (r) 20 and margin of error of 30%.
3) The upper age limit of the respondents to be surveyed would be 49 years.

With the above specifications 1,000 respondents are needed (James A Hanley et al 1996).

3.5 Standard questions (variables): -

1. How many female children were born to the same mother, apart from you?
2. How many of them are still alive but have not yet attained menarche?
3. How many of them died before getting menarche?
4. How many of them have already got menarche and are still alive?
5. How many of them have died after getting menarche?
6. How many Out of these later died during pregnancy, during Childbirth or during the first six weeks after the end of pregnancy?

NOTE:

Menarche can be taken as the age at first exposure to the risk of pregnancy and therefore to maternal death (Graham W et al 1987).

3.6 Procedure for data collection.

Interview was conducted using a structured questionnaire with both closed and open - ended questions, translated in Kiswahili language by the principal investigator (appendix 3) A one- day training was conducted for 5MCH-Aides and 6 PHN B on data collection. Exercise was conducted at Kyela Hospital, before data collectors allowed to go to 20 villages, which were randomly picked in 7 wards. Eleven staff were selected by the Council Health Management Team to assist Principal investigator to conduct interviews. 6(54.5%) were Maternal and Child Health Aides (MCHAs) and 5(45,5%) were Public Health Nurses B (PHN B). They interviewed a total of 1027 female respondents in four days.

Each data collector had 100 questionnaires. Data collection was completed over four days using eleven data collectors. Mothers from households with age ranging from 15-49 years was selected as respondents.

3.7 Data processing and analysis:

Data were entered into EPI—INFO version 6 for processing and analysis after classic question coded and cleaned.

3.8 ETHICAL CONSIDERATION

The Ethical approval to conduct this study was granted from the scientific committee of the Muhimbili University College of Health Sciences, then Regional Health management Team, The Kyela district Administration officer and the Council Health

management Team. Informed consent was obtained individually from those who participated in the interview.

3.9 PRE-TEST

Pre-test was done on 31 may, 2002 at Mbeya Municipality by 5 MCHA using questionnaire (appendix 3). Problem encountered with the questionnaire: Gravida was omitted as it was confusing the respondents since they were not pregnant; Otherwise all 21 forms were completely filled.

4.0 DEFINITION OF TERMS

UNSAFE ABORTION:

Is a procedure for terminating an unwanted pregnancy that is performed by persons lacking the necessary skills and or in an environment lacking minimal medical standards (WHO 1992).

MATERNAL DEATH:

A death of a women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of pregnancy, from any cause related or aggravated by the pregnancy or its management but not from accidental and incidental causes (Graham W et al 1989).

SURVEY

An investigation on which information is systematically collected but in which the experimental method is not used.

SISTERHOOD METHOD

Is an indirect demographic technique which uses the proportions of adults sisters dying during pregnancy, childbirth or puerperium reported by adults during a census or survey (Graham W. et al 1989).

ACCESS TO CARE

That Maternal Health care is within reach of women who need it. They can get to it easily and are not deterred from using the service available, either because of cost or poor treatment by staff (Abou Zahr 1997).

CHAPTER FOUR

4.0 RESULTS

A total number of 1,027 female respondents of reproductive age (15-49 years) were interviewed. Age distribution of respondents is given in table 1. Interviews were carried out directly with the named individual using a structured questionnaire (appendix1). Majority (312/1027 = 30.4%) of the respondents were in the age group of 20-24 years followed by those in the age group of and 25-29 years (24.9%). The age group of 45-49 years constituted the least (2.8%).

4.1 Estimating maternal mortality rate: -

Respondents reported a total of 662 deaths of adult sisters, of which 41(6.2%) were a result of maternal causes. The sum of the number of respondents and alive adult sisters when multiplied with age group specific adjustment factor give sister units at risk exposure and probability of maternal death can be obtained. Table 1 below gives the necessary data and steps for calculation of the estimate of maternal mortality ratio. The study shows that of the 662 deaths, which had occurred, respondents in the age group of 20-34years reported 33 (80.5%) maternal deaths, suggesting that the group had a better recall on their sisters. Attrition is with the younger age group below 20 years, and the older age group 40 years, since majority of deaths will have occurred many years ago.

Table 1:Steps for calculations in estimating MMR in Kyela district using the sisterhood method

Age Group (in years) of Respondents 1	Number of Respondents 1	Alive Adult Sisters 2	Dead adult Sisters 3	Total Adult Sisters 4 (=1+2)	Adjustment Factor* 5	Sister Units of Risk Exposure, B 6 (=4x5)	Maternal Death, r 7	Probability Of Maternal Death, Q 8 (= 7÷6)
15 – 19	135(13.1%)	170	39	305	0.107	32.64	0	0
20 – 24	312(30.4%)	562	175	874	0.206	180.04	12	0.0667
25 – 29	256(24.9%)	562	177	818	0.343	280.57	15	0.0535
30 – 34	164 16 %)	355	140	519	0.503	261.06	6	0.0230
35 – 39	88(8.6%)	194	70	282	0.664	187.24	8	0.0427
40 – 44	43 (4.1%)	98	36	141	0.802	113.08	0	0
45 – 49	29 (2.8%)	63	25	92	0.9	82.8	0	0
TOTAL	1027	2004	662	3031		1,127.43	41**	0.0364***

* Adjustment factor (column5) is a given constant required to arrive at expected ultimate number of sister units at risk, and is based on the age distribution patterns of developing countries (Graham W et al, 1987).

** r is from the survey question 9, 10, 11 and 12

*** An estimate of the overall probability of maternal death (Q) is derived by summing up the maternal deaths (r), divided by B, which is the total of sister units at risk exposure. Since the number of recorded maternal deaths of each age group is not big enough to rely upon, it is wise to aggregate the data in column 6 and 7 to get a single best estimate for estimating maternal mortality ratio.

The numbers of alive adult sisters, dead adult sisters and maternal deaths (r) in columns 2, 3, and 7 respectively are as reported by the respondents of various age groups. Age-

specific probability of maternal death is obtained through dividing the number of maternal deaths (r) by the number of sister units of risk exposure (B).

Hence, Q = 41/ 1,127.43=0.0364

The quantity Q (=0.0364) can be interpreted as the probability of maternal death by the end of the reproductive period. Thus about one out of every 28 woman in the reproductive age is estimated to have died.

Lifetime probability of avoiding death from maternal causes is given by P = 1-Q. Thus in this case, the lifetime probability is 1- 0.0364 = 0.9636

Maternal mortality rate (MMR) can be calculated from the approximation:

$MMR = 1- P^{1/TFR}$, where TFR stands for Total Fertility Rate.

A simplified approximation to the maternal mortality rate is given by:

MMR = Q/TFR, and this can be translated into the more conventional measure of maternal mortality (maternal deaths per 100,000 live births) by suitable multiplier of 100,000. That is maternal mortality rate, MMR = (Q/TFR) x 100, 000. Maternal mortality rate is directly proportional to the probability risk exposure of pregnancy, Q and inversely proportional to the number of pregnancies, which is TFR. Using the National figure of 5.8 for total fertility rate to women aged (WORLD BANK HNP Strategy 1997) we obtain Maternal mortality rate of 628 per 100,00 live births

4.2 SAMPLING VARIABILITY OF MMR

Since maternal death (r) and probability of risk at exposure (B) are derived from a sample survey, estimates of Q (= r/B) and MMR (= Q/ TFR) are subject to sampling variability. Total Fertility Rate can be taken as a constant. Confidence limits for Q can be obtained from the normal distribution approximation to the binomial distribution of Q. Thus the 95% confidence interval of population based Q is given by: -

$r/_B \pm 1.96.SE(Q)$, where SE(Q) is the standard error of Q:

$$SE(Q) = \sqrt{\{r/^B\}\{1-r/^B\}/B}$$

In this case, SE (Q) = 0.00557

Hence Q =0.0364 ± 1.96 x 0.00557

If we denote Ql for lower limit and Qu for upper limit of Q, then:

Ql = 0.02548 and

Qu = 0.04732.

The lower and upper 95% of confidence limits of the maternal mortality rate follow immediately as 440 and 816 per 100,000 live births, respectively.

By this method we can say with 95% confidence that maternal mortality rate lies between 440 and 816 per 100,000 live births.

4.3 Place of Death

We note from table 2 that slightly over one quarter (177 = 26.7%) of the deaths reported by respondents occurred at home, 23.6% in health facilities, and only 3.3% in other places that included in the hands of TBAs and on the way to hospital. But 307 (46.4%) deaths could not be accounted for in terms of where the deaths occurred since the respondents could not remember! This observation suggests that we cannot rely only on health facility based data.

Table 2: Place of Death of Adult Sisters reported by respondents

Place	**Frequency**	**%**
At home	177	26.7
Health facility	142	23.6
Others	22	3.3
Unknown	307	46.4
Total	**662**	**100**

4.4 Cause of Death

Most (322 = 48.6%) of the deaths reported by respondents were due to indirect obstetric causes. Direct obstetric causes accounted for 23 deaths (3.5%) and causes were not known for 317 (47.9%) deaths.

Table 3 Cause of death as reported by respondents

	Frequency	**%**
Indirect obstetric	322	48.6
Direct obstetric	23	3.5
Unknown	317	47.9
Total	**662**	**100**

4.5 Causes of maternal Deaths.

Respondents reported a total of 41 maternal deaths, of which 25(60.9%) were non-obstetric related. The causes were reported as fever 16 (36.6%), anaemia 3 (7.3%) and others 6(17%). Obstetric causes accounted for 16(39.1%), which included prolonged labour 3 (7.3%), haemorrhage 6(14.6%) and ecclampsia 3 (7.3%).

Table 4:

Maternal deaths and cause of death reported by respondents: -

CAUSE OF MATERNAL DEATH	NUMBER OF DEATH
Direct obstetric	16(39.1%)
Indirect obstetric	25(60.9%)
TOTAL	41(100%)

CHAPTER FIVE

5.0 DISCUSSION

The first specific objective of this study was to estimate maternal mortality rate using sisterhood method, which involves obtaining data from female respondents about the surviving of all their adult sisters. Respondents reported 662 death of adult sisters of which 41(6.2%) were maternal deaths. The magnitude of maternal mortality was derived after converting the data obtained: 41 maternal deaths and the total of sister units at risk exposure of 1,127.43 led to the conventional measure of maternal mortality rate (MMR) amounting to 628 per 100,000, and ranging from 440 and 816 per 100,000 live births as 95% confidence limits. The estimated maternal mortality rate is significantly three times higher than the one, which has been reported in Kyela district. However the result is consistent with reports coming from other developing countries and other district in Tanzania where the same method was used, also tallies with National data of 529 per 100,000 live births. Using sisterhood method, Kilombero district revealed that maternal deaths accounted for 19% of total adult sister's deaths in the study.

The National figure for maternal mortality rate is 529 per 100,000 live births (TDHS 1999). In rural Zambia maternal mortality rate was estimated institutionally as being between 548 and 1,179 per 100,000 live births. By sisterhood method found to be 1,238 per 100,000 live births (Vork F.C et al 1999). In South Africa the official figures ranged from 2 to 58 per 100,000 live births. However using sisterhood method conducted

during 1992/ 93-revealed maternal mortality rate of approximately 400 per 100,000 live births (CEDAW part 4). In 1993-94 in Swaziland health facility-based data of maternal mortality rate was considered to lie between 107 and 125 per 100,000 live births. Use of the sisterhood method the study revealed the estimated maternal mortality rate to be 229 per 100,000 live births (Lech M.M et al 2002). Reports from Iringa district health facility data of maternal mortality ratio was 492 per 100,000 live births by using sisterhood method it was recorded as 946 per 100,000 (Francesconi P et al 2000). In Bolivia health facility –based estimate of death during pregnancy and pregnancy-related was 69%, this result is significant lower than that obtained using the traditional sisterhood method (Stecklov G et al 1995). The aim is not to compare with the conventional statistics but it gives orders of the magnitude for interventions. The official reports from Kyela district on maternal mortality rate of 240 per 100,000 live births, is much lower than that recorded in the study. In Gulu district maternal mortality rate was estimated to be 662 per 100,000 live births. By using sisterhood method showed that maternal mortality rate was 324 per 100,000 live births, which is lower than the conventional statistics of 662 per 100,000 live births (Orach C G 2000). However an average, sisterhood method consistently gives higher estimates of maternal mortality rate than the conventional methods.

Regarding the causes of maternal death; the study observed two main causes of maternal deaths. Direct obstetric causes 16(39.1%), which included; Haemorrhage 6(14.6%), 3(7.3%) due to prolonged labour and 3(7.3%) due to ecclampsia. Indirect-obstetric

causes 25(60.9%), which included fever 16(36.6%), Anaemia 3(7.3%) and others 6(17%). In developing countries, about 25% of maternal death caused by haemorrhage, 7% prolonged labour, 15% by puerperal sepsis and STD and 13% eclampsia (WHD 1998). Complication of pregnancy and childbirth are the leading cause of premature death among women (World Bank 1993). Still the result of this study correlate with other studies done in developing countries and other district in Tanzania i.e. Kilombero; Haemorrhage 17% and 35% puerperal sepsis (Font F et al 2000). Kyela district is a holoendemic for malaria; fever can mean also puerperal sepsis, and for other causes HIV can be one of it. The information obtained by this method of an overall distribution of causes of maternal death can be of value to public health, particularly for planning of programmes aimed at reducing maternal mortality rate (Shahidullah 1994).

Lack of comprehensive vital registration systems missed to capture 177(26.7%) deaths occurred at home, 156(23.6%) in health facilities, 22 (3.3 %) in other places and while 307(46.4%) they could not accounted for where it occurred. Therefore with population-based surveys can assist to reveal deaths occurring outside health facilities In Mozambique the figure officially used are derived from the data of some hospital in the main cities. The community-based study revealed gross underreporting. Health institutions failed by 86% in recording maternal death and other official source registering only 9% of the maternal death (Songane F 2002). In Gulu Uganda by using sisterhood method, it was found that 65% of mothres delivered at home (Orach C G

2000). They are also range of barriers limit, women's access to care i.e. poverty and lack of decision-making power particular at delivery and in case of complications.

Other objective of this study was to assess suitability of Sisterhood method in estimating maternal mortality ratio in general population. This method makes use of the data collected from female respondents in a sample survey, this procedure cuts down the required sample size drastically because women generally have several sisters who could have been exposed to the risk of maternal mortality each time they were pregnant (Ross DA et al 1986). The study observed that; it is possible to be done by existing structure of CHMT. In this study, 6 MCHAs (54.5%) and 5PHNB (45.5%) were involved in data collection supervised by the principal investigator. A total of 1027 questionnaires were given for interview. Interviewees responded comfortably well to all questions. This practical and simple method of estimating maternal mortality in a given area, at a relatively low cost, could readily be incorporated into routine medical activities. The method can be performed by the human resources available in the district council. Data collection can be done MCHAs and PHN B while estimation for maternal mortality rate can be done by District Medical Officer or any other trained member of the CHMT.

CHAPTER SIX

6.0CONCLUSION AND RECOMMENDATIONS.

6.1 CONCLUSION

Basing on the findings of this study, the sisterhood method approximates satisfactorily the level of maternal mortality, which is needed for advocacy and to draw attention to the problem. The method gives orders of magnitude rather than precise ratio, and therefore proves to be useful for identifying a priority problem and generating awareness, support planning and intervention strategies.

The Kyela CHMT has always based on the health facility data to come up with maternal mortality rate of 240 per 100,000 live births. But from this study, it has been found that the maternal mortality rate can range between 440 and 816 per 100,000 live births. The method can be performed by the human resources available in the district council. Data collection can efficiently be done by MCHAs and PHN B, while estimation of maternal mortality rate can be done by District Medical Officer or indeed by any other trained member of the Council Health Management Team.

However, it is important to point out here that while it is feasible to adopt the sisterhood method for estimating maternal mortality rate, accuracy of the method relies on the recall process and knowledge by respondents regarding causes of death. The fact that, in this study, causes for nearly 48% of deaths were not known could imply an underestimation of maternal mortality.

6.2 RECOMMENDATIONS

With the background that some maternal deaths in Kyela district occur outside of the health facilities without knowledge of public health-planners and decision-makers, it is recommended that the sisterhood method be adopted for the purpose of estimating maternal mortality rate. Advantage of the sisterhood method can be seen in the following points:

- The method requires small samples. It is designed to overcome the problem of large sample sizes and the human resources available; data can be collected and estimated with less time wasted.
- The method covers deaths occurring over a large interval time around 10 to 12 years prior to the survey. Insofar as maternal mortality generally changes very slowly, for that matter Sisterhood method could readily be incorporated into routine medical activities.

The fact that 46.4% of deaths could not be accounted for in terms of place where they occurred, also the 26.7% of deaths occurred at home; the authority should establish a strong and sustainable system of registers at all levels and community should be sensitised on the importance of registering deaths and births for better planning.

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