



AVERTING MATERNAL DEATH AND DISABILITY

Availability and use of emergency obstetric services: Kenya, Rwanda, Southern Sudan, and Uganda

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Abstract

The article summarises the baseline assessments of emergency obstetric care (EmOC) carried out in Uganda, Kenya, Southern Sudan, and Rwanda in 2003 and 2004. *Objectives:* Our objectives were to: (1) set up program baselines on the availability and utilization of EmOC services in these countries; (2) identify gaps and obstacles in providing EmOC services; and (3) make recommendations to governments based on evidence generated. *Methods:* Data were collected from clinical record reviews, provider and client interviews, observations, and focus group discussions. Either random or universal sampling was applied in the selection of health facilities assessed. Local nurses and midwives participated in the data collection and, to some extent, data processing and analysis. *Results:* The coverage of basic EmOC services ranged 0–1.1/500,000 population compared to the UN-recommended level of 4/500,000. The coverage of comprehensive EmOC services ranged 0.5–4.3/500,000 compared to the recommended level of 1/500,000. Between 0.6% and 8.8% of all births took place in EmOC facilities, and 2.1% and 18.5% of all expected direct obstetric complications were treated. Cesarean section as a proportion of all births was between 0.1% and 1%. Shortage of trained staff especially mid-level providers,

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poor basic infrastructure such as lack of electricity and water supplies, inadequate supply of drugs and essential equipment, poor working conditions and staff morale, lack of communication and referral facilities, cost of treatment, and lack of accountability and proper management were identified as the main obstacles in providing 24-h quality EmOC services especially in remote and rural areas. *Conclusions:* Lack of basic EmOC services limits women's access to life-saving services during obstetric complications. To reduce maternal mortality ratio the states and development partners need to focus their effort to improve the coverage, quality, and utilization of EmOC services through supportive national policy, effective program strategies, increased budget allocation to maternal health program, rural infrastructure development, and regular monitoring, and evaluation of progress.

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1. Introduction

One of the Millennium Development Goals (MDG) is to reduce the maternal mortality ratio by 3/4 by 2015. Pregnancy and childbirth claim the lives of an estimated 514,000 women globally each year. More than half of these deaths occur in Africa. To reach, or at least make, sustained progress towards the goal in Africa requires interventions supported by national policy, health systems, human and financial resources, basic infrastructure, equipment, and regular monitoring and evaluation of progresses. In the last decades the role of good quality emergency obstetric care (EmOC) as a service necessary for the reduction of maternal mortality ratios by the amount required to reach the goal is being increasingly recognised. Supported by the Maternal Mortality Reduction Strategy of UNICEF Eastern and Southern Africa Regional Office [1], countries in the region have been going through a paradigm shift with the rest of the world, resulting in stronger support by states and development partners to upgrade those elements of their health systems that will result in improved EmOC.

The UN process indicators are used to set up program baselines and measure progress made towards the improvement of EmOC and hence the reduction of MMR [2]. Since 2003, a number of UNICEF country programs in the region have supported their counterparts to carry out these assessments. In Uganda, a national assessment in 19 districts was carried out in April 2003. In the North-Eastern Province (NEP) of Kenya, the assessment was carried out in June 2003. In Southern Sudan the assessment was carried out in two counties, Yambio and Rumbek, in October 2003. The Rwanda assessment took place in March 2004 in four health districts. The baseline data have been used to plan and revise the national policies and implementation strategies of the reproductive health programs.

The EmOC signal functions assessed included:

- 1) Parenteral antibiotics
- 2) Parenteral oxytocic drugs
- 3) Parenteral anticonvulsants for pregnancy-induced hypertension
- 4) Manual removal of placenta
- 5) Removal of retained products (e.g., vacuum aspiration)
- 6) Assisted vaginal delivery (e.g., vacuum extraction, forceps)
- 7) Cesarean delivery
- 8) Blood transfusion.

If a health facility performs the first six functions routinely it qualifies as a basic EmOC facility and if a health facility performs all the eight functions routinely it qualifies as a comprehensive EmOC facility.

WHO, UNICEF, and UNFPA recommend that for every 500,000 people, there should be at least one comprehensive and four basic EmOC facilities; 15% of all births should take place in EmOC facilities; 100% obstetric complications should be treated; 5–15% of all births are by Cesarean sections; and the case fatality rate of obstetric complications should be less than 1% [2].

2. Methodology

2.1. Assessment tools

The assessment tools used in the UNICEF Eastern and Southern Africa program were developed by Columbia University and UNICEF in 1992 and later endorsed by WHO, UNFPA, and UNICEF in 1997 [3]. They include clinical record review, facility observation, and staff interview. For EmOC signal func-

tions, records from the last 3 months preceding the assessments were reviewed. For obstetric complications, typically records from previous years were reviewed. Focus group discussions (FGDs) with women were added to elicit the views of women regarding obstetric complications and how these complications were traditionally handled. Participants of the FGDs were mothers attending antenatal clinics or from the catchment areas.

2.2. Sampling

2.2.1. Uganda

The emergency obstetric care needs assessment survey was conducted in 19 of 56 districts where 9,392,537 people lived—almost 40% of the people resident in Uganda. In each district, one district hospital and 50% of all the Health Center IV (with surgical care facility) and Health Center III (without surgical care facility) were randomly sampled. In total 197 health facilities were assessed.

2.2.2. Kenya

In the North-Eastern Province, the provincial, district, and subdistrict hospitals, and health centers providing maternal health care were all selected for the assessment. The sampled covered 17 health facilities serving 935,138 people.

2.2.3. Southern Sudan

Two counties, Yambio and Rumbek, were selected. The sampling covered 15 health facilities, including county hospitals and primary health care centers with a maternity ward, serving 760,237 people.

2.2.4. Rwanda

The sample covered an area covering 693,875 people in four health districts: Nyanza, Muhororo, Kabaya, and Gakoma were selected purposively. All the district hospitals and health centers that provided maternal health service, 28 all together, were sampled.

2.3. Organization of the assessment

All the assessments were carried out in collaboration with the reproductive health department/division of Ministries of Health or local health authorities (Southern Sudan) with funding and technical support provided by UNICEF and Averting Maternal Mortality and Disability (AMDD). Nurses and midwives collected the data. Field supervision was mostly carried out by staff from the Ministries of Health. International and national consultants provided technical support in the design, training, fieldwork, data processing and analysis, report

writing and dissemination of results. Local staff were trained to carry out future assessments.

3. Results

3.1. Coverage of EmOC facilities

With the exception of Yambio County in Southern Sudan, the rest of the areas assessed all had adequate coverage of comprehensive EmOC services. The coverage was highest in Rwanda (4.3/500,000), followed by NEP in Kenya (1.6), Uganda (1.2), and Southern Sudan (<1).

However, there was a huge gap in the coverage of basic EmOC services. The coverage of basic EmOC per 500,000 population range between 0 and 1 in different countries (Table 1). Most of the health centers could not perform assisted vaginal delivery and removal of retained products.

3.2. Geographic distribution of EmOC facilities

The ‘oversupply’ of comprehensive but acute shortage of basic EmOC facilities results in the concentration of the life-saving services in urban areas and inadequate coverage in rural areas. The existing conditions do not attract and keep qualified staff especially female staff to work in remote rural areas. Typical conditions included inadequate water and electricity supply, poor housing possibilities, poor schools for children of staff, lack of security, and lack of transport and communication facilities. Worthwhile financial incentives or career points to encourage service in hardship areas and good supportive supervision were universally absent.

3.3. Use of EmOC services

Table 2 summarizes the use of EmOC services by country assessed.

North-Eastern Province of Kenya: in 2002, 8.8% of all births took place in EmOC facilities. Three percent of the total obstetric complications were treated and 0.6% of all births were by Cesarean section. The three refugee health facilities provided maternal health care to the people living in the camp and to the surrounding population.

In Rwanda, 7.2% of all births took place in EmOC facilities in 2003; 18.5% of the total obstetric complications were treated and 1.1% of all births were by Cesarean sections.

Table 1 Coverage of EmOC services by country

Country	Kenya	Rwanda	Southern Sudan		Uganda
Year of assessment	2003	2004	2003		2003
Areas assessed	North-Eastern Province	Four districts ^a	Yambio	Rumbek	National
Population sampled	935,138	693,875	250,345	509,892	9,392,537
Health facilities assessed	13	27	7	7	197
Coverage of EmOC service (per 500,000 population)					
Comprehensive	1.6	4.3	0.5	1	1.2
Basic	1.1	0	0	0.5	1.0

^a Gakoma, Nyanza, Kabaya, and Muhororo.

In Yambio, Southern Sudan, 0.6% of all births took place in EmOC facilities in 2002/2003 and 2.1% of the total obstetric complications were treated. In Rumbek, 1.5% of all births took place in EmOC facilities and 5% of the total obstetric complications were treated. In both counties, Cesarean sections counted for 0.1% of all births.

In Uganda, 5% of all births took place in EmOC facilities in 2002; 5% of the total obstetric complications were treated and 1% of all births were by Cesarean sections.

3.4. Quality of EmOC services

Among the UN process indicators, case fatality rate (CFR) is used as a proxy indicator for measuring the quality of EmOC services. The accuracy of the estimate depends on the quality and completeness of maternal death recording. The CFR was above the recommended level (1%) in all countries (Table 3). It was 1.5% in Uganda. In NEP of Kenya, the case fatality rate in government facilities was 5% and in facilities run by NGOs for the refugees was 1–2%. The CFR for Rwanda was 3%. In Yambio, Southern Sudan, the high CFR (7%) was perhaps related to delayed referral as well as a limited number of obstetric complications treated.

3.5. Causes of direct and indirect obstetric complications

Records of obstetric complications treated in the previous year were reviewed. The major direct obstetric complications reviewed included hemor-

rhage, prolonged/obstructed labor, postpartum sepsis, retained placenta, pre-eclampsia and eclampsia, and abortion complications. For the assessments, complication of abortion was defined as 'any case of abortion that was admitted for treatment'.

The distribution of the major obstetric complications is shown in Table 4. In all the countries assessed 'complication of abortion' is the leading cause of obstetric complications. For example, in Rumbek hospital, Southern Sudan, nearly three quarters of the direct obstetric complications was a complication of abortions.

Due to the lack of routine testing in the facilities assessed, it was not possible to determine what proportion of the obstetric complications seen were in HIV⁺ women.

3.6. Infrastructure, drugs, and equipment and supplies

Lack of basic infrastructure such as electricity, water, communication, means of referrals, adequate staff quarters, and poor security especially at night and for female staff were the main obstacles to running 24-h quality EmOC services. These problems were especially acute in remote and rural areas. For example the entire North-Eastern Province of Kenya did not have a government obstetrician/gynaecologist. There had been no surgeons and midwives employed by the local health authorities anywhere in Southern Sudan for several decades since the civil war.

Emergency obstetric drugs assessed included antibiotics, oxytocics, anticonvulsants, antihyper-

Table 2 Utilization of EmOC services

Country	Kenya	Rwanda	Southern Sudan		Uganda
Year of assessment	2003	2004	2003		2003
Areas assessed	North-Eastern Province	Four districts	Yambio	Rumbek	National
Proportion of deliveries in EmOC facilities (%)	8.8	7.2	0.6	1.5	5
Proportion of obstetric complications treated (%)	3	18.5	2.1	5	5
Proportion of births by Cesarean section (%)	0.6	1.06	0.1	0.1	1.0

Table 3 Case fatality rate of direct obstetric complications by country

Country	Kenya	Rwanda	Southern Sudan		Uganda
Year of assessment	2003	2004	2003		2003
Areas assessed	North-Eastern Province	Four districts	Yambio	Rumbek	National
Case fatality rate (%)	2.9 (28/975)	3.1 (24/773)	6.9 (2/29)	1.5 (1/68)	1.6 (114/6908)

tensives, anesthetics, antimalarials, contraceptives, and drugs for infection control. In general the hospitals providing comprehensive EmOC services were much better equipped than the health centers, where only one or two drugs in each category assessed were available. The lack of 'critical items' affected the performance of signal functions. For example, in one of the rural health centers of Rwanda, the nurse performed episiotomies for mothers with prolonged labor and fetal distress because *oxytocin* was not available. According to the Rwandan Ministry of Health, oxytocin is not permitted at the health center level to avoid potential misuse for antepartum hemorrhage. A review of the records by a senior obstetrician during the assessment showed many of the cases of episiotomy could have been avoided had parenteral oxytocin been available.

Intermittent preventive treatment of malaria was not yet routinely offered to pregnant women in antenatal clinics, although the coverage had been gradually improving. Testing of HIV/AIDS and prevention of mother-to-child transmission of HIV/AIDS (PMTCT) were not yet routinely available in most of the health facilities assessed.

Essential equipment for providing EmOC services was a rarity. When equipment was available, it was usually not well maintained. Often one missing part of a critical piece of equipment, such as the oxygen tube of the anesthesia machine, bulbs of the surgical light, or the plug of the autoclave, affected the provision of EmOC.

Table 4 Distribution of major direct obstetric complications by country (%)

Obstetric complications	Kenya n=960	Rwanda n=733	Southern Sudan		Uganda n=3344
			Yambio n=38	Rumbek n=172	
Complication of abortion	27	50	47	71	39
Prolonged and obstructed labor	5	12	8	12	39
Postpartum sepsis	6	1	—	1	4
Hemorrhage	16	14	18	13	10
Pre-eclampsia and eclampsia	19	0	3	0	3
Retained placenta	—	7	—	—	—
Others	27	16	24	3	5

3.7. Views of women

We conducted focus group discussions (FGD) with women to ascertain their views regarding obstetric emergencies, how complications were handled in their neighborhoods, and the use of EmOC services. Some of the key findings were as follows:

- Almost all the focus groups noted that obstetric emergencies were commonly seen among women from different background and ethnic groups. These included bleeding, obstructed labor, fever, weakness, 'lack of blood,' and convulsions.
- The women were asked to give some examples of how mothers' and babies' lives were saved when obstetric complications took place. Many groups mentioned that when the mother was referred and treated on time, both the mother's and baby's lives were saved.
- The majority of the participants mentioned that distance and financial difficulties were the two major obstacles keeping women from seeking care during obstetric emergencies. In some assessed health facilities, although the emergency treatment was not withheld, patients were not discharged until full payment had been made.
- Some groups gave some examples on how traditional beliefs and practices could delay seeking prompt care when obstetric complications take place. In certain communities of Southern Sudan, obstructed labor is associated with adultery. If a delivery is obstructed or prolonged, the woman is asked to confess 'who else she had seen other than her husband.' Sometimes the obstructed labor resulted in maternal death and the mother was blamed for 'hiding the truth'.
- The common suggestions provided by the women to improve maternal health care were more medicines and essential supplies, better attitude of health providers, reduction of the cost of care, and the addition of more qualified staff. They also suggested that mothers should be informed of the 'danger signs' so that they can seek prompt care when problems occur during pregnancy and childbirth.

4. Good practices

During the assessments we identified many good practices adapted by local health workers and health facilities. Here are some examples:

1. Mid-level health providers perform life-saving skills: some of the health centers managed by midwives and nurses in remote areas provide basic EmOC services.
2. Use of routine data: some of the health facilities have already taken the initiative to analyze data on obstetric admission and complications, delivery, and maternal death on a monthly basis. Some health facilities began to improve the maternity registers in order to record obstetric complications properly.
3. Proper management of available resources: in one of the hospitals assessed, the matron of the operation theater on her own initiative repaired the damaged autoclave to improve infection control procedures.
4. Community participation in organizing emergency transport: in one community of Muhororo district, Rwanda, an emergency transport team is organized. Families that participate in the scheme pay half of the cost of transportation while the health committee pays the other half. This scheme has helped poor families that could not afford to organize emergency transport on time.
5. Since malaria in pregnancy is associated with anemia, preterm delivery, and increased maternal mortality, many countries have started to promote and distribute insecticide treatment bed nets and intermittent preventive treatment (IPT) of malaria in pregnancy using sulphadoxine-pyrimethamine [4]. Government health facilities have also started programs to stop mother-to-child transmission of HIV/AIDS by making rapid testing and nevirapine available in the antenatal clinics and in the labor wards and by practising safe obstetric practice.
6. Evidence generated by the Uganda assessment in early 2003 has influenced the government and international partners to rethink the national reproductive policy, giving more priority to EmOC. Funding of EmOC programs has been secured through processes such as the Sector Wide Approach to Programs (SWAPS) and Poverty Reduction Strategy Program (PRSP).

5. Discussions

5.1. Coverage and use of EmOC service

The higher coverage of EmOC does not automatically yield higher use. For example, the coverage of comprehensive EmOC services for Rwanda and Uganda was 4.3 and 1.2, respectively, per every 500,000 people, but the proportion of birth by Cesarean section was 1% in both countries. It is necessary to look beyond coverage to identify barriers limiting access to the services. These include quality of care, 24-h coverage, referral, cost of services, cultural barriers and attitudes of staff, the role of communities in facility management, and traditional beliefs and practices.

5.2. Vacuum deliveries

Vacuum assisted vaginal delivery and manual vacuum aspiration were the two most frequent missing functions in the health facilities assessed. Health workers in the countries assessed expressed two main concerns over vacuum delivery: (1) the lack of immediate Cesarean section backup due to long distances between the basic and comprehensive facilities, and nonavailability of ambulances; and (2) high prevalence of HIV/AIDS and the unknown status of some women coming for delivery and treatment of complications. Vacuum assisted vaginal delivery is apparently associated with higher risk of mother-to-child transmission of HIV infection [5,6]. Since HIV/AIDS testing was not routinely available in antenatal clinics and at the time of delivery, it added to the reluctance of health workers to apply the method.

5.3. Issues related to complications of abortion

The criteria used for diagnosing and recording 'complications of abortion' were broader than complications such as infection or hemorrhage. Cases of threatened abortion admitted for observation were normally recorded as abortion complications. This is perhaps one of the reasons that, in some of the countries assessed, the proportion of all direct obstetric complications that were abortion related was high. The criteria for clinical diagnosis should be standardized to differentiate abortion with and without complications.

5.4. Case fatality rate

The accuracy of the estimate depends on the completeness and quality of recording of obstetric

complications and maternal deaths. At the moment, maternal death is still underreported, and sometimes not reported at all. It is likely that there will be an increase in CFR after record-keeping is improved and when more women with obstetric complications come for treatment.

5.5. Limitation of the assessment

These assessments mainly looked at the availability and use of EmOC services. However, there is not enough information properly to elucidate why women use and do not use EmOC services. In future assessments it will be useful to look deeper into factors that affect access and use of EmOC services.

6. Conclusion and future actions

Emergency obstetric care is characterized by inadequate coverage of basic EmOC, low use, and high case fatality rate among the countries assessed. Although the coverage of comprehensive EmOC was adequate in term of statistics, the quality of care and 24-h services were not always present at the same time. The basic infrastructure was poor: running water and electricity were often missing. Essential supplies and medicines were inadequate. Most mid-level staff need to improve competency especially in handling obstetric complications. In particular, the following actions are recommended immediately:

1. Upgrade health centers to provide basic EmOC facilities: lack of basic EmOC facilities is identified as one of the main obstacles of accessing emergency obstetric care services in the rural areas of Africa. Upgrading health centers strategically located to provide basic EmOC services would improve access and shorten the distance between the communities and services—to realise the concept of ‘meeting the community halfway.’ However, the challenge is enormous. In Uganda, to achieve the recommended level of basic EmOC coverage in the 19 surveyed districts, 56 more health centers have to be upgraded.
2. Critical functions: vacuum assisted vaginal delivery is the most frequent missing function in both hospitals and health centers. It requires a critical review of national policies and negotiation with professional organizations to delegate the function to the mid-level providers with necessary supervision and backup.
3. Avoid vertical programs and focus on health system development. The improved EmOC services could benefit all the other departments of a health facility, and other programs of the health system. Linkages with other programs such as focused antenatal care, treatment of malaria during pregnancy, PMTCT, and newborn care must be emphasised while planning EmOC program interventions.
4. Upgrade skills and competency of staff: health providers concerned with maternal and newborn care need to upgrade their competency and skills. Supportive supervision and environment are essential for the staff to apply their skills consistently after training.
5. Improve health management information system and standardise national registers: the maternity registers recording deliveries, obstetric complications, and admissions as well as the monthly reporting format should be standardised. This will help to make critical information and analysis available routinely.
6. Strengthen the referral system to shorten the first and second delays. Mothers, their families, and communities should be informed of the major obstetric danger signs. Community emergency transport and funds should be available to assist poor families in emergencies. A better referral between basic and comprehensive EmOC facilities is vital to improve the chance of survival of mother and baby.
7. Monitoring progress and documentation of experiences and lessons: the process indicators should be measured regularly to show progress. Quality of care should be measured as the same time. More applied research is required to look into factors affecting level of utilization. Experiences and lessons should be documented and shared through various networks and media.
8. Conditions of service: a good EmOC service requires teamwork of motivated staff. Many of the service delivery points that need upgrading are in remote hardship areas where extra incentives are needed. These might include extra support to ensure a good electricity supply, running water, extra financial incentives, and a system that recognises service in hardship areas as a boost later in the career of staff, and extra efforts to ensure that schools are of good quality or extra subsidy to allow staff to be able to afford to send their children

to boarding schools. Security especially at night must be provided to all staff to guarantee 24-h EmOC services.

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