ORIGINAL RESEARCH ARTICLE

Status of Emergency Obstetric Care in a Local Government Area in South-South Nigeria

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Abstract

This study assessed the status of the availability and performance of Emergency Obstetric Care (EmOC) in 12 functional public health facilities out of the existing 19 in Gokana Local Government Area of Rivers State in South-South Nigeria, prior to the Midwives Service Scheme (MSS) launch in 2009. No facility qualified as Basic EmOC, while one had Comprehensive EmOC status. Signal functions that required supply of medical consumables were performed by more facilities than services that required special training, equipment and maintenance. Only two facilities (16.67%) had the minimum requirement of ≥4 midwives for 24-hour EmOC service; while only 2.2% of expected births occurred at the facilities. The poor state of maternal health resources in the study area requires urgent interventions by Local and State Governments for infrastructure upgrade and deployment and training of staff towards attainment of MDG-5. A follow-up evaluation would be required since the commencement of the MSS (*Afr J Reprod Health 2012; 16[3]:170-179).*

Résumé

Cette étude a évalué l'état de la disponibilité et la performance des soins obstétricaux d'urgence (SOU) dans 12 établissements de santé publics fonctionnels sur les 19 qui se trouvaient dans la région de l'administration local de Gokana, dans l'Etat de Rivers dans le sud-sud du Nigeria, avant le régime de service sages-femmes (MSS) qui a été lancé en 2009. Aucun établissement n'est qualifié d'assurer le SOU, tandis que l'un avait étendu le statut de rendre le service compréhensif de SOU. Les fonctions de signalisation qui avaient besoin de consommables médicaux ont été effectuées par plus des établissements que les services qui avaient besoin d'une formation spéciale, de l'équipement et de l'entretien. Seuls deux établissements (16,67%) ont eu l'exigence minimale de ≥ 4 sages-femmes pour 24 heures de service SOU, tandis que seulement 2,2% des naissances attendues s'est produite dans les établissements. Le mauvais état des ressources de santé maternelle dans la zone d'étude nécessite des interventions urgentes par les administrations locales et des états pour la mise à niveau des infrastructures, le déploiement et la formation du personnel en vue de la réalisation des OMD-5. Une évaluation de suivi serait nécessaire depuis le commencement du MSS (*Afr J Reprod Health 2012; 16[3]:170-179).*

Keywords: Emergency obstetric care, EmOC, Primary Health Care, Niger Delta, Nigeria

Introduction

Maternal mortality is a major health development challenge in Africa. Reducing maternal mortality has remained a daunting task despite the deployment of proven effective strategies such as the provision of access to Emergency Obstetric Care (EmOC) to pregnant women with direct obstetric complications[1,2].

Annually, an estimated 358,000 women die from complications of pregnancy-related conditions, worldwide[3]. An overwhelming 99% of these annual maternal deaths occurred in developing countries in 2008, and 57% occurred in Sub-Saharan Africa[3]; meanwhile 75% of these deaths are due to avoidable causes[4]. The Demographic and Health Survey of 2008 indicate that Nigeria's Maternal Mortality Ratio (MMR) has remained

one of the world's highest at an estimated 545 per 100,000 live births[5], with a range between 166/1000, 000 in the South West and 1,549/100,000 in the North East zone[5]. Urban and rural variations also indicated a notable difference at 351/100,000 and 828/100,000 respectively[5]. However, in Rivers State the indicators are even worse at 889 per 100,000 live births[6]. Most maternal deaths are due to complications of pregnancy and childbirth[7], for which EmOC has proven to be life saving[1]. Access to EmOC services is a key element of the WHO 'Making Pregnancy Safer' programme[8]. In 1997, the WHO, UNICEF and UNFPA developed guidelines for monitoring the availability and use of EmOC services[9]. The guidelines stipulated that eight services, termed "signal functions", must be available and should have been performed at least once within a three-month period in order to designate a facility as an Emergency Obstetric Care facility[9]. Six of the services are expected to be available and performed at the level of a Basic Emergency Obstetric Care (BEmOC) facility, usually a Primary Health Care (PHC) centre; and all eight functions at a Comprehensive Emergency Obstetric Care (CEmOC) facility, usually a hospital[9]. Though, it was in 2006, when the 1997 guidelines were reviewed and updated, that the term "Emergency Obstetric Care (EmOC)" was substituted for the former term, "Essential Obstetric Care" (EOC) [10]. This was because a seventh function was added to the criteria for Basic EmOC to include neonatal care, such that the criteria for CEmOC also became nine. In any case, the designation of a facility as an EmOC facility depends not only on the availability of these services, but also on whether they were actually performed within a three-month period. EmOC signal functions include the administration of parenteral antibiotics and uterotonic drugs; manual removal of placenta and retained products; and basic neonatal resuscitation[9, 11].

A National study on the status of 'essential' obstetric care in Nigeria showed that only 20% of health facilities studied performed the signal functions[12]. Experience in more than 40 countries showed that health systems often had enough or even more Comprehensive EmOC for a given population, but fully functioning Basic EmOC facilities are scarce[13]. Several reasons could be responsible for this, including poor funding of the PHC system leading to lack of resources. In Nigeria, the Local Governments, the custodians of PHC, get only about 16% of the Federal Government allocation, and are often reluctant to employ health manpower, claiming high overhead costs[14].

Nigeria has made several efforts at the policy level to address the problem of high maternal mortality, yet it was one of the eleven countries that contributed to 65% of all maternal deaths in 2008[15]. Examples of past efforts include the Reproductive Health Policy of 2001 aimed at reducing maternal mortality by half by 2006 [16]; the Integrated Maternal, Newborn and Child Health Strategy of 2007 targeted at addressing 90% of causes of maternal deaths[17]; and recently, the launching of the Midwives Service Scheme (MSS) in 2009 which involved the recruitment, training and deployment of retired midwives at PHC level to perform Basic EmOC signal functions in all States of the Federation[14].

Some studies have assessed and reported a poor performance of EmOC services in government-run health facilities in the Northern and South-Western parts of Nigeria[18, 19] but relatively fewer in the South-South zone. This study sought to assess the level of the availability and performance of EmOC services prior to the MSS launch in 2009, in one of the Local Government Areas (LGAs) of Rivers State in South-South Nigeria. This is important in other to stimulate policy recommendations that could improve maternal health in the State as the State strives towards the attainment of the millennium development goals by 2015. The choice of Gokana LGA was predicated on the high prospect of future health interventions occasioned by its selection as the site for the community-based experience and service programme for medical undergraduates of the University of Port Harcourt, Port Harcourt.

Methods

Study Setting

A cross-sectional facility-based survey was conducted in 2009 in Gokana Local Government Area (LGA), one of the 23 LGAs in Rivers State

of Nigeria. It is rural with a population of about 244,653 people, projected from the 2006 census[20], whose main livelihood is subsistent farming and fishing. It is also one of the oil-rich areas of Rivers State. There are 19 government health facilities in Gokana LGA - 17 PHC centres and two General Hospitals. Communities in Gokana are used as practice sites for the community health training for medical students of the University of Port Harcourt, Port Harcourt. The LGA is known for its low health facility delivery rate as a result of the proliferation of Traditional birth attendants and local beliefs about childbirth. There were an estimated 12,185 pregnant women in Gokana LGA at the time of the study.

Data Collection

All government PHC facilities in Gokana LGA are expected to provide maternity services. However, only twelve of the 19 facilities were studied because the other seven facilities were not functioning (i.e. not providing any services). The twelve consisted of 10 PHC centres and the two general hospitals. Data was collected through Key Informant Interviews of heads of the health facilities using a semi-structured questionnaire/checklist. The tool collected data on proprietary, infrastructure, equipment, and personnel. It also included an adapted checklist from the WHO Guidelines for Monitoring EmOC[10] for assessing the performance of "Signal Functions" to determine EmOC status. For our study, we used the criteria based on the 1997 WHO Guidelines[9], that is, a Basic EmOC facility was taken as one in which all six signal functions were performed in the preceding three months, and a Comprehensive EmOC facility, as one in which all eight functions were performed in the preceding three months. The list of the EmOC signal functions is displayed in Table 1.

Data collection was by research assistants who were recruited from the final year medical students participating in the University of Port Harcourt community health training programme. Prior to data collection, the research assistants were trained on the study procedures and use of the data collection tools.

Data Analysis

Data obtained were entered into Microsoft Excel® spreadsheet and analyzed using Epi-Info v6.04d. Simple frequency distributions and cross-tabulations were computed along with summary statistics. Analysis was based on the assessment of a combination of process indicators provided in the 1997 WHO Guidelines for Monitoring EmOC [9], and as well as those that have been reported by other researchers[21].

***Availability of EmOC services*[9]**

By convention this indicator is tagged "Indicator 1", while we referred to it as 'EmOC Coverage' in this report. It was assessed as *the number of basic and comprehensive EmOC per 500,000 population;* the minimum acceptable is five EmOC facilities; at least one Comprehensive and the remaining four, Basic EmOC facilities per 500,000 population[9].

The 2009 projected population of Gokana was 244,653 [20], which is about half of the reference population of 500,000. Thus, only half of the recommended number of EmOC facilities would be expected or required as the minimum acceptable number in Gokana LGA i.e. approximately three EmOC facilities i.e. one Comprehensive and two Basic EmOC facilities. This was generated by dividing the population of Gokana LGA by 500,000 and multiplying that number by five [9, 11].

***Percentage of recommended minimum number of basic and comprehensive care facilities*[9]**

This indicator expresses the 'percentage of the recommended minimum number of facilities that is actually available to the population' [9] and was derived by dividing the number of existing facilities providing EmOC services by the recommended number, multiplied by 100.

***Availability of recommended staff for a 24-hour service*[21]**

The proportion of health facilities having the recommended minimum number of skilled attendants for EmOC out of the total number of

Table 1: List of Signal Functions for Basic and Comprehensive EmOC

Basic Services	Comprehensive Services
1. Administer parenteral antibiotics	Perform signal functions 1-7 plus:
2. Administer parenteral uterotonics (i.e. parenteral oxytocin)	8. Perform surgery (e.g. caesarean section)
3. Administer parenteral anticonvulsants for pre-eclampsia and eclampsia (i.e. magnesium sulphate)	9. Perform blood transfusion
4. Manually remove the placenta	
5. Remove retained products	
6. Perform assisted vaginal delivery	
7. Perform basic neonatal resuscitation	

Source: WHO/UNICEF. Monitoring Emergency Obstetric Care: A handbook. Geneva: WHO, 2009

facilities were generated. A minimum of four midwives per health facility is recommended to ensure a 24-hour EmOC service[21]. The number of available personnel and cadre were obtained from each of the health facilities surveyed.

***Proportion of all births in EmOC facilities*[9, 11]**

By convention, this indicator is referred to as "Indicator 3". It was calculated as *the number of women recorded as having given birth in facilities identified as EmOC facilities divided by the estimated number of all live births expected* in Gokana LGA, regardless of where the birth took place. The denominator was calculated by multiplying the total population of the area by the crude birth rate of the same area[11].

In practice, the numerator is the number of women giving birth and not the number of infants born. This is because health facilities commonly keep records of the women who have given birth, and may omit the number of births; and besides, it has been noted that the difference between these two (attributable to multiple births) is not likely to change the conclusions drawn from the results[11]. It is expected that the target for this indicator should be set by national or local governments as there is no current minimum acceptable level[10], though it was formally set at 15% of expected births[9]. At a crude birth rate of 39 per 1000 [22], the estimated population of 244,653 in Gokana LGA for the year 2009 yielded a total of 9,541 expected live births.

Results

Twelve of the 19 public health facilities in Gokana LGA were judged to be functional, that is, open for services and providing a form of service at the time of the study. Of these, ten were PHC Centres and two were General Hospitals. Some of the facilities were observed to be in a varying state of disrepair with dilapidated infrastructure, though a formal assessment of infrastructure or level of functionality of the 19 facilities was not done.

Availability of EmOC

Our findings showed that none of the 10 functional PHC facilities performed all the six signal functions required for Basic EmOC in the three months preceding the survey. Indicating that Basic EmOC Coverage in Gokana LGA was 'zero' per 500,000 population. One of the two General Hospitals provided all the eight signal functions in the last three months, and thus qualified as a Comprehensive EmOC facility.

Percentage of recommended minimum EmOC

From the figures above, the computed percentage ratio of the recommended minimum number of

EmOC facilities in Gokana LGA was 33.3% (1:3) i.e., one instead of a minimum of three EmOC facilities performed services as expected.

EmOC Signal Functions

We analyzed the frequency of performance of specific EmOC signal functions among the 12 health facilities. The services most routinely performed were the administration of parenteral antibiotics (66.7%), parenteral oxytocics (41.7%), parenteral anticonvulsants (33.3%), and manual removal of placenta (33.3%). Only three of the facilities (25%), had performed the removal of retained products of conception, while only two (16.7%) had carried out assisted vaginal delivery. Also only two facilities (16.7%) had transport for emergency referral of clients (Figure 1).

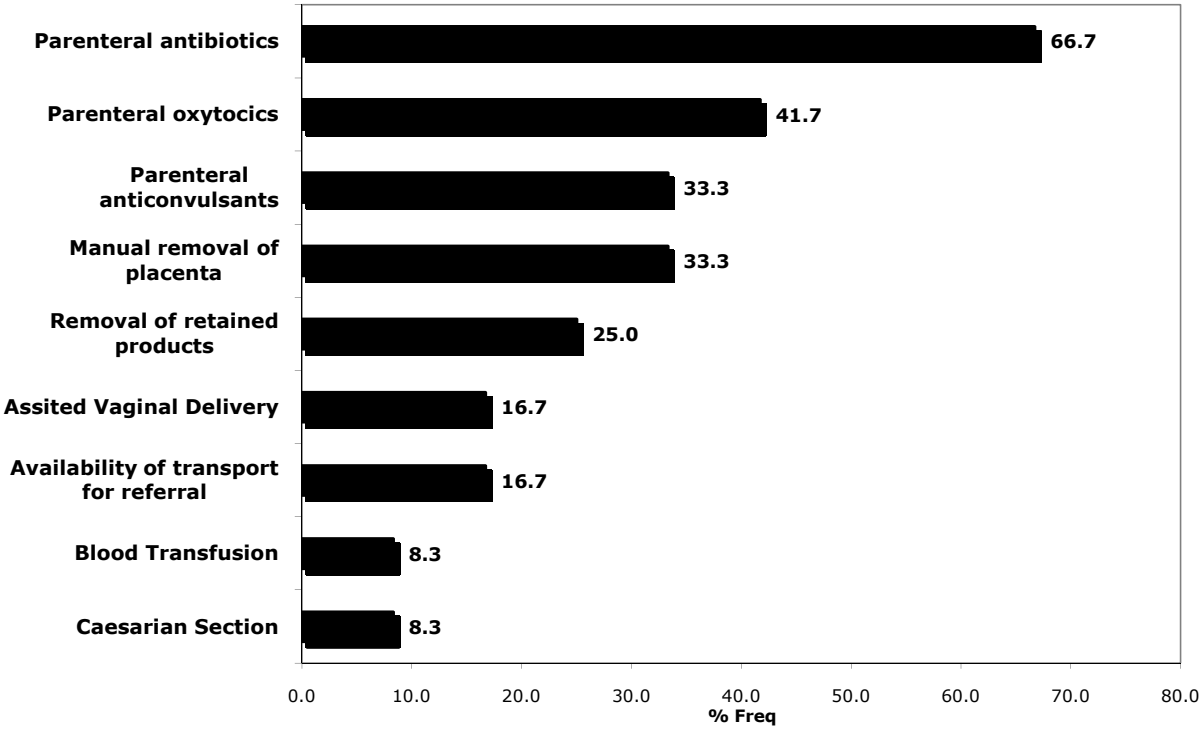

Figure 1: Performance of EmOC Signal Functions in 12 Health Facilities

EmOC Equipments and Medical Supplies

We also assessed the availability and functional state of specific equipment and medical supplies required for EmOC. Our findings indicate that most of the facilities had at least one functional sphygmomanometer and few sterile syringes/needles. About half of the facilities had sutures and a vaginal speculum, while less than half had latex gloves. Only a third (33.3%) of the facilities had intravenous fluids and infusion sets. On the contrary, two-thirds had no functional sterilizers, while a quarter did not have a pair of scissors. Partograghs, vacuum extractors and curettes were not available in any of the facilities. However, one facility had Manual Vacuum Aspiration (MVA) kit (Figure 2).

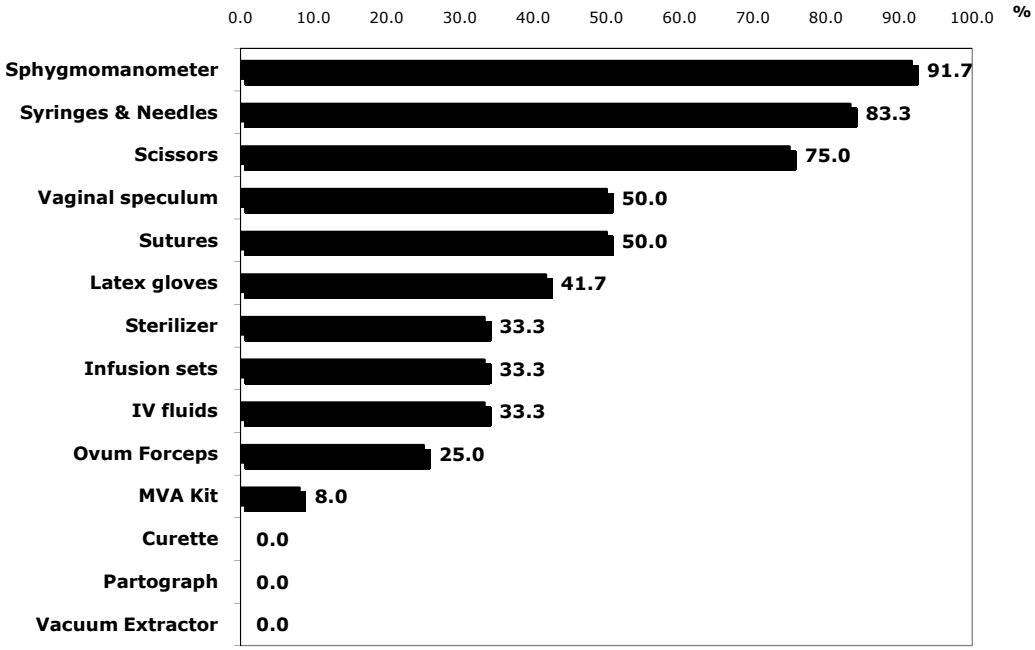

Figure 2: Availability of EmOC equipment and supplies in 12 health facilities

Availability of recommended staff

Only two facilities (16.67%) had the minimum requirement of four or more midwives, while four facilities (33.33%) had at least one qualified nurse necessary to meet the recommended 24-hour EmOC coverage by skilled birth attendants. Furthermore, nine of the 12 health facilities (75.0%) had at least one Community Health Extension Worker (CHEW), 6 (50%) had at least one Community Health Officer (CHO); seven (58.3%) had at least one midwife; and only one facility (8.3%) had at least one qualified doctor. There were no specialist anaesthetists or obstetricians in any of the two general hospitals (Table 2).

Table 2: Availability of Recommended EmOC Staff in 12 Health Facilities

Description of EmOC Staff	Nos (%)
Facilities with at least 1 Community Health Extension Worker (CHEW)	9 (75.0)
Facilities with at least 1 Community Health Officer (CHO)	6 (50.0)
Facilities with at least 1 qualified Midwife	7 (58.3)
Facilities with 4 qualified Midwives	2 (16.6)
Facilities with at least 1 qualified Nurse	4 (33.3)
Facilities with at least 1 qualified Full-time / Part-time Medical Doctor	1 (8.3)
Facilities with at least 1 qualified Full-time/ Part-time Obstetrician	0 (0.0)
Facilities with at least 1 qualified Full-time / Part-time Anaesthetist	0 (0.0)

Births in EmOC facilities

In the 12 months preceding the survey, records from seven of the 12 health facilities showed that 1,627 women received antenatal care, but there were only 213 actual deliveries in six of these facilities. One facility recorded no delivery. This translated to 2.2% expected live births for the LGA for the year 2009 (213 /9541). About only a quarter (24.9%) of the actual births were recorded within the three months preceding the study in five out of the seven health facilities that recorded births.

Discussion

The LGA health system is expected to be the provider of the primary level of care in the typical three-tier system operated in many low- and middle-income countries like Nigeria. The primary level of care ought to be the closest to the people and catering for up to 90% of their health care needs[23]. However, the poor state of functionality of public health services in the Gokana LGA reflects the fragmented and weak nature of health systems in developing countries that prevent them from delivering the needed services[24].

Regarding EmOC services in particular, our results showed that no facility in Gokana LGA met the WHO recommendations for Basic EmOC facility, while only one of twelve facilities met the criteria for Comprehensive EmOC services; this translated to one instead of a minimum of three EmOC facilities expected in Gokana LGA. Our findings are consistent with results from the South-Western and Northern parts of Nigeria[12,18,19] and from other developing countries[25-30] , where fully-functioning BEmOC are either absent or very few, but comprehensive facilities are many or are at least one to every 500,000 population[13]. This was perhaps not unexpected in Gokana LGA as only a little over one-third (33%-42%) of the facilities could perform any of the EmOC signal functions apart from administration of parenteral antibiotics or had the minimum number of recommended staff for 24-hour EmOC service at the time of study.

Of all EmOC signal functions, administration of antibiotics, oxytocics and anticonvulsants have been reported as the most performed[25, 28, 30], as our study also revealed. These signal functions require availability of specific medical products and supplies, which makes it relatively feasible. However, although up to three-quarters of the facilities performed administration of parenteral antibiotics, the percentage that administered parenteral oxytocics dropped by half, which was because only 33.3% had intravenous fluids and infusion sets. A study of an LGA in South West Nigeria also reported that only 23% of health facilities had infusion sets[18]. This inadequacy appears to feature more in PHC facilities than in secondary facilities[11, 19], and thus accounts for why EmOC services are rarely present at PHC centres[13].

Functions that require special training, equipment and maintenance, on the other hand, are often the least performed or available; assisted delivery is the least performed EmOC function in most countries in the world.[31] In our study area, none of the facilities had equipment for performing assisted vaginal delivery, and only one facility performed manual removal of retained products.

In addition, only two facilities, 16.67%, had the minimum number of four midwives required to run a 24-hour EmOC service. The shortfall of midwives in the personnel required for EmOC was reported in the National Study on Essential Obstetric Care in Nigeria conducted in 2003 - nationally, only 6.1% of health facilities had up to four midwives.[12] Even where health workforce is available, it is important that they have demonstrable skills to perform requisite health services to achieve results[32]. Moreover, Paxton et al[13] had remarked that even when EmOC personnel have had formal training, they may not have acquired the skills and competencies necessary to perform all of the signal functions. Furthermore, we observed that formal training curricular may not include modules on selected EmOC services e.g. the Basic Midwifery Curriculum for midwives deployed to PHC centres in Nigeria does not include training on assisted vaginal delivery[33], though it is now provided as part of the Life Saving Skills (LSS) programme incorporated into the Post-Basic Midwifery Curriculum[34]. A recent study among health workers in 22 primary and secondary public health facilities that offer obstetric care services in South West Nigeria reported that only 6% of them had had LSS training[35].

Improved maternal health is associated with both density and competence of health personnel[31, 36]. The UN Guidelines recommends that at least 15% of deliveries take place in EmOC facilities, whereas only 2.2% of the expected deliveries actually took place in the EmOC facilities in Gokana LGA. This contrast widely to the national figure of 13.9% [14], and 26.2% reported in an Indian study[24] as well as data reported for Chad and Senegal[11] - the wide gap may be because the

national study included urban facilities. Studies have shown that utilization of services depend on the quality of services provided[26] and human resource inadequacy is one of the major obstacles to ensuring good quality services[13,37,38]. Moore et al[39] reported that unavailability of staff and unfriendly attitude of staff were among the reasons given for not delivering at health facilities by up to two-thirds of women interviewed in Gokana LGA.

The implication of this poor utilization of obstetric services in government health facilities and especially EmOC facilities is that many women could or would develop pregnancy-related complications. It is important to find out where women with complications in these communities go. Though our findings are limited by the exclusion of privately-run health facilities, and incomplete data from the records of the public facilities, which might have resulted in an under-estimation of the EmOC services in the LGA, women in settings such as Gokana LGA do not use private for profit services mainly due to cost[21].

To sustain progress towards attainment of MDG 5, there is an urgent need for the LGA Health Authority to begin to address the concerns highlighted in this study; and for the State Ministry of Health to support the development and strengthening of EmOC services in all LGAs by improving the condition of physical infrastructure, equipment, medical supplies, staffing and training in public health facilities.

Overall, the Gokana LGA of Rivers State did not meet the 1997 UN Guidelines for minimum acceptable level of Basic EmOC though it met the requirement for Comprehensive EmOC.

The non-availability of Basic EmOC services and the poor state of the health care resources, call for an urgent action on the part of State and Local governments to expedite action in upgrading the equipment, medical supplies, staffing and staff training in life saving skills, in other to give the health care system the necessary momentum towards the attainment of the reduction of maternal mortality which is the 5th goal of the Millennium Development Goals by 2015. However, with the recent introduction of the Midwife Service Scheme (MSS) in Nigeria by the National Primary Health care Development Agency (NPHCDA), to address maternal mortality in the country, a follow-up assessment of the Basic EmOC status in Gokana LGA would be necessary to evaluate its effect.

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Contribution of Authors

MMM and SB conceived and designed the study. CIT was responsible for supervising the collection of the data. FOA and SB handled the data analysis. All authors contributed to the preparation and review of the manuscript; and all approved the submission.

References

1. Paxton A, Maine D, Freedman L, Fry D and Lobis S. The evidence for emergency obstetric care. *Int J Gynaecol Obstet* 2005; 88: 181-93
2. Campbell OMR and Graham WJ. Strategies for reducing maternal mortality: Getting on with what works. *Lancet* 2006; 368: 1284-99.
3. WHO/UNFPA/UNICEF/World Bank. Trends in Maternal Mortality, 1990-2008. Geneva: World Health Organization, 2010.
4. Wagstaff A and Claeson M. Millennium Development Goals for Health: Rising to the challenges. Washington D.C.: World Bank, 2004.
5. National Population Commission [Nigeria] and ORC Macro. Nigeria Demographic and Health Survey 2008: Preliminary Report. Calverton, Maryland: National Population Commission and ORC Macro, May 2009.
6. Rivers State Ministry of Health. State Health Policy: Achieving sustainable development through health. Port Harcourt: Rivers State Ministry of Health, 2008.
7. Ronsmans C and Graham WJ. Maternal mortality: who, where, when and why. *Lancet* 2006; 368: 1189-200.
8. Weil O and Fernandez H. Is Safe Motherhood an orphan initiative? *Lancet* 1999; 354:940-3.

9. UNICEF/WHO/UNFPA. Guidelines for monitoring the availability and use of obstetric services. New York: United Nations Children Fund, 1997.
10. WHO/UNFPA/UNICEF/AMDD. Technical Consultation on Guidelines for monitoring availability and use of obstetric services. Geneva: World Health Organization, 2006.
11. WHO/UNFPA/UNICEF/AMDD. Monitoring emergency obstetric care: a handbook. Geneva: World Health Organization, 2009.
12. Federal Ministry of Health. National Study on Essential Obstetric Care in Nigeria. Abuja: Federal Ministry of Health, 2003.
13. Paxton A, Bailey P, Lobis S and Fry D. Global patterns in availability of emergency obstetric care. *Int J Gynaecol Obstet* 2006; 93(3): 300-7.
14. National Primary Health Care Development Agency [Nigeria]. The MDG-DRG Funded Midwives Service Scheme: Concept, Process and Progress. Abuja: NPHCDA, April 2010.
15. WHO/UNICEF/UNFPA/World Bank. Maternal mortality ratio falling too slowly to meet goal. Joint News Release, 12 October 2007. Geneva: World Health Organization, 2007.
16. Federal Ministry of Health [Nigeria]. National Reproductive Health Policy. Abuja: Federal Ministry of Health, 2001.
17. Federal Ministry of Health [Nigeria]. Integrated Maternal, Newborn and Child Health. Abuja: Federal Ministry of Health, 2007.
18. Ijaduola KT, Fatusi AO, Orji EO, Adeyemi AB, Owolabi OO, Ojofeitimi EO, Omideyi AK and Adewuyi AA. Unavailability of emergency obstetric care services in a Local Government Area of South West Nigeria. *J Popul Nutr* 2007; 25(1): 94-100.
19. Odogwu K, Audu O, Baba-Lafia1 S, Bawa1 U, Tukur B, Ejembi C, Adaji S and Shittu O. Availability and utilization of emergency obstetric care services in three communities in Kaduna State, Northern Nigeria. *Afr J Reprod Health* 2010; 14(3): 83-88
20. Federal Government of Nigeria. Legal Notice on Publication of 2006 Census Final Results. *Official Gazette* No. 2 Vol. 96. Abuja, Nigeria. 2009.
21. AMDD Working Group on Indicators. Using the UN Indicators of Emergency Obstetric Care: Questions and Answers. New York: AMDD, May 2003.
22. UNICEF. At a glance: Nigeria. Available online at: http://www.unicef.org/infobycountry/nigeria_statistics.html. Accessed on 22 January 2012.
23. Federal Ministry of Health [Nigeria]. The National Health Policy and Strategy to Achieve Health for All Nigerians. Lagos: Federal Ministry of Health, 1998.
24. Travis P, Bennett S, Haines A, Pang T, Bhutta Z, Hyder AA, Pielemeier NR, Mills A and Evans T. Overcoming health-systems constraints to achieve the Millennium Development Goals. *Lancet* 2004; 364(9437): 900-6.
25. Biswas AB, Das DK, Misra R, Roy RN, Ghosh D and Mitra K. Availability and use of emergency obstetric Care services in four districts of West Bengal, India. *J Popul Nutr* 2005; 23(3): 266-74.
26. Olsen ØE, Ndeki S and Norheim OF. Availability, distribution and use of emergency obstetric care in Northern Tanzania. *Health Policy Plan* 2005, 20(3): 167-75.
27. Pearson L and Shoo R. Availability and use of emergency obstetric care services in Kenya, Rwanda, Southern Sudan and Uganda. *Int J Gynaecol Obstet* 2005; 88(2): 208-15.
28. Orinda V, Kakande H, Kabarangira J, Nanda G and Mbonye AK. A sector-wide approach to emergency obstetric care in Uganda. *Int J Gynaecol Obstet* 2005; 91(3): 285-91.
29. Gabrysch S, Simushi V and Campbell OM. Availability and distribution of, and geographical access to emergency obstetric care in Zambia. *Int J Gynaecol Obstet* 2011; 114(2): 174-9.
30. Bailey P, Paxton A, Lobis S and Fry D. The availability of life-saving obstetric services in developing countries: an in-depth look at the signal functions for emergency obstetric care. *Int J Gynaecol Obstet* 2006; 93 (3): 285-91.
31. Bailey P. The disappearing art of instrumental delivery: time to reverse the trend. *Int J Gynaecol Obstet* 2005; 91: 89-96.
32. World Health Organization. The World Health Report 2006: Working together for health. Geneva: World Health Organization, 2006.
33. Nursing and Midwifery Council of Nigeria. Basic Midwifery Curriculum. Available online at: http://nmcnigeria.org/basicmid.php. Accessed on 22 January 2012.
34. Nursing and Midwifery Council of Nigeria. Post-Basic Midwifery Curriculum. Available online at www.nmcnigeria.org/postmidcur.pdf. Accessed on 22 January 2012.
35. Ijadunola KT, Ijadunola MY, Esimai OA and Abiona TC. New paradigm old thinking: the case for emergency obstetric care in the prevention of maternal mortality in Nigeria. *BMC Womens Health* 2010; 10: 6.
36. De Brouwere V, Tonglet R and Van Lerberghe W. Strategies for reducing maternal mortality in developing countries: What can we learn from the

history of the industrialized West? *Trop Med Int Health* 1998; 3: 771-82.

37. Anand S and Barnighausen T. Human resources and health outcomes: Cross-country econometrics study. *Lancet* 2004; 364: 1603-9.
38. Dogba M and Fournier P. Human resources and the quality of emergency obstetric care in developing countries: A systematic review of the literature. *Hum Resour Health* 2009; 7: 7.
39. Moore BM, Alex-Hart BA and George IO. Utilization of health care services by pregnant mothers during delivery: A community based study in Nigeria. *J Med Med Sci* 2011; 2(5): 864-7.