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AVERTING MATERNAL DEATH AND DISABILITY

Emergency obstetric surgery by non-physician clinicians in Tanzania

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ABSTRACT

Objective: To calculate the met need for comprehensive emergency obstetric care (CEmOC) in 2 Tanzanian regions (Mwanza and Kigoma) and to document the contribution of non-physician clinicians (assistant medical officers [AMOs]) and medical officers (MOs) with regard to meeting the need for CEmOC. *Methods:* All hospitals in the 2 regions were visited to determine the proportion of major obstetric interventions performed by AMOs and MOs. All deliveries (n = 38 758) in these hospitals in 2003 were reviewed. The estimated met need for emergency obstetric care (EmOC) was calculated using UN process indicators, as was the contribution to that attainment by AMOs. Hospital case fatality rates were also determined. *Results:* Estimated met need was 35% in Mwanza and 23% in Kigoma. AMOs operating independently performed most major obstetric surgery. Outside of the single university hospital, AMOs performed 85% of cesareans and high proportions of other obstetric surgeries. The case fatality rate was 2.0% in Mwanza and 1.2% in Kigoma. *Conclusion:* AMOs carried most of the burden of life-saving EmOC—particularly cesarean deliveries—in the regions investigated. Case fatality was close to the 1% target set by the UN process indicators, but met need was far below the goal of 100%.

1. Introduction

The scarcity of qualified medical doctors for life-saving surgery is a common problem in low-income countries, particularly in rural areas. Factors contributing to this scarcity include concentration of doctors in cities, loss to AIDS and associated diseases, and emigration to higher-income countries. The need for health staff capable of performing life-saving surgery, particularly emergency obstetric care (EmOC), has increased owing to the gradually rising numbers of women attending health facilities for delivery and requiring comprehensive EmOC (CEmOC).

Good outcomes were reported in 1987 [1] and 1992 [2] following major obstetric surgery performed by nurses in a Zairean mission hospital. Reports from other hospitals serving larger populations have come from Tanzania [3], Mozambique [4–10], and Malawi [11]. These 3 African countries have taken steps on a national scale to meet the need for surgical staff by task shifting to non-physician clinicians (NPCs) much of the life-saving surgery, particularly cesareans. The training, recruitment, and professional status of the NPCs in these countries vary, but all NPCs perform major obstetric surgery independently, without a formal medical degree. In a recent nationwide inventory of all Mozambican government hospitals with operating theaters, an analysis of all surgical registers over a year showed the contribution of NPCs among 12 178 women operated upon in 34 hospitals [9]. At district-level hospitals, 92% of all major obstetric surgery was carried out by "técnicos de cirurgia" (Mozambican assistant medical officers [AMOs] who have had additional surgical training). Equally important, retention at 7 years after graduation was investigated in the same study, comparing AMOs with medical officers (MOs). Whereas not a single medical doctor stayed at district level for 7 years, 88% of the AMOs remained and performed surgery.

In Malawi, a review of 2131 consecutive major obstetric surgeries in 38 district hospitals found that 90% of cesareans were carried out by clinical officers (COs; Malawian NPCs with surgical training) and 10% by MOs. Postoperative outcomes were almost identical in the 2 groups in terms of maternal general condition immediately and 24 hours postoperatively, occurrence of pyrexia, wound infection, wound dehiscence, need for reoperation, neonatal outcome, and maternal death [11]. An earlier review of 3-day maternal and infant survival in both district and central hospitals also found no significant differences between MOs and COs [12].

Although Tanzania was the first country in Africa—more than 40 years ago—to train large numbers of AMOs for major obstetric surgery, there has been no documentation of outcome in terms of their proportional contribution to service delivery and the outcomes of surgery. The UN process indicators were developed as tools to assess

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the extent to which the need for EmOC is being met in a defined population [13–15]. The aim of the present study was to use these indicators in 2 regions of Tanzania to assess the contribution of AMOs to the targets set by the indicators.

In Tanzania, AMOs are selected from practicing COs for 2 years of further training. They are secondary-school graduates who have been trained to provide basic medical care—including minor, but not major, surgery. Thus, they have had 3 years of training to become COs, a period of practice, and a further 2 years of training, which includes 3 months of surgery and 3 months of obstetrics. On assignment to a hospital (usually the one at which they had been practicing as COs), they have additional informal, but intensive, training—with an emphasis on obstetrics because this is by far the most common surgical activity in Tanzanian district hospitals.

For the present study, 2 regions in northwest Tanzania were selected: Mwanza (estimated population 2.9 million) and Kigoma (estimated population 1.7 million). Kigoma is almost entirely rural, with no paved roads outside of the capital. Mwanza is also predominantly rural but it includes the second largest city in Tanzania and there are some paved roads in rural areas. In Mwanza, there is 1 large university hospital, and 4 mission and 6 government hospitals. In Kigoma, there are 2 mission and 3 government hospitals (Table 1). Private hospitals attend few deliveries and perform almost no major surgery, and were not included in the present review. Among the mission hospitals, 2 in Mwanza were classified by the government as Designated District Hospitals (DDH). Like all government hospitals, DDH mission hospitals provide free obstetric service and perform more deliveries than do independent mission hospitals. The university hospital in Mwanza had a fully staffed teaching obstetric service, with 6 qualified obstetricians and 5 residents in training, but no AMOs. All of the other hospitals, both government and mission, had AMOs on their staff and performing most of the obstetric surgery. Government regional hospitals functioned essentially as district hospitals for their own urban districts, with few referrals from other hospitals, but the university hospital in Mwanza was primarily a referral hospital—dealing with many complicated obstetric cases referred from other facilities.

2. Methods

All 16 hospitals, government and mission, that performed major obstetric surgery in the 2 regions were included (Table 1). The registers of the hospitals—including annual reports, major operating theater books, minor operating theater registers, delivery room records, and maternal mortality records—were examined in detail to determine the amount and kind of obstetric/gynecologic interventions performed by MOs and AMOs, in addition to outcomes in terms of maternal mortality. Ethics clearance was provided by the Tanzanian National Institute of Medical Research (NIMR/HQ/R.8a/Vol IX/375, 2005).

A CEmOC hospital has facilities in place for blood transfusion and cesarean delivery, in addition to the functions stipulated for basic EmOC (BEmOC) [13,14]. Records for all of the complicated deliveries in 2003 were reviewed for each hospital to determine the nature of the obstetric operations and the surgeons who performed them. The year 2003 was chosen because computerization of data in 2004 had led to a loss of data in some hospitals. Monthly maternal mortality review is required in all Tanzanian hospitals. Records of these mortality review meetings were used to calculate case fatality rates (CFRs) for each category of hospital.

To assess the UN process indicators, total births were estimated using the known population and a birth rate of 39 per 1000 population. Need for EmOC was taken to be 15% of estimated births, as recommended by the indicators [13,14].

Table 1
Bed capacities and burden of deliveries at hospitals with CEmOC in 2003.

Hospital category	Mwanza			Kigoma		
	No.	Beds	Deliveries	No.	Beds	Deliveries
University	1	850	4410	0	0	0
Government regional	1	129	5113	1	260	5220
Government district	5	581	10 612	2	275	4346
DDH (mission)	2	448	7266	0	0	0
Independent (mission)	2	256	771	2	262	1020
Private [a]	*3*	*200*	*<500*	—	—	—
Total	11	2304	28 172	5	797	10 586

Abbreviations: CEmOC, comprehensive emergency obstetric care; DDH, Designated District Hospital.

[a] Private hospitals in Mwanza performed few major operations at the time of review, and therefore were not included in the study.

3. Results

There was a high degree of accuracy in the operating room registers and maternity records. More than 99% of the patients listed in the maternity records as having been referred for surgery were retrievable from the operating room records. Maternal death records did not usually specify who had been responsible for the case, so overall hospital CFRs could be calculated but it was not possible to compare AMOs with MOs directly.

The extent to which the goals of the UN process indicators for EmOC were met and the contributions made by AMOs to meeting the goals are described. Indicator 1 (5 facilities per 500 000 population, at least 1 of which provides CEmOC) is not included because the present study was a regional assessment.

3.1. Adequate geographic distribution of EmOC facilities (indicator 2)

The number of CEmOC hospitals per 500 000 population exceeded the UN guideline in both regions. There were 2 CEmOC facilities per 500 000 population in Mwanza and 1.5 in Kigoma. However, the number of BEmOC facilities did not meet the target. Although most of the dispensaries and all of the health centers in both regions attended deliveries, none qualified as a BEmOC facility, usually because they rarely performed vacuum extractions, removed retained products, or used oxytocic or anticonvulsant drugs, in addition to having limited referral capacity. Thus, neither region met the goal of 5 EmOC facilities per 500 000 population.

3.2. Percentage of estimated total births in EmOC facilities (indicator 3)

Despite the lack of BEmOC facilities, the number of births in the CEmOC hospitals was enough to exceed the recommended minimum of 15% of deliveries in an EmOC facility. Overall, 115 000 (24.6%) and 65 000 (16.2%) estimated births took place in CEmOC facilities in Mwanza and Kigoma, respectively.

3.3. Met need (indicator 4)

This indicator refers to the proportion of pregnant women expected to have direct obstetric complications who are treated in an EmOC facility. According to the indicator, the number of expected complications is estimated to be 15% of total births. The goal is to treat 100% in an EmOC facility. Of the 38 758 registered hospital births, 21.3% were associated with complicated deliveries. More than half of these (11.9%) required major operations, and almost all were cesareans. Met need was calculated by comparing the actual number of hospital-managed complicated deliveries in the 2 regions with the expected number. Met need was 34% in Mwanza and 23% in Kigoma (Table 2).

In Mwanza, 47% of met need came from government district and regional hospitals, 30% from mission hospitals, and 24% from the university hospital. In Kigoma, 84% of complications were managed in government hospitals and 16% in mission hospitals (Table 2). In