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University of Zimbabwe

Two years maternal mortality in Matebeleland North Province, Zimbabwe

S RUTGERS

Abstract

Objective: To describe timeliness and completeness of maternal mortality notifications after the introduction of a revised national notification form in 1998, as well as socio-demographic and obstetric variables and causes of maternal deaths.

Design: Retrospective descriptive study.

Setting: Seven districts in Matebeleland North province.

Subjects: 95 maternal death notifications from 1 August 1998 to 31 July 2000.

Main Outcome Measures: Delay in submission and completeness of reports, age, marital status, religion, reproductive history, booking and referral status, duration and outcome of pregnancy, place of death, cause of death.

Results: 92/95 notifications were true maternal deaths, 86% were notified within 48 hours and 79% were complete, 74% of the deaths took place in a health facility. Mean age of the women was 27.8 years, mean parity 3.0. Sixty percent had booked. The five main causes of death were obstetric haemorrhage (26%), malaria (24%), immune deficiency syndrome (13%), abortion (11%) and eclampsia (8%). The maternal mortality ratio per 100 000 reported home and institutional live births ranged from 155 to 532 per district.

Conclusion: There is under reporting of maternal mortality in some districts, although from 1997 to 2000 a 200% increase in reporting was seen. Timeliness and completeness of reporting was satisfactory. With the exception of a high contribution from malaria the causes of maternal mortality in Matebeleland North province are similar to those reported elsewhere in Zimbabwe.

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Introduction

A maternal death, defined as the death of a woman during pregnancy or childbirth or within 42 days of termination of pregnancy, is a notifiable condition in Zimbabwe. Maternal deaths are to be reported to the Ministry of Health and Child Welfare following the usual channels of communication: from any health facility in a district to the District Medical Officer (DMO) and from there to the Provincial Medical Director (PMD) who forwards the information to national level. A first notification to the DMO (or delegated person) is expected within 24 hours by telephone or other fast means, who in turn notifies the PMD's office within the next 24 hours, from where the national level is informed. A maternal death in a woman who had been referred to a hospital outside the district or even the province is still expected to be reported by the district.

In early 1998 the Department of Family and Child Health (FCH) in the Ministry of Health, with input from all

provinces, developed a revised maternal mortality notification form for reporting of maternal deaths at all levels and regardless of whether the death had occurred inside or outside a health facility. Included are socio-demographic variables, past obstetric and medical history, antenatal attendance and problems, details about referral, outcome of pregnancy, *post natal* period, obstetric or medical problems and their management, cause of death and comments by senior health workers.

In June 1998 this form was formally introduced in Matebeleland North province. Health workers were urged to report all pregnancy related deaths, not only those clearly related to obstetrical or medical causes, but also those which might appear unrelated (fortuitous), in order not to miss any maternal deaths. The maternal mortality notification form was expected at the PMD's office within 30 days after the event.

At times health workers are unaware of maternal deaths that occur in their community and in order not to miss any of those, it is recommended that >BD12 — notification of

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deaths registers and *post mortem* registers are consulted, also in a referral provincial or central hospital. Admission registers, computerized inpatient data bases and malaria mortality forms are other sources of information on maternal deaths.

The following is an analysis of 95 reported maternal deaths in Matebeleland North province in the two year period 1st August 1998 to 31st July 2000. Matebeleland North has a population of around 815 000 (1999) and 96 health facilities of which nine are hospitals with a resident medical officer: one private mine hospital, five government and three mission hospitals. The province has no provincial hospital and patients are referred from district hospitals to Mpilo Central Hospital in Bulawayo.

Timeliness and completeness of reporting were assessed. Causes of maternal mortality are described here, as well as socio-demographic variables and those related to booking status, referral and outcome of pregnancy. Maternal mortality ratios were calculated by district. Factors that could have contributed to maternal deaths are discussed more in detail for the two most common conditions, haemorrhage and malaria.

Materials and Methods

Eighty five of the 95 maternal deaths in the period 1 August 1998 to 31 July 2000 were notified with a maternal mortality notification form. None of the two deaths in women who died after referral to the central hospital were notified by the central hospital staff and the referring districts ended up sending mortality forms with limited information. Three deaths in pregnant women were first reported in the local newspaper, two of which were followed by a maternal mortality notification form from the district. Two deaths were discovered months after the event when unfortunately the notes could no longer be found: one *post partum* malaria death which was recognised as a maternal death only after the malaria season and one abortion death noticed in the context of another study. Seven deaths were recovered from the central hospital's *post mortem* registers. In 10 of the deaths there was only information on age of the woman and the cause of death. Data were entered into an Epi Info 6 computer programme, from where frequency tables and cross tabulations were derived. Most maternal deaths were discussed in detail at district maternal mortality meetings. At the province two medical officers independently commented on the cause of death. In the few cases where their opinions differed or were different from the district diagnosis, consensus was reached through discussion.

Results

Seventy one (74.7%) of the reported deaths took place in a district health facility, 62 in hospital and nine in a rural health centre or rural hospital. Sixty nine were reported over the telephone within two days; the maternal mortality

notification forms arrived within 30 days after the event. The same was true for 13 deaths in women who died at home or were on their way to a health facility. Eighty six percent of the deaths were notified within two days. Seventy nine percent of the forms were complete in all respects, except for the background variables: 'educational level' (18.8%), 'husband's occupation' (34.1%), 'religion' (51.0%) and 'marital status' (80.0%). The age was unknown in four community deaths.

True maternal deaths were 92. Three were fortuitous: two women were murdered, one in a seemingly unrelated incident. The other woman arrived in hospital in labour, unconscious and with a high blood pressure and died within a few hours of admission. She was diagnosed as eclampsia until a *post mortem* result arrived from the central referral hospital almost a year later, indicating that she had died from the consequences of an assault. A third woman died in a car accident, on her way to a clinic with a retained placenta after a home delivery.

The causes of death by age groups are presented in Table I. In the great majority this was a clinical diagnosis: only twenty women had a *post mortem* examination: those who had died in the private hospital (four), in the central referral hospital (two) and those who were brought in moribund or died at home (14).

Fifty three deaths were from an obstetrical cause (57.6%). Haemorrhage contributed to 45.3% of these deaths — four *antepartum* haemorrhage (APH), all from *placenta praevia*, 12 *post partum* haemorrhage (PPH) mostly related to a retained placenta, and eight ruptured uterus.

Three women died from an ectopic pregnancy. Three women died from haemorrhage post abortion, three from post abortion sepsis and three as a consequence of traditional medicine ingested to induce an abortion. One had a septic molar pregnancy.

Thirty nine (42.4%) of the deaths had a medical cause, with complicated malaria being the most important in 56.4%. Immune deficiency syndrome was the second important medical cause of death (33.3%) but only three diagnoses had been confirmed with an HIV test.

The mean age at death was 27.8 years (SD 6.7 years, range 16 to 42 years); 14.1% of the deaths were in teenagers < 20 years. Mean parity was 3.0 (SD 2.4, range 0 to 10) and gravidity 3.5 (SD 2.4, range 1 to 11). The majority of women were married (85.1%). Of the 43 women whose religion was recorded, 11 were Roman Catholic, 22 belonged to a non-Catholic Christian religion and 10 had no religion recorded.

Sixty percent of the women were booked. Of the 61 women who died in hospital 50.8% had been referred. Fifty four women delivered 38 live births (one set of twins), three of whom ended in a neonatal death, and 12 fresh and five macerated still births.

Deaths from haemorrhage happened within hours *post partum*: from a ruptured uterus on average 1.8 hours, from PPH eight hours 15 minutes and from APH nine hours after delivery. Deaths from eclampsia occurred with a mean of 2.3 days and from sepsis 7.1 days *post partum*.

Table I: Causes of maternal deaths by age groups. Matebeleland North Province (1 August 1998 to 31 July 2000).

Age groups in years	<20	20-24	24-29	30-34	35+	Unknown	Total	%
MATERNAL DEATHS OBSTETRIC								
Abortion Related	2	3	1		3	1	10	10.9%
Haemorrhage	1	1			1		3	
Sepsis	1	1				1	3	
Muti poisoning		1			2		3	
Sepsis after mola			1				1	
Ante Partum Haemorrhage		1	2	1			4	4.3%
Placenta praevia		1	2	1			4	
Post Partum Haemorrhage	2	4	1	2	3		12	13.0%
Retained placenta		2		1	3		8	
Atonic uterus	2	1	1	1	3			
Cervical tear		1					1	
Ruptured Uterus			4	2	1	1	8	8.7%
Ruptured ectopic pregnancy			1	2			3	3.3%
Eclampsia	1	3	2	1	1		8	8.7%
Puerperal sepsis	1	1	1	3			6	6.5%
Anaesthetic accident	1			1			2	2.2%
MATERNAL DEATHS MEDICAL								
Complicated malaria	4	5	3	4	4	2	22	23.9%
Immuno-deficiency syndrome	1	1	5	4	1		12	13.0%
Anaemia/cardiomypopathy embolism	2		2		1		5	5.4%
Total	14	18	22	20	14	4	92	100%

Table II: Maternal mortality ratios/100 000 live births by district. Matebeleland North 1 August 1998 to 31 July 2000.

District	Maternal deaths	Reported live births in health facilities	MMR	Reported live births in health facilities and home	MMR
Binga	23	2 922	787	4 4326	532
Bubi	7	1 290	543	1 628	430
Hwange	19	7 212	263	7 850	242
Lupane	16	3 314	483	5 848	274
Nkayi	11	4 740	232	7 110	155
Tsholotsho	13	4 242	306	6 614	197
Umguzu	3	986	304	1 674	179
Province	92	24 706	372	35 050	262

Maternal Mortality Ratios.

The number of maternal deaths in each of Matebeleland North's seven districts is shown in Table II and compared with live births in the same period and district, firstly with reported *institutional* live births and secondly with *all reported home and institutional* live births. The maternal mortality ratio (MMR) for the province is 372/100 000 *institutional* live births and ranges from 232 in Nkayi district to 787 in Binga, and is 262 /100 000 when *all reported* live births are considered (range 155 to 532).

Haemorrhage.

The most important obstetric cause of death was bleeding. Thirteen of the 24 deaths occurred before the woman could reach the hospital: 9/12 PPH, 3/8 ruptured uterus and 1/4

placentae praeviae. Half of the deaths from PPH were in young women < 25 years.

Avoidable factors could be identified: in the management of the patient by health workers (12/24), the services (4/24) and on the part of the patients (6/24), see Table III. To illustrate this: three of the 11 women who died from PPH were *grande multiparae*, who had all delivered at home despite advise to await their delivery in a Waiting Mothers' Shelter near a hospital. One woman who had a history of PPH and another with a history of APH delivered in a rural health centre instead of a hospital. One woman with a retained placenta and PPH survived for 12 hours. Her life might have been saved, if the ambulance had not delayed on the way but arrived earlier than six hours after it had been called.

Table III: Avoidable factors in maternal deaths from obstetric haemorrhage.

Avoidable factors	Type of haemorrhage			Total n=24
	PPH n=12	Ruptured uterus n=8	APH n=4	
Delay patient or relatives	1			1
Home delivery despite identified risk	2	3		5
Negligence of health worker	1			1
Late recognition of complications or late action by health worker	1	3	1	5
Incompetence of health worker	2	2	2	6
No telephone/radio/ambulance	3		1	4
Low risk delivery at home	2			2

Of the eight women with a ruptured uterus, four had a previous caesarean section scar and three delivered in hospital. However, one was not observed well and a rupture was detected late, two others progressed very fast and ruptured. In those cases the attending medical officers had difficulty repairing the damage. In two other cases the rupture in women delivering in hospital was recognised too late. One woman with a caesarean section scar died at home during labour. One *grande multipara* and one woman with a history of 'difficult deliveries' died at home from a ruptured uterus although they were advised to await delivery in a hospital's Waiting Mothers' Shelter. Three women died from APH in hospital. One woman with a previous caesarean section scar and an intra-uterine death who had refused an operation for a dead baby, had her delivery induced by a Foley's catheter in the cervix which triggered uncontrollable bleeding from an undiagnosed *placenta praevia*. In another woman with *placenta praevia* the decision to operate was postponed for too long. The third woman died a few hours after a successful operation for *placenta praevia*, possibly from underestimated blood loss.

Two of the three women who died at home from haemorrhage after an abortion had clearly induced the abortion according to the *post mortem* reports; a third woman's life could have been saved if the health workers had taken her complaint seriously and not delayed unnecessarily.

Malaria.

The 22 malaria specific deaths made up 23.9% of all maternal deaths. Almost half of the deaths were in young women below 25 years (10/22), who had just experienced their first delivery (5/8 *para 1*) or who were nulliparous at death (2) or *para 1* (3/8), but in fact all age groups and parities were affected, see Table IV. The great majority of women died from malaria in a hospital (77.3%), the mean time between arrival and death was 30.0 hours (SD 28.0 hours, ranging from 10 minutes to 107 hours). Seven of these women had been referred from a rural health centre or rural hospital, with a mean delay of 3.4 hours (SD 2.7 hours), three women had taken six hours or more to travel after referral to hospital. Nine women did not deliver before they died. Two had an abortion. Five of the 11 who delivered had low birth weight babies < 2 500 g, four babies weighed more than 2 500 g and in two home deaths there was no record of birth weights. The mean time between delivery and death was 117.2 hours (SD 123.1, range 18 to 336 hours).

Table IV: Malaria deaths by age group and parity.

Age groups	P0 n=2	P1 n=8	P2/3 n=6	P4+ n=5	Unknown parity n=1	Total n=22
<20 years		5				5
20-24 years	2	2	1			5
25-29 years		1	2			3
30+ years			2	5	1	8
Age unknown			1		1	1

Eight women came in a serious condition to the health facility and there was delay on the part of the relatives or the patient herself. In seven cases avoidable factors within the health services could be identified: delay in recognising the seriousness of the condition and consequent referral in one and delay in giving correct treatment in hospital in six, one patient had not been monitored well and died from fluid overload. In one case a patient died after a two day stay in a remote Rural Health Centre (RHC), because transport was not available to collect her.

Discussion

To what extent are reported maternal deaths in Matebeleland North a reflection of the actual maternal mortality in the province? Surveys show that around 50 to 65% of the women in Matebeleland North deliver in a health facility,^{2,3} but maternal deaths outside a health facility made up only one fifth of the reported maternal deaths. A community study on maternal mortality in the early nineties in rural Masvingo province found a MMR of 168/100 000.⁴ However the World Health Organisation (WHO) in its 1996 'Revised estimates of maternal mortality', estimates Zimbabwe's MMR at 570/100 000 in 1990, mainly based on fertility rates and proportion of deliveries attended by trained personnel.⁵ Comparing the Matebeleland North district MMRs with those from rural Masvingo (done at a time when AIDS did not yet contribute to so many maternal deaths and with only 8% deaths from malaria) we must conclude that some districts in the province do not report even half of their maternal deaths but other districts probably the majority. If the WHO's estimates are correct, many more deaths are missed. It is indeed likely that home deaths go undetected as well as deaths in the central referral institution, since these are not notified systematically. Especially deaths from induced abortions may be concealed by the relatives. Nevertheless, the causes of deaths (with the exception of malaria and HIV-related illness) in Matebeleland North are the same as in Masvingo. The districts with low MMRs have since been encouraged to be more in touch with what happens in their communities.

The main purpose of collection of data on maternal deaths in this province is for the District Health Executives to use the case histories for discussion on prevention of deaths and continuous education on correct management of patients. Indeed, almost all districts hold monthly to quarterly maternal mortality meetings which seem to be better attended if lunch is offered as an incentive. The usefulness of only the maternal mortality notification form as basis for discussion is however limited. A narrative much better illustrates the circumstances under which women deliver their babies and health workers do their work: 'woman in labour for two days, brought to the clinic in a wheel barrow, General Hand is sent by bicycle to phone the hospital, ambulance driver cannot be found, etcetera'. A follow up visit to the home of the deceased woman to offer condolences, possibly to check on the orphan(s) and a discussion of the circumstances under which the woman died is often attempted but not always

feasible. Most districts take reporting of maternal deaths more and more seriously as reflected in the timeliness and completeness of reporting and also in the considerable increase in reported deaths, from 19 in 1997 and 23 in 1998, to 43 in 1999 and 57 in 2000.⁶ In fact, in the first 15 months after introduction of the new notification form, Matebeleland North provided 31.5% (40/167) of the notifications to the national Family and Child Health Department.⁷

With regards to the causes of maternal death, obstetric haemorrhage is as in other parts of Zimbabwe⁷ the most important and not easily amenable to reduction. Socio-economic factors play a crucial role in women deciding to deliver at home and in transport not being available at short notice. This situation is unlikely to improve in the near future. Some deaths might have been prevented if all women with a history of difficult or assisted delivery, of APH and PPH and of grande multiparity had delivered in a hospital. In other deaths there was delay in diagnosis, transfer and correct management. When bleeding occurs, the safest place is a hospital with an experienced doctor in attendance and blood in the refrigerator. Therefore at least women at risk but presumably all women living in remote areas without access to transport should await their delivery in a Waiting Mothers' Shelter or with a relative near a hospital. There is, however, also need to ensure that all medical officers stationed in the districts have had an opportunity to master the theory of obstetrics and the necessary practical skills.

Malaria specific deaths are particularly high in Matebeleland North, where districts with the highest incidence rates in the country are found.⁸ The provincial policy dictates that pregnant women be prescribed prophylaxis in the form of a full course of chloroquine on their booking visit and thereafter two chloroquine tablets weekly. In reality, pregnant women book late, in the second or even third trimester and are reluctant to take chloroquine. A recent study found that most pregnant women and the elderly women in the community think chloroquine may interfere with the pregnancy.⁹ It is therefore recommended to change the provincial policy and to give pregnant women a full course of sulphadoxine-pyrimethamine under supervision during their antenatal visits at monthly intervals. This regime has been shown to reduce severe anaemia in Malawi and could be expected to have an effect on the number of episodes of malaria and its complications and eventually on maternal mortality.¹⁰ In order to ensure early treatment, health workers and the community need to understand that malaria and pregnancy are a potentially hazardous combination and that delay in seeking treatment can result in death. This message will need constant reinforcement.

It is envisaged that the re-introduction of the Village Health Workers programme in early 2001, will result in a better insight in (ill) health events at grass root level. With increased understanding of causes and possible ways of prevention of maternal deaths by decision makers, both

health workers and community leaders, it must be possible to anticipate common problems and plan creative solutions, such as a locally organised insurance system to provide funds to transport women in labour, or forms of community support towards the care of children whose mothers are awaiting delivery near a hospital.

Hopefully the Village Health Workers will also assist those women with poor access to contraception. Matebeleland North has one of the lowest contraceptive user rates in the country and many women live far from a health facility.³ Many tragic deaths could be prevented if women were able to prevent unwanted or unplanned pregnancies. Health workers at all levels should not miss any opportunity to offer contraceptives.

Conclusion

Reporting of maternal mortality increased by 200% from 1997 to 2000 in Matebeleland North province, with satisfactory timeliness and completeness of reports. Regular audit of maternal deaths by district managers will create awareness on the importance of collecting these data and on preventable causes. Maternal deaths from malaria are very high in the province and it is recommended that malaria prophylaxis is given more emphasis.

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