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CLINICAL ARTICLE

Availability, utilization, and quality of emergency obstetric care services in Bauchi State, Nigeria

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ABSTRACT

Objective: To report the availability, utilization, and quality of emergency obstetric care (EmOC) services in Bauchi State, Nigeria. *Methods:* Between June and July 2012, a cross-sectional survey of health facilities was conducted. Data on the performance of EmOC services between June 2011 and May 2012 were obtained from records of 20 general hospitals and 39 primary healthcare centers providing delivery services. Additionally, structured interviews with facility managers were conducted. *Results:* Only 6 (10.2%) of the 59 facilities met the UN requirements for EmOC centers. None of the three senatorial zones in Bauchi State had the minimum acceptable number of five EmOC facilities per 500 000 population. Overall, 10 517 (4.4%) of the estimated 239 930 annual births took place in EmOC facilities. Cesarean delivery accounted for 3.6% (n = 380) of the 10 517 births occurring in EmOC facilities and 0.2% of the 239 930 expected live births. Only 1416 (3.9%) of the expected 35 990 obstetric complications were managed in EmOC facilities. Overall, 45 (3.2%) of 1416 women with major direct obstetric complications treated at EmOC facilities died. Among 379 maternal deaths, 317 (83.6%) were attributable to major direct obstetric complications. *Conclusion:* Availability, utilization, and quality of EmOC services in Bauchi State, Nigeria, are suboptimal. The health system's capacity to manage emergency obstetric complications needs to be strengthened.

1. Introduction

Overcoming the high burden of maternal and reproductive health problems remains a challenge in Sub-Saharan Africa, particularly in Nigeria. This country has a population of 160 million and an estimated maternal mortality ratio (MMR) of 545 deaths per 100 000 live births [1]. Nigeria constitutes 2.0% of the global population, but accounts for 10% of the world's maternal and childhood mortality burden [2]. Nigeria—along with Somalia, Mali, the Democratic Republic of the Congo, and Niger—is ranked among the 10 "worst places in the world to be a mother" [3], even though high priority has been given to maternal and child health at a national level for decades.

Despite Nigeria's substantial investment in primary health care and the country's commitment to the global maternal and child health agenda [4], the health system seems to be inadequate for provision of lifesaving emergency maternal and child health services [2]. Use of health services has also been too low to have any meaningful impact on the high levels of maternal and child mortality and mobility. Approximately 35% of all births occur in health facilities and one in five births is unassisted [1]. Access to quality maternal and child healthcare services is worse in the underserved rural areas where 70% of the country's population live [2].

Maternal health profiles are much worse in northern Nigeria than in other regions. For example, the MMRs in the states of Sokoto and Bauchi in northern Nigeria are 1500 and 1540 deaths per 100 000 live births, respectively [1]. Similarly, the total fertility rates in Bauchi (7.2) and Sokoto (8.1) are higher than the national average of 5.7 [1]. The median age at first birth among women in the states of Bauchi and Sokoto is 17.5 years and 18.2 years, respectively, compared with the national average of 20.4 years. Finally, only 8% of births in the northwest of Nigeria occur in a health facility [1].

A key intervention to reduce the occurrence of institutional maternal deaths is the strengthening of facility-based services designed to provide lifesaving emergency obstetric care (EmOC). However, tracking the effectiveness of this strategy in resource-constrained settings through measurement of the MMR can be a challenge [5], because the MMR in itself is not a robust indicator of the impact of maternal health interventions [6].

The United Nations Population Fund, the United Nations Children's Fund, and WHO have proposed proxy indicators for the monitoring of

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EmOC services for the treatment of complications of pregnancy and childbirth [7]. This guidance classifies facilities into basic EmOC (BEmOC) or comprehensive EmOC (CEmOC) facilities. BEmOC facilities provide seven lifesaving or "signal" functions (parenteral antibiotics, oxytocics, anticonvulsants, neonatal resuscitation, assisted vaginal delivery, manual removal of the placenta, and removal of retained products). CEmOC facilities provide cesarean delivery and blood transfusion in addition to the seven BEmOC signal functions. The guidance recommends that at least five EmOC facilities, including one CEmOC facility, are available per 500 000 individuals, and that this combination of facilities is evenly distributed across a country and its subnational geographic areas [7]. The UN guidance has been used in many countries to estimate the availability, accessibility, utilization, and quality of EmOC services, and to monitor and evaluate the impact of interventions that aim to improve maternal and child health outcomes.

The purpose of the present study is to report on the availability, utilization, and quality of EmOC services in Bauchi State in northern Nigeria, where various interventions to improve maternal and child health are in place. Baseline data are used from the Targeted States High Impact Project (2009–2014). This intervention—funded by the US Agency for International Development—provides technical assistance to the government, focusing on the improvement of quality of-care processes and the strengthening of maternal, neonatal, and child health delivery systems in Bauchi and Sokoto States in northern Nigeria.

2. Materials and methods

Between June and July 2012, a cross-sectional facility-based needs assessment survey of EmOC services was conducted as a baseline evaluation for the Targeted States High Impact Project. Data were obtained from 59 public health facilities (20 general hospitals and 39 public primary healthcare centers) in Bauchi State. Of the 23 general hospitals in the state, three were excluded because they were inaccessible owing to insecurity. The public primary healthcare centers administratively located around the included hospitals were purposively sampled from the 318 primary healthcare centers distributed across the state's three senatorial zones. Only primary centers that provided delivery services were included. The target units of the survey were departments that provided obstetric and newborn care services and administrative services within a facility. Ethics approval of the research protocol was obtained from the Bauchi State Health Research Ethics Committee prior to commencement of the study. Written informed consent was obtained from the heads of the health facilities before the interviews. All data were processed with strict confidentiality.

The data were collected using structured, pre-established EmOC tools developed by Averting Maternal Death and Disability [8]. These tools are based on the EmOC indicators specified in the international guidelines for monitoring the availability and use of obstetric and neonatal services [7]. The modular questionnaire was adapted to the context of the healthcare system in Bauchi State and covered EmOC signal functions and other essential services, provider knowledge and competency for maternal and newborn care, cesarean deliveries, and maternal deaths (Supplementary Material S1).

Eighteen research assistants were trained for 7 days in June 2012. Six research teams were formed, with two teams per senatorial zone. In each zone, one team obtained data on the performance of EmOC services in hospitals, whereas the other team focused on the selected primary healthcare facilities. In addition to obtaining data through individual interviews of the facility heads (managers), the research assistants extracted data from the facilities' records, including registers of labor and delivery, partographs, the operating room, and the prenatal ward. Data on maternal complications and deaths at each facility were collected retrospectively on a monthly basis for 12 months (June 2011 to May 2012). In addition, direct observations were carried out to determine availability of the core infrastructure, drugs, and supplies required to perform the signal functions [9].

Data from the completed questionnaires were captured with Epi Info version 7 (Centers for Disease Control and Prevention, Atlanta, GA, USA) by trained data clerks. Descriptive analyses including frequency distributions and bivariate analyses were performed with SPSS version 15 (SPSS Inc, Chicago, IL, USA). The χ^2 test was used for comparative analyses. $P < 0.05$ was considered statistically significant.

3. Results

On the basis of the UN process indicators and the minimum acceptable level of EmOC [7], Bauchi State—with a population of 5 715 292 [10,11]—should have at least 46 fully functioning BEmOC facilities and 11 CEmOC facilities. However, only 6 (10.2%) of the 59 sampled facilities met the UN requirements for EmOC centers (Table 1). Lack of training and equipment were the major reasons for not providing EmOC services (data not shown).

In general, EmOC signal functions were provided in secondary-care facilities more often than in primary-care centers (Fig. 1). Administration of parenteral oxytocics was performed at all facilities. Parenteral antibiotics were provided at 54 (91.5%) facilities. All 39 primary healthcare centers were expected to provide BEmOC services, however only 7 (17.9%) provided assisted vaginal delivery, 8 (20.5%) neonatal resuscitation, 9 (23.1%) removal of retained products, and 17 (43.6%) anticonvulsants. However, 8 (21%) primary-level facilities were providing blood transfusion—a CEmOC signal function. Only 3 (15.0%) of the 20 hospitals were fully functioning CEmOC facilities. Estimating from the data, none of the three senatorial zones met the minimum acceptable level of one CEmOC facility per 500 000 population.

Overall, 31 465 (13.1%) of the expected 239 930 annual births took place in a health facility, and 10 517 (4.4%) took place in an EmOC facility. The proportion of births that took place in an EmOC health facility varied significantly in the three zones ($P < 0.001$) (Table 2).

The UN [7] recommends that the proportion of births by cesarean delivery occurring in EmOC facilities should be a minimum of 5% and a maximum of 15% of all births in a population. Cesarean delivery in the present study accounted for only 3.6% (n = 380) of the 10 517 births occurring in EmOC facilities and 0.2% of the 239 930 expected live births. Similar estimates were obtained for the individual senatorial zones (Table 2).

In total, 1416 (3.9%) of the expected 35 990 women with obstetric complications were managed in EmOC facilities (i.e. their needs were met). The proportion whose needs were met varied by zone (Table 2).

The intrapartum and very early neonatal death rates reflect the quality of intrapartum care. No UN benchmarks have been proposed. Overall, 24 intrapartum and very early neonatal deaths per 1000 deliveries were recorded in the EmOC facilities. The number of deaths varied by zone (Table 3).

The direct obstetric case fatality rate in the EmOC facilities was 3.2% (Table 3), which exceeds the UN-recommended maximum of less than 1% [7]. Again, the case fatality rate varied by zone (Table 3). Overall, 13.5% of all maternal deaths in EmOC facilities were attributable to indirect causes (Table 3).

In total, 14 649 obstetric complications were recorded in all the sampled facilities, 7045 (48.1%) of which were direct obstetric

Table 1
Availability of EmOC by type of facility.[a]

Type of EmOC provided	All facilities (n = 59)	Hospitals (n = 20)	Health centers (n = 39)
Comprehensive EmOC	3 (5.1)	3 (15.0)	0
Basic EmOC	3 (5.1)	1 (5.0)	2 (5.1)
Non-EmOC	53 (89.8)	16 (80.0)	37 (94.9)

Abbreviation: EmOC, emergency obstetric care.
[a] Values are given as number (percentage).