

## The Trend in Maternal Mortality in an upgraded Tertiary Facility in North Central Nigeria

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### ABSTRACT

**BACKGROUND:** The Millennium Development Goal 5(MDG-5) aims at reducing Maternal Mortality Ratio (MMR) by 75% by the year 2015 as compared with the 1990 estimates. There is paucity of recent information on the pattern of maternal mortality in the north central Nigeria.

**OBJECTIVE:** This study aims to document the trend and causes of maternal deaths at the Federal Medical Centre, (FMC), Lokoja and to suggest ways of improving safe motherhood services at the centre and in Nigeria.

**METHOD:** This is a review of case records of 44 aternal deaths that occurred between 1<sup>st</sup> January 2005 and 31<sup>st</sup> December 2009 at FMC, Lokoja, north central Nigeria.

**RESULTS:** Forty four maternal deaths occurred and 9496 live births were recorded, giving a Maternal Mortality Ratio (MMR) of 463 per 100,000 live births. The annual MMR decreased from 779/100,000 live births in 2005 to 392/100,000 live births in 2009. The unbooked patients constituted about 68.2% of maternal deaths and about half (56.9%) of women that died were within the age range of 25-29 years. Hypertensive disorders (31.8%), abortion complications (18.2%), obstructed labour/uterine rupture (9.1%) and hemorrhage (9.1%) were the leading causes of death.

**CONCLUSION:** We observed a decreasing trend in annual maternal mortality at the hospital but more commitment is needed to achieve the MDG-5.

**KEYWORDS:** Lokoja, Maternal mortality, North central Nigeria, Trend.

occur annually among women giving birth in the country<sup>1</sup>. Thus, deaths among Nigerian women rank second only to India<sup>1</sup>

Pregnancy being a largely physiological process should not cause the death of most women if they receive evidence-based maternity care. Most maternal deaths in Africa are preventable. Poverty, illiteracy, poor health seeking behaviors and health care practices, inadequate obstetric care and facilities, poor compensation of medical personnel, poor transportation and communication networks, and inadequate political will are important factors contributing to adverse pregnancy outcomes<sup>3-14</sup>.

The MMR is accepted as a measure of the standard of regional healthcare delivery<sup>1,2,15</sup>. Consequently, the high MMR among women in Nigeria serves as a surrogate for the overall poor state of healthcare delivery in Nigeria. Despite its commitment to the attainment of the Millennium Development Goal -5 (reduction of maternal mortality by 75% by 2015), Nigeria continues to experience an increase in maternal mortality<sup>3-7</sup>. The advent of democracy in Nigeria in 1999 has positively impacted on the way government and leaders view the need for reduction in the maternal mortality statistics of the country<sup>4</sup>. At present, there is an increased acceptance of open dialogue among the community members, non-governmental agencies and governmental entities to address the issue of healthcare delivery<sup>4</sup>. Recent government efforts aimed at reducing maternal mortality include the National Reproductive Health Strategic plan<sup>13</sup>, establishment of multi-sectoral National commission on safe motherhood, provision of health equipment, Midwives Service Scheme (MSS), research and capacity building workshops on essential obstetric care and various Millennium Development Goal initiatives.

Also, in order to improve healthcare delivery in Nigeria, the Federal Government in the year 1999, ensured that a federal tertiary health institution existed in all the states of the Federation by upgrading existing state-owned secondary healthcare facilities in states without a federal tertiary institution. Federal Medical Centre (FMC) Lokoja, North Central Nigeria was then created alongside others to offer tertiary care to the people of Kogi State and the contiguous North central states.

**Date Accepted for Publication:** 14th August, 2012  
NigerJMed2012:282-289

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### INTRODUCTION

The Maternal Mortality Ratio (MMR) in sub Saharan Africa and especially Nigeria is unacceptably high when compared with data from the developed world<sup>1,2</sup>. According to the World Health Organization (WHO), Nigeria's MMR is 700-1500 per 100,000 live births which is extremely high in comparison with developed nations such as Britain which reports an MMR of 13/100, 000 live births<sup>1,2</sup>. The life time risk of dying from complications related to pregnancy and child birth in Nigeria is 1 in 18 women which is far greater than the life time risk of 1 in 2400 reported for women in Europe<sup>1</sup>. Although approximately 1.7% of the world's population lives in Nigeria, 10% of all maternal deaths (52,000)

Clinical audit is a form of quality assurance process that is utilized for assessing healthcare services in order to improve patient's care<sup>16</sup>. After the upgrade, FMC Lokoja has witnessed improvements in infrastructural and manpower development which should translate to improved maternity practice in the centre. However, the impact of the upgrade on obstetric care at the centre has not been documented. The objective of this study was to review the trend in maternal mortality over a five year period at the FMC Lokoja, Nigeria in order to document: the maternal mortality ratio, the causes of maternal deaths and the socio demographic characteristics of the dead women with a view to establishing the trend and designing strategies to improve maternal healthcare delivery in the centre in order to be able to achieve the Millennium Development Goal-5.

### Materials and Method

This was a retrospective study of maternal deaths at the Federal Medical Centre, Lokoja, north central Nigeria. The centre renders primary, secondary and tertiary care to the inhabitants of Kogi state, north central Nigeria and her environs. The centre accepts referrals from primary and secondary health facilities within and outside the North Central States. Lokoja, a semi-urban town, is the capital of Kogi State. The population of Kogi State is 3.4million<sup>17</sup>. The average annual number of deliveries at the centre is 1,900.

All maternal deaths in the centre between 1<sup>st</sup> January 2005 and December 31st, 2009 were reviewed. Data were obtained from Medical Records Department, Labour ward, Gynaecology ward and the post Natal Ward Registers. Information reviewed included the patient's age, marital status, parity, booking status, length of stay in the hospital before death, clinical cause of death and occupation of the deceased women. The educational qualifications of most of the deceased and the occupations of their husbands were not available for most of the cases studied. Thus, we were unable to use this information as a proxy for social status as suggested by some studies<sup>18</sup>. Few post mortem examinations were done on these patients because of cultural values of family members against medical autopsy. The causes of death were classified according to the tenth edition (2007 Version) of the International Statistical Classification of Diseases and Related Problems<sup>19</sup>.

The apparently dominant condition was listed as the cause of death when there was more than one contributory factor leading to the death of the patient. The patient were classified as "booked" if they registered and attended the antenatal clinics of FMC Lokoja during the index pregnancy while patients were classified as "unbooked" if they did not attend antenatal clinics at the FMC Lokoja. The study was approved by the ethical committee of FMC, Lokoja. The data collected were

analyzed using the EPI-INFO 6.02 software.

### Results

There were 44 maternal deaths during the 5- year study period and 9496 live births yielding a maternal mortality ratio (MMR) of 463/100,000 live births. The trend in the yearly maternal mortality ratio shows a gradual decline till 2008. There was a slight increase in 2009 as shown in (Figure 1) below. The annual live births do not follow any pattern with the highest number of births recorded in 2007 and the fewest live births recorded in 2006. Four case notes could not be retrieved. However, most of the information about those four patients was available in the labour ward and other registers.

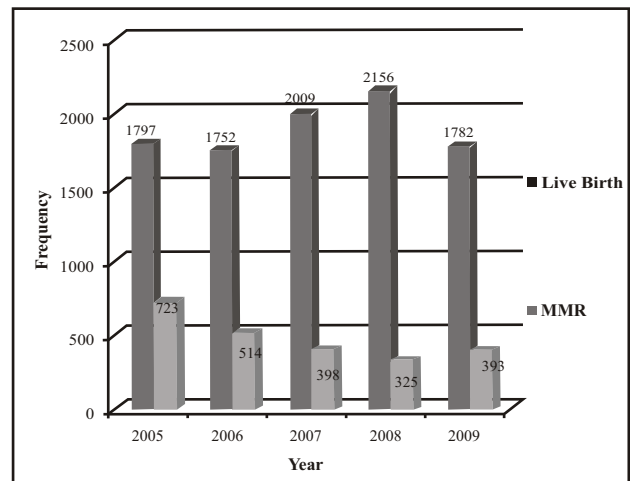


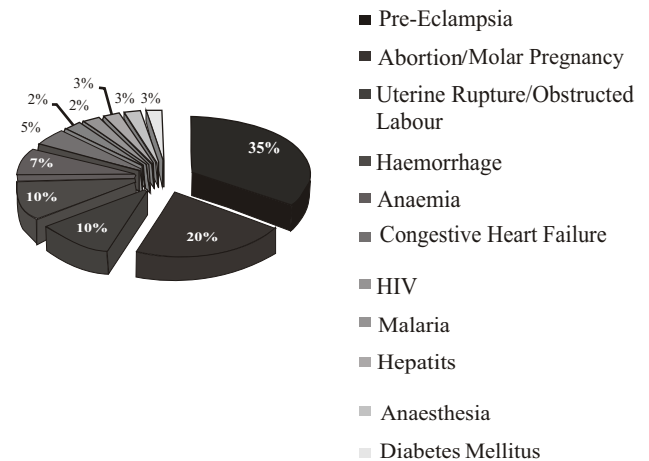
Figure 1. Trend in maternal mortality ratio at FMC, Lokoja (2005-2009)

Table 1 below shows the socio demographic data of the dead women. The age range of the women who died was 15-47 years. The modal age group was 25-29 years with 36.4% of maternal deaths occurring amongst this age group. About half (56.9%) of the maternal deaths occurred within the age range 20-29 years. All the 3 teenage maternal deaths occurred as a result of complications of unsafe abortion. The parity range of maternal death was 0-6 births. The parity of women who were at highest risk for death was Para zero (25%) and Para 1 (22.7%). Grandmultipara women had an incidence of maternal death of 4.5% in this study. There were 10(22.7%) booked and 30 (68.2%) unbooked patients who died during the study period. The booking status of 4 patients (9.1%) was not known (Table 1). The MMR for unbooked patients was 2,703/100,000 live births while that for the booked patients was 106/100,000 live births. Thus, the risk of maternal death amongst unbooked patients was 25.5 fold higher than the booked patients. Most maternal deaths occurred amongst housewives and students (50.0%) that have no means of livelihood.

**Table 1: Socio demographic characteristics of the dead women.**

| Variable              | Number of Women (N=44) | Percentage (%) |
|-----------------------|------------------------|----------------|
| <b>Age(years)</b>     |                        |                |
| <20                   | 3                      | 6.8            |
| 20-24                 | 9                      | 20.5           |
| 25-29                 | 16                     | 34.4           |
| 30-34                 | 5                      | 11.4           |
| e35                   | 7                      | 15.9           |
| Not stated            | 4                      | 9.1            |
| Total                 | 44                     | 100.0          |
| <b>Parity</b>         |                        |                |
| 0                     | 11                     | 25.0           |
| 1                     | 10                     | 22.7           |
| 2                     | 6                      | 13.6           |
| 3                     | 4                      | 9.1            |
| 4                     | 3                      | 6.8            |
| e5                    | 2                      | 4.6            |
| Not stated            | 8                      | 18.2           |
| Total                 | 44                     | 100.0          |
| <b>Booking Status</b> |                        |                |
| Booked                | 10                     | 22.7           |
| Unbooked              | 30                     | 68.2           |
| Not stated            | 4                      | 9.1            |
| Total                 | 44                     | 100.0          |
| <b>Occupation</b>     |                        |                |
| Skilled worker        | 2                      | 4.5            |
| Semi-skilled worker   | 14                     | 31.8           |
| Unskilled worker      | 2                      | 2.3            |
| Housewives/students   | 22                     | 50.0           |
| Not stated            | 5                      | 11.4           |
| Total                 | 44                     | 100.0          |

Figure 2 shows that the four leading direct causes of maternal death are preeclampsia/eclampsia (35.0%), abortion (20.0%), uterine rupture/obstructed labour (10.0%) and obstetric hemorrhage (10.0%). Anaemia (7.0%) and congestive cardiac failure (5.0%) are the leading indirect causes of death. More women died from direct causes of maternal death than indirect causes (30 direct causes of death to 10 indirect causes of deaths and 4 causes unknown). Six (13.6%) women (all of whom were students) died of complications of unsafe abortion and 2(4.5%) women died of complications of Gestational Trophoblastic Disease (GTD).

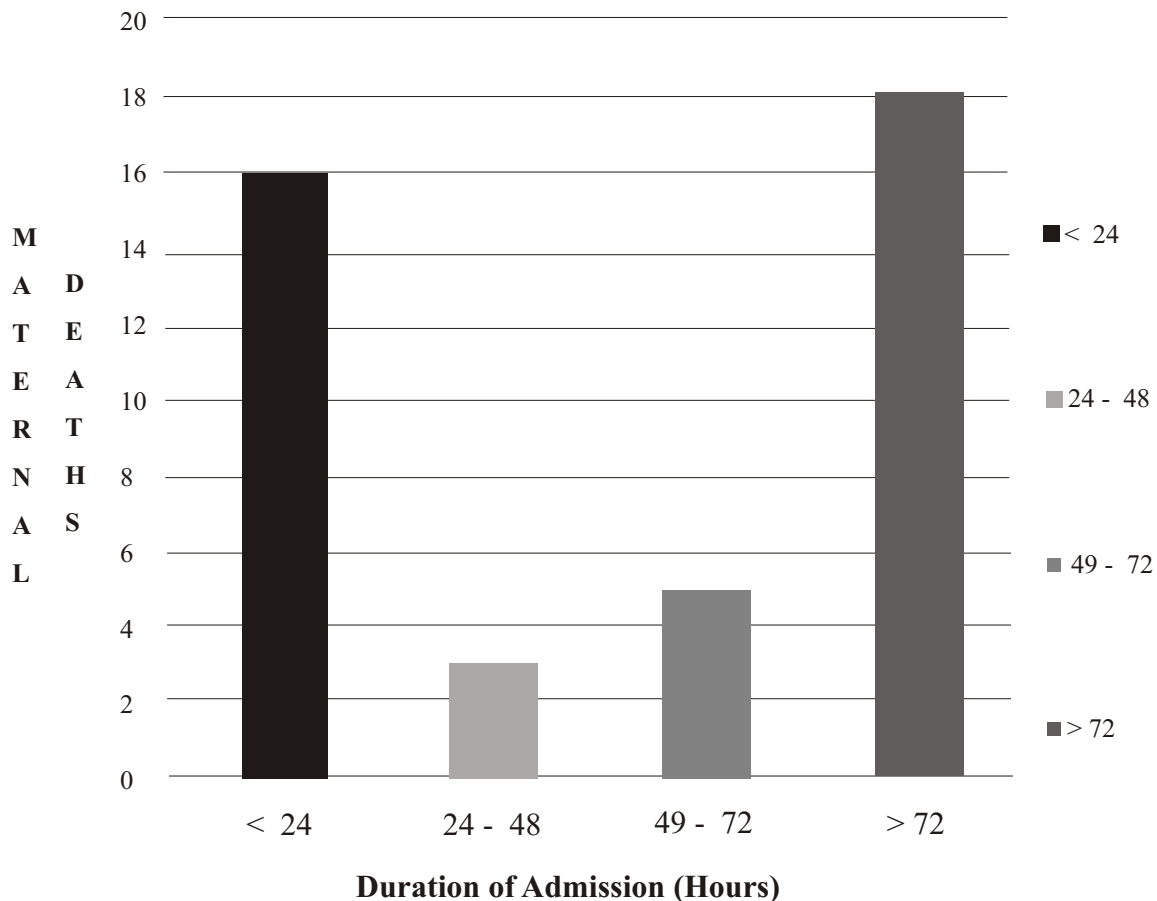


**FIGURE 2: Clinical Causes of Maternal Deaths at Lokoja**

From Table 2, there was no death due to hemorrhage for the last three years and there was no death due to anaemia for the past four years. The incidence of preeclampsia/eclampsia and abortion as direct causes of maternal death has been relatively stable throughout the five year study period.

**Table 2: Annual Trend of the 5 leading causes of maternal death at Lokoja (2005-2009).**

| Year/cause of death                 | 2005 | 2006 | 2007 | 2008 | 2009 | Total |
|-------------------------------------|------|------|------|------|------|-------|
| Preeclampsia/Eclampsia              | 4    | 2    | 2    | 4    | 2    | 14    |
| Abortion/GTD                        | 1    | 2    | 2    | 2    | 1    | 8     |
| Uterine Rupture / obstructed labour | 1    | -    | 2    | 1    | -    | 4     |
| Haemorrhage                         | 1    | 3    | -    | -    | -    | 4     |
| Anaemia                             | 3    | -    | -    | -    | -    | 3     |
| Other medical conditions            | 1    | 1    | 2    | -    | 3    | 7     |
| Not stated/undetermined             | 1    | 1    | 1    | -    | 1    | 4     |
| Total                               | 13   | 9    | 8    | 7    | 7    | 44    |



**FIGURE 3: Distribution of maternal deaths based on the duration of stay in the hospital (2005-2009)**

From Figure 3, 36.4% of the patients died within 24 hours of death. However, 40.9% of the patients stayed beyond 72 hours in the hospital before death

### DISCUSSION

The maternal mortality ratio of 463/100,000 live birth in this study is relatively lower than other studies from the Northern region of Nigeria<sup>6,8-10</sup>. It is also lower than the result from a survey of some health institutions in Kogi state<sup>20</sup>, the average national MMR<sup>1,2</sup> and studies from other parts of Nigeria<sup>5,7,10-12</sup>. This result is indeed an unusual result from the northern part of Nigeria where maternal mortality ratio is very high as compared to other parts of the country. However, the maternal mortality ratio from this study is comparable with studies from Benin City (South South Nigeria)<sup>11</sup> and Abeokuta (South Western Nigeria)<sup>21</sup>. This result from FMC Lokoja, is still unacceptably high when compared with results from the developed world<sup>1,2</sup>. The annual maternal mortality ratio decreased from 723/100,000 live births in 2005 to 393/100,000 live births in 2009. There was however a slight increase from 2008 to 2009. Similar progressive declines in MMR have been reported in Nguru (North West Nigeria), Benin (South South Nigeria), and Enugu (South Eastern Nigeria)<sup>8,11,12</sup> but several other studies in Nigeria have shown a progressive increase in MMR<sup>5-9</sup>. Upgrading of facilities, employment of more obstetricians and midwives; initiation of post graduate

training of residents; training and retraining of health personnel on emergency obstetrics care and increased hospital deliveries have been stated to be reasons for decline in MMR in previous studies<sup>8,11,12</sup>. At the FMC Lokoja, the progressive decline in MMR could be attributed to employment of more obstetricians, midwives and support staff; training and retraining of medical officers, regular clinical review and audit of maternity care practices with improvement in the organization of perinatal care and infrastructures. Other reasons for the decline in the MMR includes provision of credit facility, quick dispensing of drugs using the pre-packed system, improved blood transfusion services, the accreditation of the hospital to train house officers (thus increasing medical personnel offering service), and improvement in the provision of Emergency Obstetrics Care (EmOC)

Maternal mortality was disproportionately high amongst unbooked patients as compared to the booked patients. Unbooked women accounted for 68.2% of maternal mortality in this study and the risk of an unbooked patient dying as compared to the booked patients was 25.5:1. This is a consistent finding from all previous studies done in sub-Saharan Africa<sup>3,5-12,21,22</sup>. Most of the unbooked patients patronize poorly trained Traditional Birth Attendants (TBAs), faith-based centres and private health facilities that do not have the minimum

requirements for EmOC<sup>21,22</sup>. Most of these care givers are not skilled at recognizing emergencies early; hence most patients are referred when they are already moribund. The unbooked patients patronize the TBAs because of cost and perceived unfriendly attitude of healthcare practitioners in Government owned hospitals<sup>21</sup>. Women tend to lack confidence in the better equipped tertiary and government-owned hospitals because of operational problems caused by frequent strike actions undertaken by the staff members. Some women who booked with government owned health facilities were forced to deliver elsewhere because of these strike actions. These are correctable barriers if hospitals and tertiary facilities are properly equipped and the health workers are appropriately compensated for their work.

Most tertiary centres are not prepared for the type of emergency situations, complications and challenges posed by unbooked patients<sup>23</sup>. Most unbooked patients present to the hospital at off hours when there are few skilled personnel and inadequate facilities to administer emergency obstetric care<sup>5,23</sup>. Recognizing these critical barriers to providing emergency obstetric care is essential in our planning for care of obstetric patients in our centres. Experienced and highly skilled staff should be readily available at night and easily mobilized to save the life of the patients.

Public education campaigns about the importance of antenatal care and education of women and young girls is necessary to reduce the rates of pregnant women booking at substandard facilities or avoiding antenatal care. Poverty and unemployment are integrally tied to adverse pregnancy outcomes and maternal mortality as demonstrated by our patients. Virtually all (92.9%) the unregistered women that died were unemployed. One-third of the maternal mortalities occurred among the unemployed women. Among unbooked women who died, 43.3% were unemployed. Deaths among women who were registered for antenatal care were more likely to be semi-skilled or low wage earners, demonstrating that higher social status can be linked with increased propensity to book for antenatal care. Higher social status and improved female empowerment have also been found to help reduce maternal mortality<sup>3,5,6,8,11</sup>.

Another important public policy initiative that would enhance care and improve outcomes is the subsidy of antenatal care, drugs and delivery services in government hospitals. Credit facilities are another important linkage as this resource provides patients with the funds to pay for ante natal care and emergency obstetric care. Lack of credit facilities was identified as a major cause of death amongst unbooked patients in Benin<sup>11</sup>. It is of note that our centre offers credit facilities and this could have contributed to the reduction in MMR in comparison with the other regional mortality rates.

The low parity (para zero and 1) patients contribute about 47% to maternal mortality. Studies from Benin<sup>11</sup> also showed similar pattern, but this pattern was at variance with results from Jos<sup>6</sup>, Plateau state (North central Nigeria). The patients with low parity are likely to be young and naïve and may not be empowered. These factors (low parity, young age and unbooked status) are determinants of maternal mortality in some studies<sup>3, 6-8, 11, 24</sup>. Also, grand multiparity has been linked to several complications that may ultimately lead to death<sup>6,25</sup>. In this study the incidence of death among grandmultiparous women is low (4.5%), but several studies have reported a higher risk in them<sup>5,6,8,11</sup>. This may be due to a high index of suspicion for complications or improved management of 3<sup>rd</sup> stage of labour at the centre.

Preventable direct causes of maternal deaths (eclampsia, abortion, obstructed labour and hemorrhage) accounted for 68.2% of maternal deaths while 22.8% of maternal deaths at FMC, Lokoja were due to indirect causes. The cause of death was not determined in 9.1% of cases. This is a similar finding in most of the previous studies in Nigeria<sup>1,3,5-12,14,21,23,26</sup>. This underscores the need to make antenatal care and emergency obstetrics care to be available to all pregnant women in order to prevent the greatest killers of women in our environment.

Hypertensive disorders in pregnancy were the leading cause of direct maternal death in this study (35.0%). This was also reported by some authors in Nigeria<sup>7-9,12,20,26</sup>. The annual incidence of death from eclampsia was relatively stable all through the study period. The unavailability of Magnesium Sulphate (MgSO<sub>4</sub>) in the hospital during the study period such as it happened in other centres<sup>7,8,12,20,26</sup> could have contributed to the deaths from eclampsia during the study. However, since the introduction of MgSO<sub>4</sub> at the centre (since October 2009), no woman has died on account of preeclampsia/eclampsia in the centre. Medical practitioners and midwives should be trained in the use of MgSO<sub>4</sub>, in order to help reduce mortality and morbidity from preeclampsia/eclampsia

The incidence of death from malaria or anaemia in pregnancy in the study occurred only in the first year of the study. This may suggest that most patients (both booked and unbooked) now take routine haematinics more consistently. It may also show that awareness about malaria is increasing and more women may be receiving prophylactic malaria therapy. There might however be several morbidities from malaria infestation that were not reported. Thus, the “roll back malarial initiative” should be strengthened. Provision and promotion of insecticide treated mosquito nets and provision of affordable anti malarial prophylaxis and therapy should be encouraged and sustained.

Surprisingly, death from ectopic pregnancy that used to

be a common cause of maternal death because of poor diagnosis and late presentation<sup>27</sup> did not occur within the period of the study. High index of suspicion with adequate blood banking service may be responsible for the observed zero fatality from ectopic pregnancy in the study.

The trend in the clinical cause of maternal death showed that no woman died of hemorrhage in the last 3 years of the study. This may also suggest improved emergency obstetric care. It may also mean that the hospital's blood bank services (which are complemented by the National Blood transfusion service in Lokoja) have been of great help in making blood available and hence reducing death from haemorrhage. Also, active management of labour with associated use of misoprostol when necessary might have also helped to reduce the incidence of primary post partum haemorrhage due to uterine atony. Efforts should be geared towards sustaining this result.

Six (13.6%) students died of complications of criminal abortion in the study. This is the second leading cause of death in the study (after hypertensive disorder). Death from unsafe abortion in Africa had been reported by several authors<sup>6, 28, 29</sup>. This is because of the clandestine way that abortion is being procured since induced abortion is illegal in Nigeria<sup>28, 29</sup>. The restrictive abortion laws should be liberalized in order to reduce death from abortion. Also, adolescent reproductive health issues and sex education should be introduced in our secondary school curricular in order to prevent deaths from complications of unsafe abortion. Contraception and abstinence should also be vigorously preached to these young women. Such initiative may not be culturally acceptable in the northern part of Nigeria<sup>6</sup>. Advocacy and communication strategies aimed at breaking this barrier should be pursued.

Of the two patients that died of Gestational Trophoblastic Disease (GTD), one was lost to follow up and later presented with complications of choriocarcinoma while the other died of complications of interventions of molar pregnancy. It is important that obstetricians always have high index of suspicion for GTD as part of differential diagnosis of secondary post partum haemorrhage, abortion and abnormal uterine bleeding. Appropriate counseling and follow up plan must be strictly drawn to avoid death from this condition.

Obstructed labour and uterine rupture contributed 10.0% of the maternal deaths. The patients affected were all unbooked and were possibly in labour under the supervision of unskilled persons. Death from obstructed labour hardly occur in the developed world<sup>1</sup>. It is still common in our environment because of poor intrapartum supervision and strong aversion to caesarean section by some women in our environment. Public enlightenment campaign and training and retraining of midwives will go

a long way to reduce death from this condition.

Sepsis as a cause of maternal death has been reported severally as one of the three leading causes of maternal death in our environment<sup>5,7,12,20</sup>. However, sepsis was implicated as a contributory factor to three of the six deaths from unsafe abortion in this series, but overall our study surprisingly did not record any death primarily from puerperal sepsis.

The contribution of Human Immunodeficiency Virus (HIV/AIDS) to maternal death in this study was 2.0%. Other studies from North central Nigeria<sup>6,20</sup> also showed low incidence (1.5%-12.1%) of indirect maternal deaths from HIV/AIDS. This is a paradox since North central Nigeria has a high prevalence rate of HIV/AIDS according to the National prevalence rate of the disease<sup>31</sup>. HIV/AIDS has however been noted as a major and important contributor to global and regional maternal mortality ratios<sup>2,32</sup>. All the various arms of Prevention of Mother to Child Transmission (PMTCT)<sup>31</sup> must be strengthened to prevent a future epidemic of maternal deaths from HIV/AIDS at FMC Lokoja and elsewhere.

Anaesthetic death was not as common (3%) as was reported from Jos (North central Nigeria)<sup>6</sup>. This could be because most of the anaesthetic nurses at FMC Lokoja are getting more proficient with spinal anaesthesia under the guidance of the consultant anaesthetist. Spinal anaesthesia has been shown to reduce anesthetic complications from caesarean section as compared to general anaesthesia<sup>33</sup>. Furthermore, the study from Jos reviewed a seventeen year period from 1985-2001. While this present study reviewed the period from 2005 to 2009. The general improvement in knowledge, skill and techniques of anaesthesia over the years might also explain the noted improved difference<sup>33</sup>.

Thirty six point four percent of maternal deaths occurred within 24 hours of getting to the hospital while 40.9% of maternal deaths occurred more than 72 hours after getting to the hospital (figure 3). This contrast with other reports in which most maternal deaths occurred within 24 hours of hospital care<sup>5,6,11,12</sup>. Yearly trend of duration of hospital care before death showed that there was a dramatic drop in the number of women dying within 24 hours of admission. Between 2005 and 2006, an average of 56.5% of maternal deaths occurred within 24 hours, while between 2007 and 2009, average maternal death that occurred within 24 hours reduced to 18%. Improvement in Emergency Obstetric care, with relatively prompt mobilization of necessary skills, interventions and drugs at off hours, might be reasons for this trend. Also, the annual reduction in the number of women dying within 24 hours of hospital stay in the hospital may be because peripheral centers refer patients earlier than they used to do.

Since initiation of residency training programme with associated upgrade of facility and increased manpower has been reasons adduced for a downward trend in maternal mortality ratio in some centres<sup>11,12</sup>. Tertiary centres in the region should be encouraged to train obstetricians and midwives in order to improve maternity care. Such training programmes will also reduce the proportion of unsupervised deliveries in the region. Current information however show that few centres offer residency training programme in Obstetrics and Gynaecology<sup>34</sup> in the North central region of the country. The role of tertiary health institutions like the FMC Lokoja in the attainment of the millennium development goal in the north central region cannot be overemphasized. We therefore suggest that a tertiary health center like ours with adequate facility and manpower should be created in every senatorial district of the country to help service the various primary health care facilities, offer comprehensive emergency Obstetric care and train requisite manpower.

Health records and entries were not well kept at the centre. We suggest an improvement and possible computerization of the maternity records. This will make future reviews to be easily conducted.

## CONCLUSION

The trend in the Maternal Mortality Ratio at the FMC, Lokoja Nigeria an upgraded tertiary facility in the North central part of Nigeria have been presented and discussed. It was found that the Maternal Mortality Ratio at FMC Lokoja is still unacceptably high (though declining). The four leading causes of maternal mortality at the centre (Hypertensive disorders, abortion complications, obstructed labour/uterine rupture and hemorrhage) are largely preventable and most of the deaths occurred among the “unbooked” patients.

Public enlightenment campaign on the need for ante natal care and education of the girl child with interventions for women empowerment will help to further reduce the maternal mortality ratio to achieve the Millennium Development Goal-5 in Nigeria.

The management and staff of the FMC Lokoja should continuously review and improve on their maternity practice in order to sustain the current downward trend of the maternal mortality ratio at the centre.

## CONFLICT OF INTEREST:

The authors declare that there is no conflict of interest.

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