Magnitude and Causes of Maternal Deaths at Health Facilities in Eritrea in 2007.

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Abstract

Objective: To measure the level of maternal mortality in health facilities as well as the magnitude and proportion of obstetric complications in health facilities in Eritrea.

Methods: The study was a cross-sectional survey of all hospitals and health centers in Eritrea and a random sample of around a third of health stations. Medical records of all patients who encountered obstetric complications in 2007 were reviewed.

Findings: The main causes of obstetric complications among hospital admissions in 2007 were abortion complications (45.6%), obstructed/prolonged labor (18.4%), abnormal fetal presentation (10.3%) and pre-eclampsia/ eclampsia (7.7%).

The number of maternal deaths at facilities was relatively small. Out of the 6,315 patients who were admitted for obstetric complications in 2007, 41 were classified as maternal deaths. The leading causes of maternal deaths included pre-eclampsia/ eclampsia in 22.0 percent of the cases, abortion complications in 19.5 percent of the cases and postpartum sepsis in 17.1 percent of the cases and post-partum hemorrhage in 14.6 percent of cases. The case-fatality rate for obstetric complications was low at 0.75 percent. The majority of maternal deaths (65 percent) occurred in the post-partum period, while 32 percent occurred during the ante-partum period, and 3 percent during intra-partum or during labor or delivery

Conclusion: Over all it can be concluded that the Eritrean health system is performing well with the current demand for services. The issue of abortion requires special attention because it is the leading obstetric complication, which accounts for 46 percent of maternal complications and is responsible for one fifth of maternal deaths. Although the case fatality rate of all obstetric complications combined is not high (0.75 percent), the cause specific case fatality rates for the leading causes of maternal mortality was high

Keywords: *Maternal mortality, obstetric complications, abortion, case fatality rate*

Introduction

Maternal deaths occur due to a range of direct or indirect causes related to pregnancy, childbirth or postpartum period; 80 percent of deaths are due to direct causes and the remaining 20 percent are due to indirect causes. The five major direct causes of maternal death are: severe bleeding, mainly due to postpartum hemorrhage; infections; hypertensive disorders of pregnancy (eclampsia); obstructed labor; and abortion complications. Indirect causes that complicate or are aggravated by pregnancy include malaria, anemia, HIV/AIDS and cardiovascular diseases [1].

Maternal mortality is an avoidable tragedy since most causes of maternal deaths can be prevented with timely and appropriate medical care. Several factors restrict women's access to medical care. The three-delay model by Thaddeus and Maine (1994) that lead to maternal deaths were described as: delays in seeking care; reaching care; and providing care. The first two delays are related to care seeking practices including making the decision to seek care and reaching the health facility in time. The third delay occurs at the health facility, and is due to factors including the shortage of personnel, drugs and equipment, administrative delays and clinical mismanagement of patients. While the delays may directly contribute to the deaths, they are symptomatic of deeper systemic problems and in many settings, the care may not only be delayed but be absent altogether[2].

Maternal mortality estimates developed by WHO, UNICEF, and the World Bank for 2005 (World Health Organization, UNICEF et al. 2007) indicate the level of maternal mortality for Eritrea at 450 per 100,000 live births, which is below 50 percent of the 1995 EDHS estimate (998 per 100,000) for maternal morality ratio, for the period between 1985 to 1995 (National Statistics Office Eritrea and Macro International Inc. 1995). Although Eritrea's current estimate for maternal mortality ratio is much better than the average for Sub-Saharan Africa (estimated at 940 per 100,000), it is still high.

Maternal mortality study undertaken in 2003 in Eritrea revealed a Maternal Mortality Ratio of 752 per 100,000 live births, for the period of 2002 to 2003 using a household survey on a nationally representative sample [3]. The 2003 estimate for maternal mortality ratio was 25 percent less than the 1995 EDHS estimate. The Ministry of Health in collaboration with the National Statistics office is now undertaking EDHS+ which shall soon determine maternal mortality ratio, more reliably using a bigger sample size.

Although the need for caution in the interpretation or making conclusions based on 'Facility based MMR' is obvious, looking at the numbers and trends of facility based maternal mortality is informative. In 2006 a total of 66 (263.8/100,000) maternal deaths including deaths

due to abortion (49 from delivery report and 17 from inpatient) were reported from health facilities, which declined by 14 percent as compared with that of 2005. Additional 24 home based deaths were also reported by TBAs. Taking the 2000 figure, it has declined by 25 percent in 2006. In 2007 a total of 60 (220.5/100,000) maternal deaths were reported from health facilities, which declined by 9 percent as compared with that of 2006 [4].

Of the total reported facility based (hospitals + Health Centers +Health Stations) 5 years and above deaths in 2006, MMR accounted for about 4 percent. It was 4.6 percent in 2005. The causes for about 64 percent of maternal deaths in health facilities is not properly reported using ICD code. Health Stations do not use ICD code for reporting but only 3 deaths were reported from health stations in Gash Barka. All of the rest were reported from hospitals and health centers, where the ICD code is used for morbidity and mortality reports. From the deaths reported using ICD code, abortion, and pre eclampsia and eclampsia were the major causes of maternal death.

Abortion has been a leading cause of hospital admission among females of reproductive age in Eritrea over the past 10 years. The major cause of outpatient and inpatient visits for obstetric patients in 2006 was abortion (47.5 percent). Treatment for incomplete abortion has been a leading obstetric problem among women from both urban and rural areas in Eritrea. A study conducted in two hospitals in Asmara among women admitted with abortion complications showed that the unplanned pregnancy rate was 43%, whereas the proportion of unwanted pregnancy was 35 percent. Of 395 abortions studied, 17 percent were certainly induced and another 9.8 percent were probably induced [5].

Materials and Methods

The study was undertaken by the Eritrean Nursing Association (ERINA) in collaboration with the Ministry of Health and the World Bank as part of a World Bank intercountry study that was undertaken in three countries, Eritrea, Malawi and Niger.

The study was a cross-sectional survey of all hospitals and all health centers that provide maternity service and a random sample of around a third of health stations in Eritrea (18 hospitals, 47 health centers and 53 health stations from the six Zobas). The survey team collected data from Medical records of all (6,315) patients who encountered obstetric complication from January 1 to December 31, 2007. The data were collected from May to August 2008. The objectives of the study include: - measuring the level of maternal mortality in health facilities as well as measuring the magnitude and proportion of obstetric complications in health facilities in Eritrea.

A list of obstetric complications based on the International Classification of Diseases-10 manual was used as a reference for selecting medical records for inclusion. An instrument was filled out for each patient. It included data on the complication experienced by the patient, treatment provided, survival outcome of the patient and other details. In addition, summary statistics from the maternity ward registers for the year 2007 were recorded at each of the facilities. The summary statistics provided a total count of the number of deliveries, including normal and cesarean deliveries, number of maternal deaths, stillbirths, neonatal deaths, and other pregnancy and delivery outcomes. In the health centers and health stations, it was not possible to conduct the medical record review because case notes on individual patients were not maintained. Hence, instead, only the summary statistics were recorded. The instrument captured details on patient characteristics, complications, treatment provided and outcome. Data on maternal deaths that took place in the communities was not collected in this study.

Results

The analysis is based on data collected from medical records of all maternity patients who experienced obstetric complications in the period January 1 to December 31, 2007.

Obstetric complications: As revealed in table 1, 54 percent of patients with obstetric complication were admitted to the National Referral Hospital for treatment. The Zonal referral hospitals and community hospitals received about 25 percent and 19 percent of the cases, respectively.

Table 1: Distribution of obstetric complication admissions by hospital type in 2007

	Number of cases	Percent
National Referral Hospital	3,394	53.75
Zoba Referral Hospital	1,574	24.92
Community Hospital	1,220	19.32
Parastatal Hospital	127	2.01
Total	6,315	100.00

Table 2 reveals that the main causes of obstetric complications among hospital admissions in 2007 were abortion complications (45.6%), obstructed/prolonged labor (18.4%), abnormal fetal presentation (10.3%) and pre-eclampsia/ eclampsia (7.7%). A very large proportion of admsions and one of the leading causes of maternal deaths were complications of abortion. The proportion of obstetric complications due to abortion varied moderately by zoba, with health facilities in Anseba (40.4%), Debub (52.3%), Debubawi keih Bahri (44.7%), Gash Barka (39.2%), Maekel (44.8%), and Semanwi Keh Bahri (51.9%).

Table 2: Causes of pregnancy complications for hospital admissions

Primary Obstetric complication	N=6315	Percent
Ectopic pregnancy	7	0.11
Ruptured uterus	40	0.63
Cord prolapse	76	1.20

Retained placenta products	191	3.02
Postpartum hemorrhage	197	3.12
Postpartum sepsis	207	3.28
Antepartum hemorrhage	224	3.55
Retained placenta	228	3.61
Preterm labor	234	3.71
Premature rupture of membranes	408	6.46
Pre-eclampsia/eclampsia	485	7.68
Abnormal fetal presentation	650	10.29
Obstructed/prolonged labor	1163	18.42
Abortion complications	2881	45.62

N.B. Analysis in this table was made by responses; hence some patients have been presented with more than one obstetric complication.

Maternal Deaths: As revealed in table 3, out of the 6,315 patients who were admitted for obstetric complications in 2007, 41 were classified as maternal deaths. The case-fatality rate for obstetric complications was 0.75 percent. The direct cause of death could be identified from medical records in 34 out of the 41 cases, because as revealed in table 3 secondary causes were recorded as primary causes for six of the cases: anemia (4), cardiac arrest (1), and severe complicated malaria (1).

The leading causes of maternal deaths among these 41 cases was identified as pre-eclampsia/ eclampsia in 22.0 percent of the cases, abortion complications in 19.5 percent of the cases and postpartum sepsis in 17.1 percent of the cases and post-partum hemorrhage in 14.6 percent of the cases. We used 41 deaths as the denominator rather than 34 because, particularly for the two leading causes of maternal deaths, using the 41 cases as denominator makes more sense as compared to 34 because the six cases with unidentified primary causes were not cases of abortion and eclampsia.

Table 3: Primary cause of maternal death in health facilities

Primary Cause of death	Fre quency	Per cent	Cumulative Percent
Pre-eclampsia/eclampsia	9	22.0	22.0
Abortion complications	8	19.5	41.5
Postpartum sepsis	7	17.1	58.6
Postpartum haemorrhage	6	14.6	73.2
Anemia	4	9.8	83.0
Obstructed/prolonged labour	2	4.9	87.9
Ruptured uterus	2	4.9	92.8
Antepartum haemorrhage	1	2.4	95.2
Cardiac arrest	1	2.4	97.6
Severe complicated malaria	1	2.4	100.0
Total	41	100.	

The majority of maternal deaths (65 percent) occurred in the post-partum period, while 32 percent occurred during the ante-partum period, and 3 percent during intra-partum or during labor or delivery. The majority (61 percent) of the deaths that occur during ante-partum were due to abortion.

As revealed in table 4 the cause specific case fatality rate was high (greater than 1 percent), for ruptured uterus (4.9%), postpartum sepsis (3.1%), postpartum hemorrhage (3.0%), and pre-eclampsia/ eclampsia (1.8%). Malaria and anemia, although are not considered as direct causes of maternal mortality also have high case fatality rate, 4.0 percent for malaria and 2.1% for anemia.

Table 4: Case Fatality Rates for Causes of Maternal Deaths (*CFR > 1%)

Type of complications	No. of Complications (Causes)	Maternal deaths (Deaths)	(Deaths/ Causes)* 100
Antepartum haemorrhage	224	1	0.45
Postpartum hemorrhage	201	6	2.99*
Obstructed/prolonged labor	1164	2	0.17
Ruptured uterus	41	2	4.88*
Postpartum sepsis	221	7	3.17*
Pre-eclampsia/eclampsia	503	9	1.79*
Abortion complications	2881	8	0.28
Malaria	25	1	4.0*
Anaemia	190	4	2.11*
Total	5451	41	0.75

Discussion

This cross sectional study was conducted to determine the national status of maternal morbidity and mortality in Eritrea. The main causes of obstetric complications among hospital admissions in 2007 were abortion complications (45.6%), obstructed/ prolonged labor (18.4%), abnormal fetal presentation (10.3%) and pre-eclampsia/ eclampsia (7.7%).

Out of the 6,315 patients who were admitted for obstetric complications in 2007, 41 were classified as maternal deaths. The leading causes of maternal deaths included pre-eclampsia/ eclampsia in 22.0 percent of the cases, abortion complications in 19.5 percent of the cases and postpartum sepsis in 17.1 percent of the cases and post-partum hemorrhage in 14.6 percent of cases. Abortion was the most prevalent obstetric complication in Eritrea, and one of the leading causes of maternal deaths. The high prevalence of abortion corresponded with low use of family planning and highlights the unmet need for post abortion care and counseling services. It will not be possible to reduce maternal mortality in Eritrea to the required levels without addressing the issue of abortion.

The number of health facility based maternal deaths was relatively small and the overall case-fatality rate for all obstetric complications combined was also relatively low at 0.75 percent, which may be an indication of improving levels of quality of

maternal health care. However, the case fatality rate was not low for the following obstetric complications: - ruptured uterus (4.9%), postpartum sepsis (3.1%) and postpartum hemorrhage (3.0%) and pre-eclampsia/ eclampsia (1.8%).

Globally, in the year 2005, an estimated 536,000 women died of maternal causes worldwide of which 86% occurred in sub-Saharan Africa and South Asia and less than 1% in more developed countries (WHO, et al,2007) . The large regional differences in maternal deaths demonstrate that most of these deaths are preventable. Maternal mortality is a major public-health problem in deve loping countries. Extreme differences in maternal mortality rates between developed and developing countries indicate that most of these deaths are preventable (WHO, et al,2007; Sharma BR et al, 2009).

The pattern of maternal deaths in our setting are similar to the findings documented in Nairobi where the major causes of maternal death were abortion complications, hemorrhage, sepsis, eclampsia, and ruptured uterus. In that study, only 21% of the 29 maternal deaths delivered or aborted with assistance of a health professiona(Ziraba AK, et al,2009). However in Nigeria, the four leading causes of maternal deaths the majority of which were eclampsia (34.4%), hemorrhage (25.0%), infections (18.8%) and abortions 12.5%) (Onakewhor JU, et al,2008; Adegoke AA, et al, 2009).

To ensure skilled attendance at birth for all women, the international community set a target of 80% by 2005, 85% by 2010 and 90% coverage by 2015. However, in 2008 only 65.7% of all women were attended to by a skilled attendant during pregnancy, childbirth and immediately postpartum globally with some countries having less than 20% coverage (Fortney JA, et al,2009).

Conclusion

The issue of abortion requires special attention because it is the leading obstetric complication, which accounts for 46 percent of maternal complications and is responsible for one fifth of maternal deaths. Hence, availability of services for management of abortion complications and post abortion care should be ensured. As abortion is very common problem and the prevailing abortion practice in Eritrea is unsafe, it is crucial to discourage unsafe abortion practices by promoting protection against unwanted pregnancy through prompting life skills to delay sex among adolescents and use appropriate and effective contraceptive when necessary.

Although the case fatality rate of all obstetric complications combined is low (0.75 percent), the cause specific case fatality rate for the leading causes of maternal mortality is high. Hence, there is need of making further studies and finding ways to decrease the case fatality rate of ruptured uterus, postpartum sepsis and postpartum hemorrhage. Malaria and Anemia in pregnancy, although are not considered direct causes, are found to be important secondary causes, hence they also require special attention.

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