

## ORIGINAL RESEARCH ARTICLE

# Maternal Mortality in a Transitional Hospital in Enugu, South East Nigeria

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## ABSTRACT

Nigeria has one of the highest maternal mortality ratios in the world. The study was to determine the trend of maternal mortality ratio in the hospital as it transits from a General through a Specialist to a Teaching hospital. It was a retrospective review of maternal deaths at Enugu State University Teaching Hospital Parklane, over its 5 year transition period (January 2004 to December 2008). There were 7146 live births and 60 maternal deaths giving an overall maternal mortality ratio (MMR) of 840/100,000 livebirths. The MMR rose from 411 to 1137/100 000 live births as a specialist hospital, with a decline to 625/100 000 as a Teaching hospital. Pre-eclampsia/eclampsia was the leading cause (29.63%) of maternal death. MMR was highest as a Specialist hospital due to limited manpower and inadequate facilities to properly manage the rising number of referred obstetric emergencies. Adequate preparations should be made before upgrading a hospital, to enable it cope with the challenges of managing referred obstetric emergencies (*Afr J Reprod Health 2009; 13[4]:67-72*).

## RÉSUMÉ

**Mortalité maternelle vue à travers un hôpital transitoire à Enugu, Sud-est du Nigéria.** Le Nigéria a une de plus grandes proportions de la mortalité maternelle du monde. L'étude avait pour but de déterminer la tendance de la proportion de la mortalité maternelle dans l'hôpital dans sa transition d'un Hôpital Général en passant par l'Hôpital spécialisé à un Centre Hospitalier Universitaire. Il s'agissait d'une analyse rétrospective des décès maternels au Centre Hospitalier Universitaire à Enugu à travers sa période de 5ans de transition (janvier 2004 – décembre 2008). Il y avait 7146 naissances vivantes et 60 décès maternels, ce qui donne dans l'ensemble une proportion de la mortalité maternelle (PMM) de 840/100,000 naissances vivantes. La PMM a augmenté de 411 à 1137/100.000 naissances vivantes dans l'hôpital spécialisé avec une baisse jusqu'à 625/100,000 dans un Centre Hospitalier Universitaire. La pré-éclampsie/éclampsie était la cause principale (29,63%) du décès maternel. La PMM était plus élevée dans l'hôpital spécialisé à cause d'une main-d'œuvre limitée et du manque de facilités qui ne permettent pas de bien prendre en charge le nombre montant de cas obstétriques d'urgence qui sont orientés vers ces hôpitaux spécialisés. Il faut prendre des dispositifs adéquats avant d'améliorer un hôpital, afin de lui permettre de se débrouiller avec les défis de la prise en charge des urgences obstétriques qui sont adressées d'un autre hôpital (*Afr J Reprod Health 2009; 13[4]:67-72*).

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KEYWORDS: Maternal mortality, Transitional hospital, Enugu, Nigeria

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## **Introduction**

Maternal mortality is a worldwide problem, especially in developing countries like Nigeria. Nigeria constitutes 1.2% of the world's population but contributes 10% of the global estimates of maternal deaths<sup>1</sup>. It is estimated that 52,900 Nigerian women die annually from pregnancy related complications out of a global total of 529,000 maternal deaths. A woman's chance of dying from pregnancy and childbirth in Nigeria is 1 in 13<sup>2</sup>. This rate is unacceptably high even by African standards as many of these deaths are preventable. In developed countries, maternal mortality is decreasing with more deaths due to indirect obstetrics causes than direct causes as is the case in developing countries<sup>3,4</sup>

The high maternal mortality in developing countries can be attributed to the wide spread poverty, social inequalities, ignorance, illiteracy, poor transportation and communication facilities, shortage and misdistribution of trained medical personnel, expensive or inconsistent, poorly formulated and managed health policies.

Enugu State University Teaching Hospital is located in Enugu, a Metropolitan city and the capital of Enugu state, South Eastern Nigeria. It was established in 1930 as a Nursing home for the British colonial masters. During the Nigerian civil war (1967-1970), it was converted to a General hospital. It existed as a General hospital, until November 2003 when it was upgraded to a specialist hospital and

finally to a Teaching hospital in June 2006. It serves an estimated six million people of Enugu state and neighboring states. Its admission policy is unrestricted as it serves a dual purpose of both a General and specialist hospital.

The objective of this study was to compare the maternal deaths in the institution during its phases as a General, Specialist and finally a Teaching hospital. Our expectation was that the MMR should fall with each rise in status.

## **Methods**

Maternal deaths that occurred in the maternity unit of the hospital during the 5 year period from 1st January 2004 to 31<sup>st</sup> December, 2008 were reviewed. The case notes of the patients were retrieved from the medical records department and studied. The deaths were reviewed in relation to patient's age, parity, booking status, causes of death and the contribution of type 3 delay to maternal death. Data was analysed using epi- info statistical software version 3.3.2.

## **Results**

There were 60 maternal deaths during the 5-year period. However 54 (90%) of the case files were available and formed the basis of further analysis. In all the cases, no post-mortem examination was done as the relations of the deceased refused the procedure.

During the 5-year period, there were 7574 deliveries, 7146 live births and 60 maternal deaths giving an overall

maternal mortality ratio (MMR) of 840/100,000 live births.

The yearly maternal mortality ratio from 2004 to 2008 is shown in Table 1. There was a sudden rise in the MMR immediately after being upgraded to a Specialist hospital from 411 to 1137/100 000 live births with a decline to 625/100 000 as a Teaching hospital (Table 2). The differences between the maternal mortal ratios for the three periods were statistically significant (p-value=0.00069133). The MMR as a specialist hospital (1137/100,000 was quite above the national average of 800 per 100,000 live births.

**Table 1:** Yearly maternal mortality ratio distribution

Year	No of maternal deaths (%)	No of live births (%)	MMR (/100,000 live births)
2004	17(28.33)	1210(16.93)	1405
2005	10(16.67)	1172(16.40)	853
2006	12(20.00)	1222(17.10)	981
2007	11(18.33)	1426(19.96)	771
2008	10(16.67)	2116(29.61)	473
Total	60	7146	840

*Chi square for linear trend=7.226; p-value =0.00718*

The MMR was lowest within the age bracket 20 to 29 years. Pregnancy in patients 40 years and above constituted only 2.71% of the total number patients but carried the highest risk of maternal deaths being responsible for 2 (3.70%) of all maternal deaths but with a MMR of 1031/100,000 live births. Figures in parenthesis represent the percentage of various age groups.

**Table 2:** Trend of maternal mortality ratio during the Transition period

Period of study	No of maternal deaths	No of live births	MMR (/100,000 live birth)
1999-2003 (General hospital***)	19	4617	411
Jan.2004-June 2006 (specialist hospital)	34	2988	1137
June 2006-Dec. 2008 (Teaching hospital)	26	4158	625

*Chi square =14.55; 2 degree of freedom. P-value =0.00069133*

*\*\*\*Onah et al published in Journal of Obstetrics and Gynaecology, August 2005; 25(6): 569 – 574.*

The parity of the patients and their proportion in relation to the total number of live births and maternal mortality ratio within each parity are shown in Table 3. Grand-multiparous patients (parity 5 and above) carried the highest risk in terms of maternal death as the MMR within the group was 1399 while the group was responsible for 8 (14.81%) of maternal deaths. This was followed by nulliparous patients. The safest parity from the study was parity 1 as the MMR within the group was 442 and they constituted 6 (11.11%) of all maternal deaths. Figures in parenthesis represent the percentage of various parities.

Table 4 shows the distribution of patients based on their duration of stay from the time of arrival at the emergency unit until death. A significant number of the patients, 26 (48.12%) died within the

first 24 hours of arrival at the hospital. The decision -delivery interval could not be assessed, as the time of decision were not documented in the folders.

**Table 3:** Distribution of patients and maternal mortality ratio by parity

Parity	No of maternal deaths (%)	No of live births (%)	MMR (/100,000 livebirths)
0	22 (40.74)	2564 (35.88)	842
1	6 (11.11)	1356 (18.97)	442
2	9 (16.67)	1339 (18.74)	672
3	5 (9.26)	772 (10.80)	648
4	4 (7.41)	543 (7.60)	864
>5	8 (14.81)	572 (8.00)	1399
	54	7146	

Chi square for linear trend= 0.582; p-value =0.44560

**Table 4:** Distribution of maternal deaths based on the duration of stay in the hospital before death

Duration of stay	No of maternal deaths	%
00hrs---11hrs 59min	19	35.16
12hrs---23hrs 59min	7	12.96
24hrs---35hrs 59min	9	16.67
36hrs---47hrs 59min	1	1.85
>48hrs	18	33.33
Total	54	100

The 6275 booked patients were responsible for 17 (31.48%) maternal deaths with a MMR of 271/100 000 livebirths. Unbooked patients were almost 16 times more likely to die than booked patients (p-value=0.0000). The causes of death are shown in Table 5. Pre-Eclampsia and Eclampsia constituted the most common cause of maternal death accounting for 16 (29.63%) of

maternal deaths. This was closely followed by haemorrhage 15 (27.78%). Puerperal sepsis accounted for 6 (11.11%) of maternal deaths, while severe anaemia and unsafe abortion were responsible for 5 (9.26%) and 4 (7.40%) respectively.

**Table 5:** Probable cause of death as diagnosed clinically

Probable cause of death	No of maternal deaths	%
Pre-Eclampsia/Eclampsia	16	29.63
Haemorrhage	10	16.67
Obst. Labour/Ruptured Uterus	6	11.11
Puerperal Sepsis	6	11.11
Severe Anaemia	5	9.26
Unsafe Abortion	4	7.4
Ruptured ectopic	3	5.56
Meningitis	2	3.70
Cerebral Malaria	1	1.85
Hepatitis	1	1.85
Diabetes Mellitus	1	1.85
<b>Total</b>	<b>54</b>	<b>100</b>

## Discussion

The maternal mortality ratio in this study was 840 /100 000 live births. This is unacceptably high when compared with what is obtainable in developed countries i.e. Sweden 2, Spain 4, Ireland 4, and 13/ 100 000 live births in United Kingdom<sup>5</sup>. This is equally higher than the national MMR average of 800/ 100 000 live births and much higher than 286/ 100 000live births for the South East, Nigeria to which Enugu State belongs<sup>6</sup>. This may be as a result of the fact the present study

is hospital based and the hospital served as referral center while the national survey was population based and employed the sisterhood method of collecting data relating to maternal mortality.

As a General hospital, MMR of 411/100 000 live births was reported by similar study<sup>7</sup>. With the upgrading of the hospital to a Specialist hospital, there was a sudden rise in the MMR to 1137/100 000 live births with a decline to 625/100 000 as a Teaching hospital. This could be attributed to lack of adequate manpower to handle the numerous obstetric emergencies referred to the hospital after the upgrading. The structure on ground and the facilities available at the institution were inadequate to manage the emergencies referred to them especially during its phase as a Specialist hospital; hence the sudden rise in the MMR at the hospital. There was a progressive drop in the MMR with the employment of more Midwives, Resident doctors and Obstetricians/Gynaecologists in 2007 (Table 1). The training and re-training of Medical officers on essential obstetric care also contributed in the declining MMR seen as a Teaching hospital.

Many of the maternal deaths occurred in patients who presented at a late stage with associated poor prognosis.

Although the MMR is high in our hospital, it is lower than the 2736, and 2151/100 000 live births reported in other teaching hospitals in Nigeria i.e. Port Harcourt and Sokoto respectively<sup>8,9</sup>.

The unbooked women were responsible for 68.52% of the maternal deaths. They were 16 times more likely

to die compared to booked women. The majority of these women presented as referred obstetric emergencies posing a great challenge to the limited number of qualified health personnel and available facility in the institution. Unbooked status was a risk factor for maternal mortality in several studies<sup>10-14</sup>.

The leading cause of death varied from centre to centre. In this study, hypertensive disease was the leading cause of death as has also been reported from other centers in Nigeria<sup>8,9</sup>. The high maternal mortality was common among the unbooked primigravidae who usually present late with eclampsia, coupled with the non-availability of magnesium sulfate in the hospital within the study period; a drug that has been shown to be very effective in the management of severe pre-eclampsia and eclampsia.

Haemorrhage was also a common cause of death. Most of these deaths are preventable by the use of oxytocics and anti-shock garments in labour ward and transfusion of adequate compatible blood. Sepsis, severe anaemia and unsafe abortion were the other causes of maternal death. The availability of a wide range of potent antibiotics would have controlled sepsis and prevented death, but unfortunately most of these patients who delivered at home under very unhygienic condition present in septicaemic shock and could not afford potent and effective antibiotics which may be their only saving grace. Severe anaemia was seen among the unbooked patients. The presented in anaemic heart failure and died shortly after arrival

despite resuscitative measures. Cerebral malaria was documented as the cause of death in one of the patient. Cerebral malaria is exceptionally rare as a cause of maternal death in indigenous adult women who have lived all their lives in a malarial holoendemic area as Enugu.

## Conclusion

We conclude that proper planning and implementation are prerequisites before upgrading a General hospital to a Teaching hospital by government or other agencies.

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