Review of maternal deaths at Umtata General Hospital — 1981 - 1985 and 1988 - 1992

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Objective. To assess and evaluate the determinants of maternal mortality for the periods 1981 - 1985 and 1988 - 1992.

Design. Retrospective case study.

Setting. Referral hospital, Umtata, E. Cape.

Patients. All maternal deaths at Umtata General Hospital during the study period.

Intervention. None.

Main outcome measures. Avoidable and unavoidable causes of maternal deaths.

Results. The crude maternal mortality rate was 158.6/100 000 live births. No particular trends were detected. The three major causes were medical conditions, hypertension and obstetric haemorrhage.

Conclusion. Doctor-related, patient-related and transportation problems were identified as the main avoidable factors. Improvement in primary health care, medical staffing and the transport system are the main recommendations.

Maternal mortality rates (MMRs) in developed countries have declined steadily. In the Netherlands, the rate has declined from 8.8/100 000 (1983 - 1988) to 5/100 000 live births (1988)[1,2] and in the USA the rate for 1979 - 1986 was reported to be 9.1/100 000 live births.[3] The recent figure for the UK is 45.6/1 000 000 known pregnancies.[4]

Although maternal deaths are generally under-reported in the developing countries, the incidence is still unacceptably high.[2] In Africa, it has been reported to be highest in west Africa, followed by east and then southern Africa.[5,6] In South Africa, a number of studies have been done. In a Cape Town study, a downward trend in MMR was observed during the period 1953 - 1983. In Bloemfontein the rate has been reported to be 287/100 000 deliveries.[7] In an overview of maternal deaths for the southern African region, Boes estimated a rate of 8.3/100 000 deliveries.[8,9]

The true MMR for the former Transkei is unknown. Crude estimates from the Transkei National Maternity Information System[10] suggests the rate to be 220/100 000 deliveries.

The objective of this study was to determine the MMR and identify causative factors at Umtata General Hospital.

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Materials and methods

In this study a maternal death is defined according to WHO *ICD-10* recommendations,[11] viz. death of a woman while pregnant or within 42 completed days of termination of pregnancy, irrespective of the duration or site of the pregnancy.

All maternal deaths during the periods 1981 - 1985 and 1988 - 1992 were retrospectively reviewed. The following information was extracted from each record: date and time of death, referral status, reason for referral, age, obstetric history, past medical and surgical history, diagnosis on admission, management, investigations, final clinical diagnosis, postmortem diagnosis and avoidable factors. All data were entered into Epi Info 5. Descriptive summary analysis was undertaken.

Results

During the study periods, there were 127 maternal deaths. Of these, 57 occurred during the period 1988 - 1992. The MMR could not be calculated for the period 1981 - 1985; neither the total number of deliveries nor that of the live births was available. The MMR for the period 1988 - 1992 was 158.6/100 000 live births.

As shown in Table I, the highest number of deaths occurred during 1985 and the lowest in 1988. The mean annual number of deaths was 12.7, with a range of 8 - 20. As shown in Table II, 48.8% of patients died within a day of admission, while 17.6% died within 2 - 4 days.

Table I. Yearly distribution of maternal deaths

Year	No.	%	Live births	MMR
1981	9	7.1	-	-
1982	12	9.5	-	-
1983	13	10.2	-	-
1984	16	12.6	-	-
1985	20	15.7	-	-
1988	6	4.7	6 020	99.6
1989	11	8.7	6 631	165.8
1990	8	6.3	6 769	118.2
1991	15	11.8	7 907	189.7
1992	17	13.4	7 734	219.8
Total/average	127	100.0	35 061	158.6

Table II. Duration of stay at Umtata General Hospital

Days	No.	%
0 - 1	61	48.0
2 - 4	22	17.3
5 - 10	24	18.8
11 - 14	5	3.9
15 - 19	1	0.8
> 20	5	3.9
Dead on arrival	2	1.6
Unstated	7	5.7
Total	127	100.0

Fifty-six per cent of patients (70) were referred. Of these, 48.8% (57) came from a peripheral hospital, while 10.2%

(13) were from peripheral clinics and general practitioners.

In 72 cases the reason for referral was stated. The commonest reasons were hypertension in pregnancy (20), haemorrhage (11), sepsis (10), caesarean section (8) and respiratory distress (6).

In 20 cases, surgery had been performed at the referring institution. Nine patients (45%) had undergone caesarean section, while 2 each had had dilation and curettage, hysterectomy, hysterotomy and repair of a ruptured uterus.

Table III shows the distribution of maternal deaths by age, parity and booking status. Fifty-one (44%) of the deaths were in mothers under 24 years of age, while 74 (63.6%) were under 30 years old.

Table III. Maternal death by age, parity and booking status

	No.	%
Age (yrs)		
< 20	19	14.9
20 - 24	32	25.2
25 - 29	23	18.1
30 - 34	20	15.7
35 - 39	14	11.0
40 and above	8	6.3
Unknown	11	8.8
Total	127	100.0
Parity		
Primigravidas	39	30.7
1-4	38	29.9
5 and above	33	25.9
Unknown	17	13.5
Total	127	100.0
Booking status		
Less than 3	13	10.2
3 times and above	19	14.9
Unknown	95	74.9
Total	127	100.0

Of the patients in whom parity was indicated, 35% of the deaths occurred in primigravidas, 34.5% in the para 2 - 4 group and 30% in those para 5 and above. The booking status was documented in only 32 patients. Those who attended the antenatal clinic for fewer than 3 visits accounted for 40.6% while 59.3% attended the clinic for 3 or more visits.

Over half the patients were at term, while 25% were at less than 28 weeks' gestation. Twelve patients had a history of previous caesarean section. In the 98 patients in whom fetal state was recorded, 30.6% of babies were fresh stillborn. Of the 118 patients for whom place of delivery was indicated, 48% delivered at Umtata General Hospital while 15% delivered at home. Of the 99 for whom mode of delivery was reported, 35% were delivered by caesarean section, while 6% and 7% respectively had vacuum extraction and caesarean hysterectomy.

Table IV shows the distribution of maternal deaths by clinical and postmortem diagnosis. Medical conditions accounted for the majority of cases. Among the medical conditions were cardiac lesions, and pulmonary conditions such as pneumonia, pulmonary oedema and pulmonary embolism. Eclampsia accounted for 20 of the 26 cases of hypertension in pregnancy. Obstetric haemorrhage from atony of uterus and abruptio placentae was the third-leading cause.

Table IV. Maternal death by diagnosis

		No.	%
Clinical diagnosis			
Medical conditions		28	22.1
Valvular lesion of heart	5		
Congenital heart disease	1		
Pneumonia	3		
Chronic lung disease	3		
Pulmonary oedema	1		
Epilepsy	3		
Subarachnoid haemorrhage	1		
Meningitis	1		
Chronic renal disease	2		
Liver disease/failure	3		
Typhoid	2		
Amoebiasis	1		
Stevens-Johnson syndrome	1		
Bleeding diathesis	1		
Hypertension in pregnancy		26	20.5
Obstetric haemorrhage		23	18.1
Ruptured uterus		15	11.8
Puerperal sepsis		12	9.4
Abortion-related		6	4.7
Ectopic pregnancy		5	3.9
Miscellaneous		12	9.5
Total		127	100.0
Post-mortem diagnosis			
Medical conditions		19	14.9
Liver disease	2		
Pulmonary oedema/over-transfusion	7		
Amoebiasis	1		
Cerebral thrombosis/infarction	3		
Pulmonary embolism	2		
Pneumonia	2		
Heart disease (congenital)	2		
Haemorrhage		11	8.7
Septicaemia		9	7.0
Eclampsia/severe pre-eclampsia		12	9.4
Ruptured uterus		3	2.3
Amniotic fluid embolism		1	0.8
Choriocarcinoma		3	2.3
Anaesthesia		1	0.8
Not performed		68	53.8
Total		127	100.0

Of the 15 patients with ruptured uterus, 9 died as a result of haemorrhage, 3 of sepsis, 2 from pulmonary oedema, and 1 from pulmonary embolism. Sepsis was responsible for 4 of the 6 abortion-related deaths. In 3 of the 5 cases of ectopic pregnancy, pulmonary oedema was the final cause of death.

There were 12 cases in the 'miscellaneous' group. Of these 6 died of anaesthetic complications and 3 from

choriocarcinoma, while pulmonary embolism and amniotic fluid embolism accounted for 1 case each; 1 patient was dead on arrival. Similarly, the postmortem diagnosis revealed medical conditions to be the leading cause of death, followed by haemorrhage and septicemia. Three patients died of eclampsia.

Table V shows some of the avoidable factors that were subjectively determined by the author. The doctor-related factors included inexperienced staff, delayed diagnosis and treatment and late referral. These accounted for 48 cases.

Table V. Avoidable factors

	No.	%
Doctor-related factors		
Inexperienced staff	30	23.6
Delayed diagnosis	15	11.8
Delayed treatment	3	2.4
Patient-related factors		
Patient non-compliance	40	31.5
Delayed transfer	13	10.2
Poor documentation	26	20.5
Total	127	100.0

The patient-related factors documented as non-compliance included unbooked patients, late bookings, refusal to accept medical advice, and attempts by women who had previously had a caesarean section to deliver at home.

Delayed referral or transfer was due to the patient's lack of transport as well as to inadequate transport systems at peripheral hospitals. Lack of vehicles, non-maintenance of vehicles and lack of drivers were some of the transport problems identified by this review. Transport difficulties were directly responsible for delayed referral in 13 cases. Causative factors could not be identified in 26 cases because of poor documentation.

Discussion

One of the major problems associated with maternal mortality studies is that of deciding on a universally accepted denominator. Total deliveries, total births, total live births and total known pregnancies have all been used. In this study we used live births as the denominator. The crude MMR in this study of 158.6/100 000 live births is comparable to the rate of 122 - 137/100 000 live births in Zimbabwe, but lower than the 190/100 000 live births reported in Kenya, and 559/100 000 live births in Guinea. However, it does not reflect the overall MMR in the former Transkei, as Umtata General Hospital is a referral institution.

The short duration of stay (less than 4 days) at Umtata General Hospital in the majority of cases reflects the critical condition on arrival. It is therefore not surprising that most patients were unsalvageable.

Hypertension, haemorrhage and sepsis were the main reasons for referral. This is a reflection of the poor antenatal services at the peripheral hospitals and clinics. It would appear that high-risk cases are not identified in time and referred for appropriate management.

Over 64% of maternal deaths were under the age of 30 years. Approximately 29.3% of maternal deaths occurred between the ages of 30 and 39 years, and 6.9% of maternal deaths were over the age of 40. According to Solleder,[10] 76.6% of all deliveries occurred in the under-30 age group, 19.2% between the ages of 30 and 39, and 3.1% over the age of 40 years. This study, like Solleder's findings, appears to support the notion that MMR increases with age.

Medical conditions, hypertension and haemorrhage were the leading causative factors in our study. Medical conditions as the leading cause of death were a disturbing finding. Sepsis was a minor cause of death.

In developing countries, and particularly in Africa, the most common causes are hypertension, haemorrhage, sepsis, obstructed labour, ruptured uterus, illegal abortions, anaesthetic complications and trauma.[5,12-14] In her study, Boes reported hypertension, obstetric haemorrhage and sepsis as the main causes of maternal death.[9] It is, however, reassuring that obstructed labour, sepsis and illegal abortion do not feature prominently in this study. This may be a reflection of an improvement in the management of cases.

Although subjectively assessed, three avoidable factors stand out clearly in this study, viz. doctor-related factors, patient-related factors and inadequate transport. Among the doctor-related factors identified, inexperienced staff and poor documentation feature prominently. Patient non-compliance may be a reflection of the poor formal and health education of our patients and may be compounded by a poor communication network and transport facilities. Transportation of patients from peripheral clinics and hospitals continues to be a major problem.

Recommendations

Maternal deaths at Umtata General Hospital and in the former Transkei as a whole can be reduced if the following recommendations are implemented.

1. Improve communication between the patient and the nearest clinic.

2. Improve facilities at all rural clinics, viz. transport, appointment of experienced nursing staff, delivery and communication.

3. Institute a comprehensive health education programme for all antenatal patients.

4. Appoint experienced medical staff and increase their numbers in order to improve the quality of medical care.

5. Improve and streamline the transport system in all hospitals.

6. Regular review of maternal deaths by medical staff at all hospitals in order to identify the causes, management deficits and avoidable factors. A universal format common to all hospitals for documentation of maternal deaths would be helpful.

In conclusion, a mother is the central person in a family. A maternal death leaves a broken family and orphaned children. Besides, most maternal deaths occur in young women who have much to offer in life. Most maternal deaths are preventable, and every effort must therefore be made to prevent these tragic deaths from occurring.

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