Analysis of Maternal Mortality Rate in Pregnant Women Attending University of Ilorin Teaching Hospital, Ilorin, Nigeria

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Abstract

This paper investigated the trends and predisposing factors of maternal mortality among pregnant women attending ante-natal at University of Ilorin Teaching Hospital (UITH). This is with a view to assessing the effect of educational status on the level of attendance at antenatal care. A total maternal mortality case of 310 were recorded including those that occurred on arrival as emergency (which were not included in the register). About 183 folders were retrieved while 127 folders were not seen due to movement of case-notes to the permanent site of the hospital. Out of the 183 folders, 171 folders belonged to expectant mother of reproductive age while the remaining 12 were of patients who were above reproductive age. From the analysis of data generated, it was discovered that 2010 recorded the highest maternal mortality rate with 24%, followed by 2008 (22%), 2012 (20%), 2009 (19%) and 2011 (15%). Our findings revealed that majority of the victims were within the age range of 25-29 years with 76% of the victims being SSCE holder and below while 24% attended tertiary education. About 87% did not attend antenatal clinic at all while only 13% attended antenatal clinic. Maternal mortality was majorly caused by sepsis (22%), malignancy (18%), postpartum eclampsia (15%), antepartum eclampsia (11%), postpartum haemorrhage (11%), severe anaemia (6%), lentiviral condition (5%), bleeding per vaginal (5%), uterine rupture (4%) and hypovolemic shock (3%). It was also discovered that malignancy (ovarian, genital and cervix) is the cause of mortality in majority of the victims above the age of 49 years.

1.0   Introduction

Health Information Management (HIM) is the practice of maintenance and care of health record by traditional (paper-based) and electronic means in hospitals, clinics, health departments, health insurance companies and other facilities that provide health care. HIM is also the practice of acquiring, analyzing and protecting digital and traditional medical information vital to providing quality patient care. It is an important profession that measures the data of patient from the beginning of life to the end with reference to trends in maternal mortality. The quality of obstetric care in a country can be measured by the maternal and the perinatal mortality rates. The death of a woman in pregnancy or childbirth is one of the greatest tragedies which do not only befall a family but the nation as a whole [1, 2].

Nigeria presently has one of the highest rates of maternal mortality in the developing world. A recent report listed Nigeria as one of six countries that account for 50% of global estimates of maternal deaths [3]. Indeed, the country has been ranked second after India with the highest absolute numbers of maternal deaths in the world. Consequently, there is a growing concern that the country may not achieve the maternal mortality reduction aims of the Millennium Development Goals, if the present trend continues [4].

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The word mortality is obtained from mortal, which is derived from the Latin word '*mors'* meaning death. Mortality is defined as the incidence of death in a population. It is the quality or state of being mortal. The U.S. Joint Commission on Accreditation of Healthcare Organizations calls maternal mortality a "sentinel event", and uses it to assess the quality of a health care system. According to World Health Organization (WHO), maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes [5, 6].

This paper therefore investigates the trend of maternal mortality rate by assessing the level of antenatal care attendance by pregnant mothers, impact of educational status on clinic attendance and predisposing factors causing death within the years of study (2008 to 2012). This study attempts to examine the maternal mortality data with special attention on the causes and recording of the incidences of its occurrence in University of Ilorin Teaching Hospital. It is hoped that findings from this study will assist the health sector to obtain reliable maternal mortality estimates to develop efficient health programmes and policies.

2.0 Materials and Methods

The study was carried out in University of Ilorin Teaching Hospital (UITH), Ilorin, Kwara State. The research was carried out on women of child-bearing age that died due to pregnancy complications from January, 2008 to December, 2012 (Secondary data). The study was descriptive longitudinal involving the use of a summary sheet to gather data under strict confidentiality. Data collected were presented in tabular form to show the frequency of maternal mortality in UITH from 2008 to 2012. Simple percentage was also used to show the trends in maternal mortality within the years under study. The statistical models used to analyze data in this study were time series analysis (least-square method and Pareto Chart). A statistical software (MINITAB) was used to plot the charts in this paper.

Hypothesis Test: The chi-square analysis was used to test the hypothesis:

Ho: Educational status has no significant effect on antenatal clinic attendance.

3.0 Results and Data Analysis

Table 1 and Fig. 1 display the quarterly distribution frequency and total number of maternal mortality from year 2008 to 2012. These clearly show that 68 (22%) maternal deaths were recorded in 2008, 58 (19%) in 2009, 76 (24%) in 2010, 47 (15%) in 2011 and 61 (20%) in 2012.

Table 1: Distribution of Quarterly Maternal Mortality for year 2008 to 2012

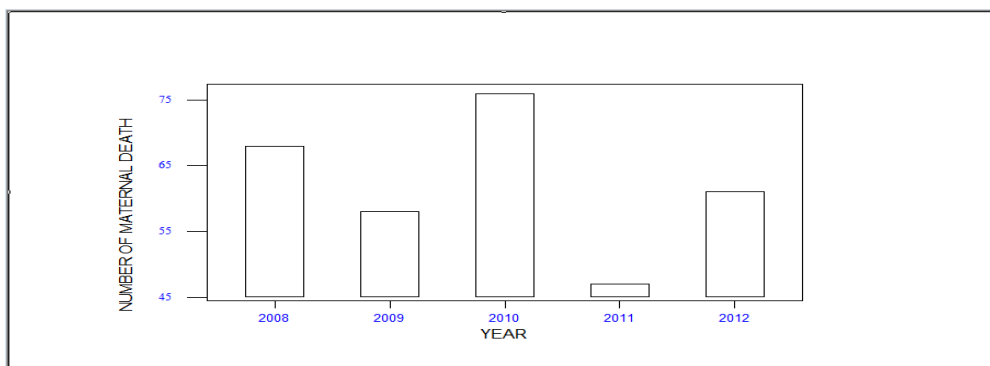| Quarters/Years	2008	2009	2010	2011	2012
Quarter 1	16	13	13	7	17
Quarter 2	11	16	26	13	14
Quarter 3	20	22	14	13	17
Quarter 4	21	7	23	14	13
TOTAL	**68**	**58**	**76**	**47**	**61**

Fig. 1: Yearly maternal mortality for the five years (2008 – 2012)

3.1   Time Series Analysis

The least square equation of Y on X is given as $Y = a + bx$ where $b = \dfrac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$ and $a = \bar{y} - b\bar{x}$

where $n =$ number of observations, $x =$ quarters, $y =$ number of patients, $b =$ the slope. Table 2 presents the summary for calculating the least square parameters and model. The table clearly showed the quarterly maternal mortality as recorded from 2008 to 2012 and analyzed using time series analysis. The least square equation trend line is therefore given as: $Y = 41.23 - 2.45x$. This equation can be used to forecast future maternal mortality rate.

Table 2: Time Series Analysis of Quarterly Maternal Mortality Recorded from 2008 to 2012

Years	Quarters	Number of Patients (Y)	X	X²	XY
2008	1	16	1	1	16
	2	11	2	4	22
	3	20	3	9	60
	4	21	4	16	84
2009	1	13	5	25	65
	2	16	6	36	96
	3	22	7	49	154
	4	7	8	64	56
2010	1	13	9	81	117
	2	26	10	100	260
	3	14	11	121	154
	4	23	12	144	276
2011	1	7	13	169	91
	2	13	14	196	182
	3	13	15	225	195
	4	14	16	256	224
2012	1	17	17	289	289
	2	14	18	324	252
	3	17	19	361	323
	4	13	20	400	260
		$\sum Y = 310$	$\sum X = 210$	$\sum X^2 = 2870$	$\sum XY = 3176$

3.2   Demographic Data of Patients

Table 3 presents the age distribution of maternal mortality victims within the period of study in University of Ilorin Teaching Hospital. The data revealed that 9 (3%) of the patients were between 15 and 19 years of age, 56 (18%) were between 20 and 24 years of age, 76 (24%) fell between 25 and 29 years of age, 73 (23%) were between 30 and 34 years of age, 37 (12%) were between 35 and 39 years of age, 21 (7%) of the patients were between 40 and 44 years of age, 8 (3%) of the patients were between 45 and 49years of age while 30 (10%) of the patients were above 50 years of age. The educational status and diagnosis of victims of maternal mortality are presented in Tables 4 and 5. The data showed that 74 (24%) of the victims were graduates while 236 (76%) hold Senior School Certificate or below. With respect to diagnosis distribution, majority of the patients died as a result of Sepsis accounting for about 22% while hypovolemic shock is the least cause of death with only 3%. In terms of attendance at antenatal clinic during pregnancy, only 23 (13%) patients attended antenatal clinic regularly while 148 (87%) patients did not attend (Table 6).

Table 3: Age Distribution of Victims of Maternal Mortality

Age (years)	Frequency	Percentage (%)
15 – 19	9	3
20 – 24	56	18
25 – 29	76	24
30 – 34	73	23
35 – 39	37	12
40 – 44	21	7
45 – 49	8	3
50 above	30	10
Total	**310**	**100**

Table 4: Educational Status Distribution of Victims of Maternal Mortality

Educational status	Frequency	Percentage (%)
Tertiary	74	24
Secondary & below	236	76
Total	**310**	**100**

Table 5: Diagnosis Distribution of Maternal Mortality

Diagnosis	Frequency	Percentage (%)
Ante-partum eclampsia (ANPE)	34	11
Postpartum eclampsia (PPE)	47	15
Sepsis (puerperal and post abortal)	69	22
Malignancy (ovarian, genital and cervix)	57	18
Postpartum haemorrhage (PPH)	33	11
Anaemia	19	6
Hypovolemic shock (HS)	9	3
Uterine rupture (UR)	13	4
Bleeding per vaginal (BPV)	14	5
Lentiviral	15	5
TOTAL	**310**	**100**

Table 6: Antenatal Clinic Attendance Distribution

Ante-natal clinic attendance	Frequency	Percentage (%)
Attended	23	13
Not attended	148	87
Total	**171**	**100**

3.3   Pareto Chart

In order to have a holistic view of the diagnoses that resulted to maternal mortality among pregnant women, the Pareto-Chart was employed using MINITAB 13 as presented in Fig. 2. The chart clearly indicated that sepsis (puerperal and post abortal) and malignancy (ovarian, genital and cervix) among these diagnoses are responsible for about 80% of maternal mortality.

3.4   Hypothesis Testing using Chi square
Ho: Educational status has no significant effect on antenatal clinic attendance.

The Chi-Square (χ^2) statistics was used to test the hypothesis at $\alpha = 0.05$ level of significance. The observed and expected values are presented in the contingency table as shown in Table 6.
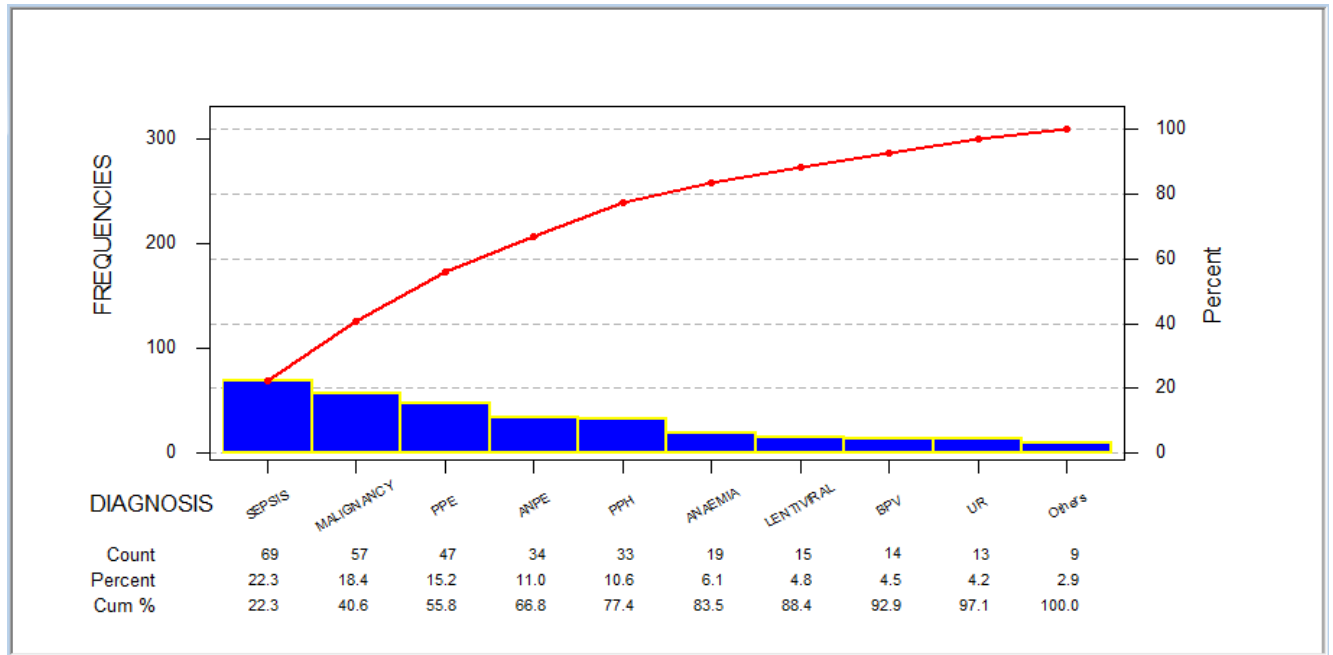
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Fig. 2: Pareto-Chart on types of diagnosis

DIAGNOSIS	SEPSIS	MALIGNANCY	PPE	ANPE	PPH	ANAEMIA	LENTIVRAL	BPV	UR	Others
Count	69	57	47	34	33	19	15	14	13	9
Percent	22.3	18.4	15.2	11.0	10.6	6.1	4.8	4.5	4.2	2.9
Cum %	22.3	40.6	55.8	66.8	77.4	83.5	88.4	92.9	97.1	100.0

Table 6: Contingency Table of Observed Values (O_i) and Expected Values (e_i) for Ante-natal Clinic Attendance

O_{ij} (e_{ij})	Attended	Not Attended	Total
Tertiary education	9 (4.9)	29 (33.1)	**38**
Secondary and below	13 (17.1)	120 (115.9)	**133**
Total	**22**	**149**	**171**

The chi square calculated value is $\chi^2 = 5.07$ while the critical value (tabulated value) is P = 3.84.

Decision: Since χ^2 calculated is greater than χ^2 table value, the null hypothesis (Ho) is rejected. Therefore, educational status has a significant effect on antenatal clinic attendance.

4.0   Discussion and Recommendation

Findings from this study revealed that majority of maternal mortality occurred among mothers within the age group of 25 to 29 years and the major causes of maternal mortality is sepsis (puerperal and post abortal). The data also clearly indicated that illiteracy attributed to non-attendance at antenatal clinic. It can therefore be concluded that women of child-bearing age need to be educated especially towards early antenatal clinic attendance during pregnancy as this will ensure early detection of problem (if any) and proper maintenance of the well-being of both the mother and unborn baby.
According to Thaddeus and Maine [7], non-attendance at ante-natal clinics is one of the major challenges faced by developing countries of the world. The chi-square test revealed that educational status has a significant effect on the antenatal clinic attendance. This implies that education play a great role in reducing maternal mortality [8].

From the findings of this study, the following measures are recommended to help reduce, if not eliminate maternal mortality:
1. Government at all levels needs to step up action on maternal health care with particular attention given to ante-natal care. In realization of Millennium Development Goals, the importance of primary health care as the bedrock of any health care system, local governments to be precise should be empowered to build facilities to treat people at the grassroots.
2. In line with federal government guidelines on health, state governments should equally establish primary health care board to work hand in hand with local government councils to build uniform primary health care facilities.

3. It is imperative that all local government areas have health centre whose aim is to decongest the secondary and tertiary health centre to cater for children and maternal health care needs of the public.
4. The security of the nation hinges on poverty reduction, but there can be no poverty reduction without improvements in health. In other words, sustainable development is impossible without a healthy population and health of our women is the most important if we are set to thread the path of progress.
5. Provision of health education to women of child-bearing age on early attendance to antenatal clinic.
6. Good nutrition helps proper growth of foetus and ensures the well-being of both mother and child. Women should endeavour to take eat well and healthy at all times especially during pregnancy in order to reduce occurrence of infection.
7. Pregnant women should ensure early attendance at antenatal clinics during pregnancy so that infection (if any) is detected and treated before complications occur.
8. Family planning should be embraced by child bearing women, when necessary.
9. Delivery should be done by professional physicians specialized in the field of gynaecology and obstetrics to reduce the incidence of sepsis.
10. Too early pregnancy should be discouraged and avoided among teenagers.

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