

REDUCING MATERNAL MORTALITY: AN ASSESSMENT OF THE AVAILABILITY AND QUALITY OF EMERGENCY OBSTETRIC AND NEWBORN CARE IN ESAN CENTRAL LOCAL GOVERNMENT AREA, EDO STATE - NIGERIA

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ABSTRACT

Background: Maternal mortality is a global public health burden, worse in Sub-Saharan Africa. In Nigeria, the maternal mortality rate is 512 in 100,000 live births. This study aimed to assess the availability and quality of Emergency Obstetric and Newborn Care (EmONC) services in Esan Central Local Government Area (LGA), Edo State, Nigeria.

Methodology: Mixed research, which included a descriptive cross-sectional study design and in-depth interviews, were used in this study. Data were collected using the United Nations' Averting Maternal Death and Disability (UN-AMDD) handbook. Forty key informants' interviews with facility managers, pregnant women, and healthcare providers were done and triangulated. Descriptive data were analyzed using the IBM Statistical Package for Social Sciences (SPSS), version 20. In-depth interviews were audiotaped, transcribed, and analyzed thematically.

Results: Twenty healthcare facilities were included in this study. Seventeen (85%) of these were primary healthcare centers, two secondary (10%), and one tertiary (5%). Seventeen were publicly-owned, while three were privately-owned. The availability of EmONC services in Esan Central LGA was 3.7 in 500,000 population. The met need for EmONC was 62.6%, and the obstetric case fatality was 1.2%. Respondents had adequate knowledge and concern about the burden of maternal mortality. The major causes of maternal mortality were hemorrhage, hypertension/convulsion in pregnancy, and prolonged labor. Lack of money, negative healthcare providers' attitudes, and poor referral systems were the major contributors to maternal mortality.

Conclusion: The availability of EmONC services is limited in both primary and secondary healthcare facilities in a low-resource setting. Therefore, there is a need to educate pregnant mothers and healthcare providers on obstetric risks and contributors to reduce maternal mortality. Supplies and equipment necessary to manage obstetric and newborn cases should also be available at all healthcare levels and affordable rates.

Keywords: maternal mortality, emergency obstetric and newborn care, quality of care

INTRODUCTION

An estimated 295 000 maternal deaths were reported globally in 2017. The overall Maternal Mortality Rate (MMR) was 211 in 100,000 live births. Ninety-four (94%) of these deaths occurred in low and lower-middle-income countries, with Sub-Saharan Africa contributing two-thirds (1). About 75% of maternal deaths are due to hemorrhage, sepsis, unsafe abortion, pre-eclampsia/eclampsia, ruptured

uterus, and obstructed labor (1-3). Life-threatening complications will occur in about 15% of pregnant women and cannot be accurately predicted or prevented during pregnancy, delivery, or immediate postpartum (4, 5). However, these complications can be managed by prompt and quality Emergency Obstetric and Newborn Care (EmONC) services if available (3-6). According to the National Demography and Health Survey (NDHS), Nigeria's maternal mortality rate was 512 in 100,000 live

births in 2018 (7). A study done in 2007 in the same country reported a maternal mortality rate of 1 747 in 100,000 live births, of which 77.8% of cases were associated with delays (8). This implies an overall reduction in maternal mortality in Nigeria.

Several strategies have been implemented to reduce maternal mortality. The three most essential efforts include increased access to quality EmONC services, family planning, and a skilled birth attendant's presence during all deliveries (2, 4, 5). It is estimated that with the availability of Emergency Obstetric Care (EmOC) services, 60% of maternal mortality, 45% of neonatal deaths, and 45-75% of stillbirths could be prevented (2, 4). The ethical dilemma in conducting randomized studies makes it challenging to measure maternal mortality, limiting the assessment of EmOC services' impact. Despite these limitations, there is strong evidence to suggest that EmOC is a critical element in any policy for reducing maternal mortality (2). Moreover, universal access to EmONC is considered essential for reducing maternal mortality (9-11).

In Nepal, improvement in infrastructure, equipment, training, data collection, policy advocacy, and community information activities in eight healthcare facilities increased the met need for EmOC from 1.9 to 16.9% and reduced the obstetrics case fatality from 2.7 to 0.3% (9). Another study found that interactive workshops and educational outreach on maternal death review and quality EmOC services significantly reduced maternal death (12). A facility-based review of the status of EmOC in South-South Nigeria found that none of the facilities designated Basic Emergency Obstetric Care (B-EmOC) facilities could offer those services (5). This is similar to a study in Uganda that reported none of the facilities designated B-EmOC offered those services. The met need for EmOC was 9.9%, while absolute obstetric case fatality was 3.0%, higher than the United Nations (UN) recommendation (13). Assessment of the availability of EmONC is necessary to guide policy decisions, planning, and budgeting to reform and strengthen the healthcare system (11). Therefore, this study aimed to assess the availability and quality of emergency obstetric and newborn care in Esan Central Local Government Area (LGA), Edo State, Nigeria.

METHODOLOGY

Study design: Mixed research, which included a descriptive cross-sectional study design and In-Depth Interviews (IDI), were used in this study.

Study setting and population: Esan Central is one of the local government areas in Edo State, Nigeria. There is no current census data for Nigeria. Therefore, this study used the World Bank and Nigeria's National Population Commission population projection of 134,190 for Esan Central. According to the National Demography and Health Survey, Nigeria's crude birth rate in 2013 was 38.9 in 1000 births. Esan Central LGA has one tertiary, two secondary, and 19 primary healthcare facilities. The study included all the registered health centers that provided maternity services in Esan Central.

Data collection: Assessment of health facilities was done using the United Nations' Averting Maternal Death and Disability (UN-AMDD) handbook for monitoring EmONC services (11). Data collection was done with the help of research assistants, who were trained on research principles. All healthcare centers registered with the state's ministry of health and offered maternity services were assessed. A review of the records from the labor, antenatal, postnatal, and gynecology wards was done. Data on the performance of EmONC signal functions, number of deliveries, identified obstetric complications, maternal deaths, and stillbirths were collected six months before the interviews. Physical observation using the UN EmONC checklist was used to assess the availability of supplies and equipment for performing EmONC services.

In-depth interviews were conducted with the person(s) in charge of maternity units or healthcare centers. Pregnant antenatal women, nurses, midwives, and doctors were also interviewed in five previously assessed facilities. Respondents were randomly selected. Eight interviews were conducted in each of the five facilities, thus a total of forty interviews. The interview consisted of questions on EmONC services in the area regarding the reduction of maternal mortality. The interviews were audiotaped, transcribed, coded, and analyzed thematically.

Data analysis: The quantitative data were entered and analyzed using the IBM Statistical Package for Social Sciences (SPSS), version 20. Descriptive variables were summarized using percentages and proportions and presented in figures and tables. Qualitative data from interviews were audiotaped, transcribed, and analyzed thematically.

Ethical consideration: Ethical approval was sought and obtained from the Irrua Specialist Teaching Hospital’s ethical committee (ISTH/HREC/20171219/47). Administrative permission was also obtained from the Local Government Council. Written informed consent was obtained from the participants before enrollment into the study.

RESULTS

A total of 22 health facilities were assessed between October 2017 and March 2018. Two that were privately-owned were not functional; hence 20 facilities were included in this study. Seventeen (85%) of these were primary healthcare centers, two secondary (10%), and one tertiary (5%). Seventeen were publicly-owned, while three were privately-owned (Table 1).

Table 1: Level and type of healthcare facilities in Esan Central LGA, Edo State

Level	Frequency/Percentage
Primary	17 (85)
Secondary	2 (10)
Tertiary	1 (5)
Type	
Public	17 (85)
Private	3 (15)

The facilities exceeded the United Nations and World Health Organization recommendation of four primary and one comprehensive EmONC services for 500,000 population. The availability of EmONC signal functions was, however, limited. Only one institution designated Comprehensive EmONC (C-EmONC) could offer all the nine C-EmONC signal functions. Parenteral antibiotics and oxytocic supplies were available in all facilities. Magnesium sulfate supplies were not available in both primary and secondary facilities (Figure 1).

The number of EmONC facility in proportion to the population was calculated as;

$$(\text{number of B-EmONC} + \text{C-EmONC}/\text{population of the area}) \times 500000 \text{ population}$$

$$\text{Therefore; } 1/134 \ 190 \times 500000 = 3.7/500000 \text{ population}$$

Thus, the availability of EmONC in the area was 3.7/500000 population. All the EmOC indicators did not meet the UN/WHO recommendation, except for the comprehensive EmOC. The met need for EmOC was 62.6 %, while the obstetric case fatality was 1.2% (Table 2).

Nurses and midwives were available in all primary healthcare centers; however, there was no active 24-hour coverage. Secondary healthcare facilities had nurses and midwives with one doctor available on-call. The tertiary healthcare facility had nurses, midwives, doctors, and obstetricians available on a 24-hour active duty roster. Maternal mortality records were only available at the tertiary hospital and one primary healthcare center (Table 3).

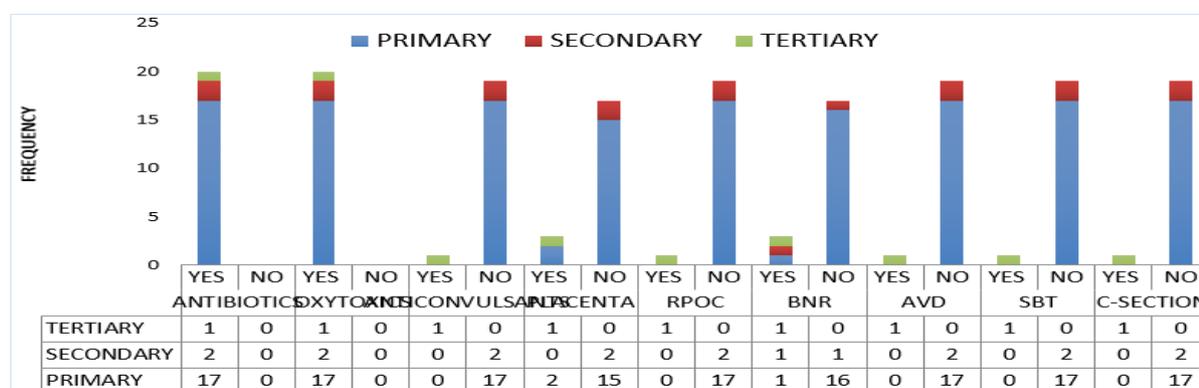


Figure 1: Bar chart showing the availability of EmONC signal functions at the three levels of healthcare assessed in Esan Central LGA, Edo State

*RPOC - Retain Products of Conception, BNR - Basic Neonatal Resuscitation, AVD - Assisted Vaginal delivery, SBT - Save Blood Transfusion

Table 2: Emergency Obstetric and Newborn Care (EmONC) indicators for Esan Central LGA, Edo State

Variable	Number or Percentage
Total population	134190
Availability of EmOC	3.7/500000
Availability for comprehensive EmOC	3.7/500000
Expected number of birth per year ¹	(5 220/2) 2600
The recorded number of births in the assessed facility	1344
Proportion of expected births taking place in the assessed facility ²	51.7%
Number of women expected to have direct obstetric complications (15% of 2 600) ³	390
Number of EOC complication recorded in the assessed facility	244
Met need for EmOC ⁴	62.6%
Recorded c/s over six months	625
Population-based c/s rate ⁵	24%
Number of recorded maternal deaths in the assessed facility	3
Obstetric case fatality ⁶	1.2%
Number of recorded stillbirth rate	35
Facility-based stillbirth rate ⁷	2.6%

1. Calculated by multiplying total population by crude birth rate, then divided by 2 half a year
2. Recorded number of births in the assessed facility/expected birth per year
3. Estimated as 15% of all expected births in the area (WHO, 2011).
4. Number of women admitted to the facility with obstetric complication/ expected EmOC complication.
5. Number of C/S performed as % of expected birth in the area.
6. Number of maternal death recorded/total number of women with obstetric complications x 100.
7. Number of stillbirths as a proportion of total deliveries.

Table 3: Distribution of Skilled Birth Attendants (SBA) and maternal death records in healthcare facilities in Esan Central LGA, Edo State

		Skilled Birth Attendants (SBA)			Total
		Nurses and Midwives	Nurses/Midwives and Medical Officers	Nurses/Midwives/ Doctors/ Obstetricians	
Level of healthcare facility	Primary	16	1	0	17
	Secondary	2	0	0	2
	Tertiary	0	0	1	1
Total		18	1	1	20
		24-hour coverage			Total
		No Roster	Functional Roster	On-Call (Emergency)	
Level of healthcare facility	Promary	16	0	1	17
	Secondary	2	0	0	2
	Tertiary	0	1	0	1
Total		18	1	1	20
		Maternal Death Records			Total
		Yes	No	Do not know	
Level of healthcare	Primary	1	4	11	16
	Secondary	0	1	1	2
	Tertiary	2	0	0	2
Total		3	5	12	20

The themes derived from the in-depth interviews included: the burden of maternal mortality, common causes, where to seek care during emergencies or complications, and what could be done to reduce maternal death. The majority, 90% (n=37) of the respondents, were aware of and concerned about maternal death's burden and consequences. The major causes of maternal deaths identified were hemorrhage, hypertension/convulsion in pregnancy, and prolonged labor. Over 70% cited poor antenatal care, lack of money, poor referral system, delay in receiving treatment, negative healthcare providers' attitude, and lack of necessary equipment as the reasons for maternal deaths. The availability of free alternative care and some patients being adamant even after counseling were the reasons why some patients rejected referrals.

Suggested solutions included increasing the supply of necessary drugs and equipment, training, and re-training skilled birth attendants, community, and healthcare providers' reorientation. Participants' overall perception about the quality of emergency obstetric care services in the area was low, 65% (n=26) (Figure 2).

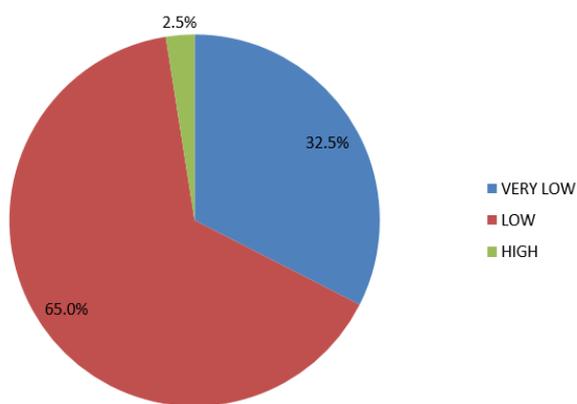


Figure 2: Participant perception of the quality of EmOC services in Esan Central LGA, Edo State

Of the 40 interviewees, 3 were male, while 37 were female. The mean age of the interviewees was 34.1 (SD 7.1). A majority, 65% (n=26), were from the Esan tribe. A majority, 52.5 % (n=21) reported having achieved secondary education, and 42.5 % (n=17) tertiary education (Table 4).

Table 4: Sociodemographic characteristics of study interviewees in five facilities in Esan Central LGA, Edo State

Variable	Number Percentage
Mean age	34.1 ±7.1
Sex	
Female	37 (92.5%)
Male	3 (7.5%)
Tribe	
Esan	26 (65 %)
On	4 (10 %)
Benin	2 (5 %)
Etsako	6 (15 %)
Ibo	1 (2.5 %)
Yoruba	1 (2.5 %)
Level of Education	
No formal education	1 (2.5 %)
Primary	1 (2.5 %)
Secondary	21 (52.5 %)
Tertiary	17 (42.5 %)

DISCUSSION

This study reported limited availability of emergency obstetric and newborn services both at primary and secondary healthcare levels. This is similar to other findings in low and middle-income countries (2, 4-6,13-22). The primary identified causes of maternal mortality were hemorrhage, hypertension/convulsion, and prolonged labor, similar to the World Health Organization (WHO) reported preventable causes (1, 23). Oxytocics and antibiotics were available; however, magnesium sulfate and Manual Vacuum Aspirator (MVA) were not available. This is similar to a study done in Uganda, where MVA and Assisted Vaginal Delivery (AVD) were the critical missing signal functions (13). Eclampsia is a significant cause of maternal mortality that can be prevented and managed with magnesium sulfate. However, a study in Pakistan found magnesium sulfate is not universally available at primary and secondary healthcare levels (24). The met need for EmONC was 62.5 %. This is lower than the UN recommendation but relatively higher than the global overall met need for EmOC of 45% (25).

Increased access to quality EmONC services is necessary to reduce maternal mortality (2, 4). Lack of funds, healthcare providers' negative attitude,

poor access, and dysfunctional referral system were the main reasons for delayed patient presentation for care. This is similar to findings reported elsewhere (8, 26,27). Cost of care is a major contributing factor to reduced access to EmOC services (28, 29). Many women who would have needed EmOC services declined referral to the tertiary healthcare center and opted for missionary maternity home, only to present at these facilities when their condition had deteriorated. This contributed to delay, as reported in similar studies within Edo State (8, 27). The population-based estimate of the cesarean section in this study was 24%, which was higher than the UN recommendation (5 - 15%). The high rate may suggest access to life-saving skills. However, it may also imply delayed patient presentation. The availability of skilled birth attendants is necessary for quality EmONC services (3, 11). Nurses and midwives were available at the primary and secondary healthcare centers; however, a 24-hour duty roster was not available. This is similar to other findings reported elsewhere (15).

Study strengths and limitations

This is the first study to use a mixed research approach to assess the availability and quality of emergency obstetric and newborn care services in Esan Central local government area to the best of our knowledge. Abysmal data and poor record-keeping pose may limit the generalization of this study.

CONCLUSION

The availability of EmONC services is limited in both primary and secondary healthcare facilities in a low-resource setting. Therefore, there is a need to educate pregnant mothers and healthcare providers on obstetric risks and contributors to reduce maternal mortality. Supplies and equipment necessary to manage obstetric and newborn cases should also be available at all healthcare levels and affordable rates.

RECOMMENDATIONS

This study recommends an urgent need for the relevant stakeholders to partner to upgrade the primary and secondary health centers to ensure increased access and affordability of obstetric and newborn care services. An efficient and effective referral system across all healthcare levels is

also necessary, especially regarding obstetric and neonatal emergencies.

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