# ESTIMATING MATERNAL MORTALITY RATE USING SISTERHOOD METHOD IN PLATEAU STATE, NIGERIA.

**BY**

Authors
***ABUBAKAR I. S. [1], ZOAKAH A. I. [1], DARU H. S. [2] AND PAM I. C. [2]**

1. Department of Community Health
2. Department of Obstetric and Gynaecology, Jos University Teaching Hospital

Correspondence:
* Dr. I. S. Abubakar
DEPARTMENT OF COMMUNITY HEALTH
JOS UNIVERSITY TEACHING HOSPITAL
JOS.

**ABSTRACT**

**OBJECTIVES**

A sisterhood method was used to determine the maternal mortality rate(s) in four (4) communities in Plateau State, and to compare the rates between Urban and Rural Communities.

**METHODOLOGY**

Using an interviewer-administered questionnaire, a cross sectional survey of 1238 surviving siblings of dead ever married women (who died as a result of maternal causes) was done.

**RESULTS**

The Maternal Mortality Rate was found to be 905/100,000 live births, with a life-time risk of 0.519, while the rates for urban and rural communities are 450 and 1,320/100,000 live births; and a life-time risk of 0.278 and 0.838 respectively. These figures indicate that the maternal mortality rate is still high in Plateau State, Nigeria.

Therefore, the Safe Motherhood Initiative Programme should include a registration system of both maternal and child morbidity and mortality, which could serve as a surveillance strategy to identify the magnitude of the problem and to mobilize resources to areas where the problems are most prominent for adequate control.

**KEY WORDS:** Maternal Mortality Rate, Sisterhood Method.

## INTRODUCTION

The World health Organisation (WHO) defines a maternal death as the death of woman 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. Usually the maternal mortality ratio (MMR) is used, which is the number of maternal deaths per 100,000 live births.[1]

Estimating the level of maternal mortality is a problem in developing countries because of the absence of a complete and reliable vital registration or health statistics. Most official maternal mortality rates, with the notable exceptions of hospital rates are underestimates. The reason for this will vary according to certification practices, the degree of sophistication of the vital registration system or whether indeed a vital registration system exists at all. [2]

Developing countries including Nigeria, where vital registration system is yet to attain this ideal state, an indirect technique – Sisterhood method, which is based on sibling survivorship is very helpful in estimating maternal mortality rate. This method which is a community-based system of estimating maternal mortality is an alternative, so as to reduce the problems of index reporting, and mis-reporting. Shahidullah in Bangladesh, using Sisterhood method found correct reporting, under-reporting and mis-reporting as 79% and 16% respectively compared to the well established demographic surveillance system in Matlab. [3]

Therefore, the main objective for embarking on this study is to determine maternal mortality rate in four (4) communities, two urban and rural each using the Sisterhood method, and to compare the rates in these communities.

## METHODOLOGY

A cross-sectional survey was employed using information on sibling survivorship to derive the estimate of maternal mortality rate.

Data was obtained from (Naraguta and Gangare) two urban communities in Jos and two rural communities (Gindiri and Zamkwo) in Plateau State, Nigeria. Respondents were selected through a multistage sampling involving random selection of two urban and two rural communities, selection of houses by systematic sampling and subsequently balloting was done to select a single person from each house.

A pre-tested, open ended interviewer - administered questionnaire was used to obtain information on the number of ever-married sisters including those that are dead, the number alive, the number of dead ever married sisters and those whose deaths were related to maternal causes.

The proportion of sisters dying from maternal causes (x) as reported by the respondent aged (y) in the survey was related to the probability (z) of dying from maternal cause by age (y). This method which will provide an estimate of the probability of death from maternal causes by the end of the reproductive period as reported by the respondent in age group (k), are adjusted to get sister units of exposure to the risks of maternal death over the whole reproductive period (B).

Dividing the number of maternal deaths R in $Y^{th}$ age group by the corresponding sister units $B_K$, we obtained an estimate of Q (u).[4]

## RESULTS

The following information were obtained from respondents from four (4) communities in Plateau State:-

The number of sisters born to the same mother that had ever been married

The number of those ever married sisters now alive

The number of those sisters that are now dead

The number of those who died while they were pregnant or during child birth or during six weeks after the end of pregnancy.Using the above information both maternal mortality rates and the life time risks for these communities were calculated. The maternal mortality for the two urban communities was found to be 450/100,000 with a life-time risk of 0.278; the rate for the rural communities was 1,320/100,000, with a life time risk of 0.838. The maternal mortality rate and life time risk for all the four communities was 905/100,000 and 0.519 respectively. Women of child-bearing age in rural communities in Plateau state have three (3) times the risk of dying compared with those in urban communities in Jos.

## TABLE 1:MATERNAL MORTALITY FOR URBAN COMMUNITIES IN JOS

| Age Group | No. of Respondent | No. of Ever Married | No. of Maternal Death | No. of death due to other causes | Total sisterhood death | Proportion of maternal death | Adjustment Factor | Sister Unit B1 | Life time Risk (of W) |
|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 89 | 213 | 2 | 9 | 11 | 0.1818 | 0.1070 | 23 | 0.087 |
| 20-24 | 93 | 195 | 1 | 9 | 10 | 0.1000 | 0.2060 | 40 | 0.025 |
| 25-29 | 138 | 245 | 5 | 19 | 24 | 0.2083 | 0.3430 | 84 | 0.06 |
| 30-34 | 118 | 255 | 6 | 14 | 20 | 0.3000 | 0.5030 | 123 | 0.049 |
| 35-39 | 98 | 231 | 3 | 13 | 16 | 0.1875 | 0.6640 | 153 | 0.02 |
| 40-44 | 92 | 189 | 4 | 26 | 30 | 0.1333 | 0.8020 | 152 | 0.026 |
| 45-49 | 81 | 199 | 2 | 18 | 20 | 0.1000 | 0.9000 | 179 | 0.011 |
| 50-54 | 64 | 164 | 8 | 19 | 27 | 0.2962 | 0.9580 | 157 | 0.051 |
| 55-59 | 23 | 54 | 1 | 3 | 4 | 0.0000 | 0.9860 | 53 | 0.019 |
| 60+ | 23 | 59 | 2 | 6 | 8 | 0.2500 | 1.0000 | 59 | 0.034 |
| Total | 819 | 1804 | 34 | 136 | 170 | 1.7571 | 6.4690 | 1023 | 0.382 |

## TABLE 2:MATERNAL MORTALITY FOR RURAL COMMUNITIES IN PLATEAU STATE

| Age Group | No. of Respondents | No. of Ever Married Sister | No. of Maternal Death | No. of death due to other causes | Total sisterhood death | Proportion of maternal death | Adjustment Factor | Sister Unit B1 | Life time Risk (of W) |
|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 41 | 186 | 6 | 1 | 7 | 0.8571 | 0.1070 | 20 | 0.300 |
| 20-24 | 49 | 333 | 6 | 5 | 11 | 0.5454 | 0.2060 | 69 | 0.087 |
| 25-29 | 67 | 207 | 7 | 11 | 18 | 0.3888 | 0.3430 | 71 | 0.099 |
| 30-34 | 54 | 126 | 9 | 9 | 18 | 0.5000 | 0.5030 | 63 | 0.143 |
| 35-39 | 54 | 142 | 8 | 7 | 15 | 0.5333 | 0.6640 | 94 | 0.085 |
| 40-44 | 43 | 97 | 7 | 14 | 21 | 0.3333 | 0.8020 | 78 | 0.090 |
| 45-49 | 49 | 163 | 5 | 17 | 22 | 0.2272 | 0.9000 | 147 | 0.034 |
| 50-54 | 33 | 60 | 7 | 11 | 18 | 0.3889 | 0.9580 | 57 | 0.123 |
| 55-59 | 12 | 55 | 1 | 2 | 3 | 0.3333 | 0.9860 | 54 | 0.019 |
| 60+ | 17 | 43 | 1 | 4 | 5 | 0.2000 | 1.0000 | 43 | 0.023 |
| Total | 419 | 1412 | 57 | 81 | 138 | 4.3073 | 6.4690 | 696 | 1.003 |

## TABLE 3:MATERNAL MORTALITY RATE FOR FOUR (4) COMMUNITIES PLATEAU STATE

| Age Group | No. of Respondents | No. of Ever Married Sister | No. of Maternal Death | No. of death due to other causes | Total sisterhood death | Proportion of maternal death | Adjustment Factor A1 | Sister Unit B1 | Life time Risk (of W) |
|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 130 | 399 | 8 | 10 | 18 | 0.4444 | 0.107 | 43 | 0.186 |
| 20-24 | 49142 | 528 | 7 | 14 | 21 | 0.3333 | 0.206 | 109 | 0.064 |
| 25-29 | 67205 | 452 | 12 | 30 | 42 | 0.2857 | 0.343 | 155 | 0.077 |
| 30-34 | 54172 | 381 | 15 | 23 | 38 | 0.3947 | 0.503 | 192 | 0.078 |
| 35-39 | 54172 | 373 | 11 | 20 | 31 | 0.3548 | 0.664 | 248 | 0.044 |
| 40-44 | 43135 | 286 | 11 | 40 | 51 | 0.2157 | 0.802 | 229 | 0.048 |
| 45-49 | 49130 | 362 | 7 | 35 | 42 | 0.1667 | 0.900 | 326 | 0.022 |
| 50-54 | 3397 | 224 | 15 | 30 | 45 | 0.3333 | 0.958 | 215 | 0.070 |
| 55-59 | 1235 | 109 | 2 | 5 | 7 | 0.2857 | 0.986 | 107 | 0.019 |
| 60+ | 1740 | 102 | 3 | 10 | 13 | 0.2308 | 1.000 | 102 | 0.029 |
| Total | 1238 | 3216 | 91 | 217 | 308 | 3.0451 | 6.469 | 1726 | 0.637 |

**TABLE 4:CALCULATED MATERNAL MORTALITY RATE AND LIFE-TIME RISKS BY COMMUNITY**

| COMMUNITY | *MMR/100,000 | **LIFE-TIME RISK |
|---|---|---|
| Urban (Gangare and Naraguta) | 450 | 0.278 |
| Rural (Gindiri & Zamkwo) | 1320 | 0.838 |
| Combined (Urban & Rural) | 905 | 0.519 |

*MMR= Maternal Mortality Ratio

** LIFE-TIME RISK = Probability of dying

**DISCUSSION**

Maternal mortality has been a serious problem in developing countries. Reports from UNICEF in 1996 showed that about 585,000 women die each year from causes related to pregnancy and child-birth. Almost 90% of these deaths occur in developing countries. It further indicates that 1 in 13 women in sub-Saharan Africa and 1 in 35 women in Southern Asia die of maternal causes compared with 1 in 3,200 women in Europe and 1 in 3,300 in United States of America.[5]

Clinic based studies conducted by Harrison et al, 1985, showed an incidence rate of 1.3/1000 and 28.6/1000 live births among the booked and unbooked emergency cases respectively. Similar studies in Enugu, recorded 0.86/1000 and 41.3/1000 live births for these groups of women respectively.[7] Most studies in Nigeria have reported similar finding and because of a lack of a registration system, a realistic figure on maternal mortality rate is lacking in Nigeria.

Using the sisterhood method, our study has revealed that the maternal mortality rate is still high in these communities in Plateau State. (905/100,000 live births). The life-time risk of 0.519 for women of child bearing age is still high. Women in rural communities have greater risk of death compared with those in the urban communities assessed. The life time risk of women in rural communities is three (3) times higher than their counterparts in urban centres because in these communities women do not have access to maternal health services, and even when these services are available there is lack of trained manpower and most women in rural communities have to depend on traditional birth attendants. Although some of these attendants have been trained, our previous study showed that there is no re-training programme and regular supervision of these attendants.[8] Therefore, these attendants might be contributing to the already high maternal mortality rate.

The global safe motherhood initiative programme should include the introduction of a registration system of both maternal and child morbidity and mortality, which will serve as surveillance strategy to identify the magnitude of the problem and mobilize resources to areas where these problems are prominent.

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