Hospital Report

Maternal Mortality and Morbidity Rates among Pregnant Mothers Attending Antenatal Care at Imo State Tertiary Health Institutions

Georginia C. Njoku [1], Adanma S. Nwagwu [1], Chinelo C. Vincent [1], Julia E. Ibebuike [1]
[1]Department of Nursing Science, Imo State University, Orlu, Nigeria

Corresponding author: Georginia C. Njoku
Email: njokugeorgenia@gmail.com
Phone: +2348076363581

Abstract

Background: The study examined maternal mortality and morbidity rates among pregnant mothers that received antenatal care at tertiary health institutions in Imo State.
Methods: The study adopted the retrospective and descriptive survey research designs. 9,651 pregnant women who attended antenatal care at Federal Medical Centre Owerri, Imo State University Teaching Hospital Orlu and Imo State Specialist Hospital Umuguma all in Imo State, Nigeria constituted the population of the study. Sample sizes of 384 and 528 pregnant women for the descriptive and retrospective studies were used. Data Abstraction Instrument on Determined Factor Effect and Preventive Measure Questionnaire (DFEPMQ) were used for data collection. The instruments were validated by experts in data extraction and Measurement and Evaluation. The reliability of the 2nd instrument was ascertained using the Cronbach's Alpha reliability method and 0.81 was the reliability index obtained. A standard hospital profoma was used for relevant information abstraction from the health institutions while the investigator employed direct methods to collect responses using the questionnaires. The SPSS version 29.0.1while and t-test were used to analyze the results.
Results: The study showed high maternal mortality and morbidity in health institutions in Imo State, Nigeria and the rates were higher in rural than urban areas among others.
Conclusions: A functional Health Insurance Scheme at the community level can increase substantial resources to provide health care to women, the government should employ qualified health professionals and provide medical subsidy among others.
Keywords: Mortality, Morbidity, Pregnant women, Ant-natal care, Health Institutions

Introduction

All over the world and almost in every culture, childbirth is a celebrated event. That notwithstanding, thousands of women in many countries do not experience childbirth with joy, but a private hell that may end in death. In every society, celebration of life is the dominant theme while the grimmer side of childbearing is often shrouded in silence, known only to those who suffer it and those who attend them. Although the health care has greatly improved and advanced in many countries of the world, a number of women still die while pregnant or within one month after delivery or termination of pregnancy. Maternal mortality and morbidity remain unacceptably high in Nigeria, ranking among the highest in the world and the rate of reducing these death rates have been slow as many of the contributory factors remain unaddressed [1]. Every day, approximately 830 women die from preventable causes related to pregnancy and childbirth; 99% of these deaths, however, occur in developing countries [2]. Nigeria is the second largest contributor to maternal mortality worldwide, after India. It was estimated that roughly 303,000 women died in 2015 during and following pregnancy and childbirth [3]. Almost all of these deaths occurred in low-resource settings, and most of them could have been prevented. Between 1990 and 2015, the global maternal mortality ratio (the number of maternal deaths per 100,000 live births) has declined by 2.3% only per year between the above years under review. However, increased rates of continuous decline in maternal mortality were observed from 2000 onwards. In some countries, annual declines in maternal morbidity and mortality between 2000 and 2010 were above 5.5% Global Health Observatory [4].

It is obvious that maternal mortality is a key constituent of maternal health. The World Health Organization in the international statistical classification of diseases and related health problems (ICD), has defined maternal mortality as the death of a woman while pregnant or within 42 days of a termination of a pregnancy, from any cause related to or aggravated by the pregnancy or its management but not accidental and incidental causes [2]. Maternal morbidity refers to the disease/illness experienced by pregnant women. Many times, this often results in an inability to function properly and in many situations affects the victim's economic, social and fertility roles [5].

In Nigeria, the five leading causes of maternal death include obstetric haemorrhage, eclampsia, sepsis, obstructed

labour and complications of unsafe abortion [6]. Maternal mortality and morbidity during pregnancy is attributed to mental health conditions [6]. The risk of maternal mortality is increased in women who have had two children and above [7]. The higher the number of antenatal visit, the lower the likelihood of maternal mortality and morbidity.

As maternal mortality and morbidity is a global health issue, understanding its causes is crucial in confronting the challenges of unyielding high rates in our society. Therefore safe motherhood which encompasses the services of initiative delivery guidelines designed to ensure that women receive high quality gynecological, family planning, pre-natal, delivery and post-partum care in order to achieve optimal health for both mother and foetus during pregnancy, child birth and post- partum, should be adopted and maintained as an essential strategy for achieving maternal and child health.

Methodology

Research Design

The study utilized a retrospective and descriptive survey research designs, specifically focusing on the analysis of data collected from hospital records and questionnaire. By examining existing records, the researcher gathered valuable information regarding maternal mortality and morbidity rates among the target population.

Ethical considerations

Identification letter was collected from department of Nursing Science, Imo State University. This letter was shown to the director in charge of each of the tertiary health institutions. Ethical approval was obtained from the Institutional Review Board before conducting the study. All research activities was conducted in accordance with the principles of research ethics, ensuring the protection of participants' right, privacy, and confidentiality. However, strict data protection protocols were adhered to, and all collected data was kept secure and confidential.

Study setting

The study was carried out in Imo state tertiary health institutions, south eastern Nigeria. Imo state lies on the latitude $5^{0}29^{'}$N and $7^{0}2^{'}$E and shares boundary in the North with Anambra State, in the south and west with River state and in the east with Abia state. It comprises of three senatorial zones

i.e Owerri, Orlu and Okigwe. Owerri is the capital of Imo state.

Imo state has three tertiary health institutions i.e Federal Medical Center Owerri, Imo State University Teaching Hospital Orlu and the Imo State Specialist Hospital Umuguma Owerri. The tertiary institutions provide comprehensive and sensitive healthcare services procedures, and intervention strategies through engagement of state-of-the-art healthcare facilities suitable in improving and promoting quality of life and wellness of the populace.

Population of the study

The population of the study comprises all pregnant women who sought antenatal care at the three studied tertiary health institutions (Federal Medical Center Owerri, Imo State University Teaching Hospital Orlu and the Imo State Specialist Hospital Umuguma Owerri) during the defined study period. A total population of 9651 was targeted for the study. We reviewed their hospital records and collected relevant data below.

Sample and sampling technique

The sample sizes comprised of 528 and 384 pregnant women for the retrospective and descriptive studies. The sampling techniques adopted for the study included the direct data collection method from the hospital records of the three health institutions, as well as simple random and stratified random sampling techniques for the questionnaire responses.

Instruments for Data Collection

Information on maternal mortality and morbidity rate, as well as causes and associated determinant factors were collected from the hospital records. A standardized data collection form was used to ensure consistency and accuracy in record abstraction. Other relevant information necessary for the study were obtained using the 2nd instrument called Determinant Factor Effect and Preventive Measure Questionnaire (DFEPMQ)

Validity and reliability of Instruments

To ensure the validity of the data collected from hospital records, two trained personnel were involved in reviewing and extracting information from the records. Regular training sessions were conducted to enhance inter-rater reliability and minimize errors in data abstraction. Furthermore, the questionnaires were subjected to scrutiny by two experts in Measurement and Evaluation

who finally with the supervisor validated the final instrument for use.

The reliability of the data collection process was maintained via the consistent application of standardized data collection form. Additionally, regular quality checks and audits were conducted to ensure the accuracy and consistency of the collected data. Possible discrepancies or errors were resolved promptly through discussions and consultations with the supervisor. The reliability of the instrument – questionnaire was determined using the cronbach reliability method and a reliability index of 0.81 was obtained.

Procedure for data collection

A standardized protocol was followed to abstract relevant information from the records, including demographic details, medical history, pregnancy-related complications, interventions and outcomes. Throughout the data collection process, a total of 6000 patient folders from the hospital records was reviewed. Their folders contained information on maternal deaths and severe morbidity cases that occurred within the specified period under study. Each folder was reviewed carefully accurately to capture all the necessary data for the study.

To maintain confidentiality, personal identifiers ware ignored from the data collected from the hospital records. Only anonymous data was utilized for analysis and reporting purposes.

The review of medical records covered a retrospective period of 5 years (2017-2021), to enable the extraction of relevant data from the medical records of pregnant women who experienced maternal mortality and morbidity within the period under review. Regarding the timeframe, the data collection process took approximately six weeks to complete. This duration allowed for thorough review and extraction of information from the patient folders, ensuring accuracy and attention to details.

During these weeks, the researcher worked closely with the hospital staff to gain access to the necessary records and ensure a streamlined data collection process. Their assistance and cooperation were invaluable in facilitating the smooth and efficient retrieval of the required information. The questionnaire responses and information collection also followed concurrently.

Data analysis

The collected data was entered into a secure electronic database for analysis. Descriptive

statistics, such as frequencies, percentages and charts, mean and standard deviations were used to summarize the data. Furthermore, inferential statistics of t-test was used to analyze the findings.

Results

Of the 2114 total deliveries in Federal University Teaching Hospital Owerri, 35 maternal death was recorded and a maternal mortality ratio of 1656/100,000 was calculated. Imo State Teaching Hospital Orlu recorded a total delivery of 1951 out of which 40 deaths were recorded and a maternal mortality ratio of 2050/100,000 was calculated, while at Imo State Specialist hospital Umuguma where 1811 total delivery were recorded, 49 deaths and maternal mortality ratio of 2706/100,000 were observed. On the overall, 5876 total deliveries were recorded in Imo State Tertiary Hospitals, out of which 124 deaths were reported with a maternal mortality ratio of 2110/100,000 (Table 1).

One hundered and twenty four (124) deaths were recorded. Of this number, the booked statutes in federal University teaching hospital, Imo state university teaching hospital and Imo specialist hospital were 14, 11 and 18 while 21, 29 and 31 respectively were un-booked. It was identified that the educational levels mostly obtained by the patients was secondary school. The table also recorded that maternal death rate was higher in the range of age 26-35 years. It was revealed that maternal mortality occurs mostly at post-partum and 28 weeks onset of labor and also duration of hospital stay before death is mostly less than 2 days (Table 2).

The causes of maternal morbidity were found to be haemorrhage, pre-eclampsia/eclampsia, infection, severe anemia, hepatitis, transfusion reaction, embolism, anaesthetic complications, abortion and some others in their varying degrees of occurrence (Table 3).

The causes of 124 maternal mortality and morbidity in Imo state tertiary hospitals were found as hemorrhage 34 deaths, infection 22, hypertensive disorders 16, transfusion reaction 11, embolism 4, 3 deaths as result of anesthetic complications, abortion 6 deaths, while 9 deaths were as a result of unidentified causes (Figure 1).

Discussion

The study showed significant challenges in maternal healthcare in Imo State, Nigeria. The maternal mortality rate in Imo State tertiary hospitals was found to be higher than the national average, indicating a pressing concern for maternal health in the region. This finding supports the long-held notion that maternal mortality is more pronounced in the North than in the South. Similarly, the finding is in contrast to the findings of a similar study where a descriptive research on maternal death in a tertiary health institution in South East Nigeria (Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka) was conducted and which found that though maternal mortality rate (MMR) is gradually increasing in COOUTH, it is still lower than the national average and outcome in similar health institutes in Nigeria.

The analysis of hospital records identified the leading causes of maternal mortality, such as postpartum hemorrhage, pre-eclampsia/eclampsia, and infection. This information underscored the need for targeted interventions to address these specific health issues. The findings identify the leading causes of maternal mortality to be haemorrhage, pre-eclampsia/eclampsia and infection. The finding seems to be in line with the finding of another study which found that Eclempsia, pre-eclempsia amd haemorrhage were reported to be the most common direct causes of maternal mortality in Nigeria. Nevertheless, the study differed with this study in some respects in the study area, research designs, year of study,

population and sample size among others. Furthermore, the study showed that a significant proportion of maternal deaths occurred among women who had limited or no access to prenatal and antenatal care. This highlighted the importance of improving access to these essential healthcare services.

Common complications such as pre-eclampsia/eclampsia, infection, and anemia were identified by the study. These findings emphasized the need for comprehensive maternal healthcare services to address both mortality and morbidity. The finding agrees with a study on the prevalence of maternal morbidity in Owerri and found out that maternal morbidity was higher in rural communities than in Urban communities and the highest cause of maternal morbidity was malaria, pre-eclamsia and eclampsia.

The analysis of hospital records highlighted the systemic challenges within the healthcare system, such as understaffing, inadequate facilities, and limited availability of essential resources. These challenges were identified as contributing factors to the maternal health issues in Imo State. The findings corroborate with another study which showed that the majority of causes and contributory factors to maternal death are preventable through combine self-motherhood strategies of focused antenatal care, prompt referral, active management of labour and immediate post-partum period and access to family planning.

The findings of the present study underscore the urgent need for targeted interventions and investments in maternal healthcare in Imo State. Furthermore, the data obtained from hospital records provided valuable insights into the specific factors contributing to maternal mortality and morbidity, which can be used to inform policy and programmatic interventions aimed at improving maternal health outcomes in the region.

Conclusion

The findings of the study emphasize the need for improved access to quality maternal healthcare services, better infrastructure, and enhanced healthcare policies. The implementation of strategies for early detection and intervention in high-risk cases, as well as continuous education and training for healthcare professionals, are critical to reducing the maternal mortality and morbidity rates. Additionally, collaboration between healthcare stakeholders and government authorities is essential for facilitating sustainable improvements in maternal healthcare in Imo State.

Conflict of Interest

The authors declare that there is no conflict of interest

References

1. Adewole I. Nigeria Sets Up Task Force to Reduce Maternal Mortality. The Eagle Online. Ref.2017: https://tinyurl.com/yxsqlfhe

2. WHO. Maternal mortality in 2005. Estimates developed by WHO, UNFPA, and the World Bank. 2018.

3. Alkema L, Chou D, Hogan D. Global, Regional and National Levels and Trends in Maternal Mortality between 1990 and 2015, with Scenario-based Projections to 2030: A Systematic Analysis by the UN Maternal Mortality Estimate Inter-Agency Group. Lancet 2015, 387(10017):462-74p.

4. GHO. Global Health Observation data. Fact sheet 2016.

5. WHO, the World Bank, United Nations Population Division. NewYork, USA, UNICEF. Levels and Trends in Child Mortality. Report. The Inter-agency Group for Child Mortality Estimation (UNIGME) 2015.

6. Azuh D, Azuh A, Iweala E, Adeloye D, Akanbi M. Factors Influencing Maternal Mortality among Rural Communities in Southwestern Nigeria. Int J Women's Health 2017, 9: 179-188.

7. Bauserman M, Lokangaka A, Thorsten V, Tshefu A, Goudar S. Risk Factors for Maternal Death and Trends in Maternal Mortality in Low-and Middle-income Countries: A Prospective Longitudinal Cohort Analysis. Reprod Health 2015; 12: S2S5.

Tables and figures

Table 1: Yearly maternal mortality and ratios

Federal University Teaching Hospital, Owerri

Year	Total Deliveries	Maternal Deaths	Maternal Mortality Ratio
2017	417	5	1199
2018	427	4	937
2019	418	7	1675
2020	380	11	2895
2021	472	8	1695
Total	2114	35	1656

Imo State University Teaching Hospital

Year	Total Deliveries	Maternal Deaths	Maternal Mortality Ratio
2017	419	6	1432
2018	448	5	1116
2019	481	8	1691
2020	319	12	3762
2021	292	9	3082
Total	1951	40	2050

Imo State Specialist Hospital Umuguma

Year	Total Deliveries	Maternal Deaths	Maternal Mortality Ratio
2017	378	7	1852
2018	380	6	1579
2019	380	9	2368
2020	289	11	3806
2021	385	16	4156
Total	1811	49	2706

Imo State Tertiary Hospital (Total)

Year	Total Deliveries	Maternal Deaths	Maternal Mortality Ratio
2017	1214	18	1483
2018	1255	15	1195
2019	1271	24	1889
2020	988	34	3441
2021	1148	33	2875
Total	5876	124	2110

Table 2: Socio-Demographic Characteristics, period of death and duration of hospital stay

Booking statues	**Number**			**Percentage**		
Health Institutes	FMC	IMSUTH	ISSHU	FMC	IMSUTH	ISSHU
Booked	14	11	18	40.00	27.50	36.73
Un-booked	21	29	31	60.00	72.50	63.27
Total	35	40	49	100	100	100
Levels of Education of Patients						
No Education	4	3	2	11.43	7.50	4.08
Primary	7	15	8	20.00	37.50	16.33
Secondary	12	18	25	34.29	45.00	51.02
Tertiary	9	3	13	25.71	7.50	26.53
Not stated	3	1	1	8.57	2.50	2.04
Parity	**Number of Death**			**Percentage**		
Health Institutes	**FMC**	**IMSUTH**	**ISSHU**	**FMC**	**IMSUTH**	**ISSHU**
0	6	7	8	17.14	17.50	16.33
1	6	6	7	17.14	15.00	14.29
2	5	7	8	14.29	17.50	16.33
3	5	5	7	14.29	12.50	14.29
4	4	5	7	11.43	12.50	14.29
≤5	9	10	12	25.71	25.00	24.49
Total	35	40	49	100	100	100
Maternal Age Distribution of Patients						
Age	**Number**			**Percentage**		
Health Institutes	**FMC**	**IMSUTH**	**ISSHU**	**FMC**	**IMSUTH**	**ISSHU**
<15	1	2	1	2.86	5.00	2.04
16-25	10	9	11	28.57	22.50	22.45
26-35	17	18	23	48.57	45.00	46.94
36-45	5	7	9	14.29	17.50	18.37
>45	2	4	5	5.71	10.00	10.20

Time of Death						
Before 28 wks	5	4	6	14.29	10.00	12.24
28 wks onset of labor	10	13	15	28.57	32.50	30.61
Intra-partum	7	8	11	20.00	20.00	22.45
Post-partum	13	15	17	37.14	37.50	34.69
Duration of Hospital stay before Death						
≤2 days	21	25	30	60.00	62.50	61.22
3-7 days	11	12	13	31.42	30.00	26.53
≥8 days	3	5	6	8.57	12.50	12.25

Table 3: Causes of maternal death

Maternal Morbidity	**Number**			**Percentage**		
Health Institutes	**FMC**	**IMSUTH**	**ISSHU**	**FMC**	**IMSUTH**	**ISSHU**
Hemorrhage	11	10	13	31.43	25.00	26.53
Pre-eclampsia /Eclampsia	6	7	9	17.14	17.50	18.37
Infection	4	6	6	11.43	15.00	12.24
Severe Anemia	3	3	4	8.57	7.50	8.16
Hepatitis	3	3	4	8.57	7.50	8.16
Transfusion reaction	2	4	5	5.71	10.00	10.20
Embolism	1	1	2	2.86	2.50	4.08
Anesthetic complications	1	1	1	2.86	2.50	2.04
Abortion	2	2	2	5.71	5.00	4.08
Others	2	4	3	5.71	10.00	6.12

Figure 1

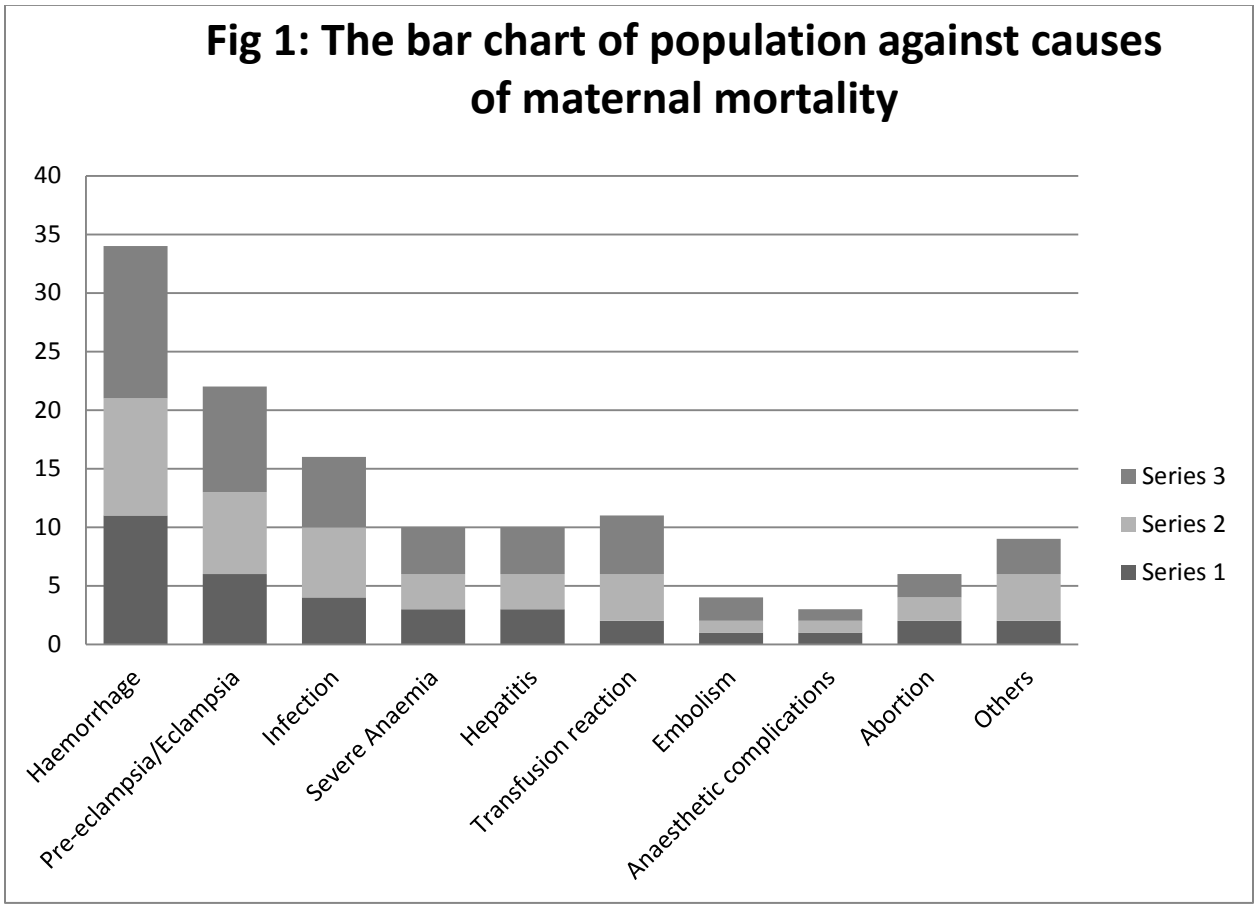
Fig 1: The bar chart of population against causes of maternal mortality
40
35
30
25
20
15
10
5
0
Haemorrhage
Pre-eclampsia/Eclampsia
Infection
Severe Anaemia
Hepatitis
Transfusion reaction
Embolism
Anaesthetic complications
Abortion
Others
Series 3
Series 2
Series 1