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Nationwide maternal mortality in Surinam

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Objective To assess the magnitude, causes and associated factors of maternal mortality in Surinam.

Methods Nationwide confidential enquiry. Maternal deaths were identified using various methods and sources for the period 1991–1993. All cases were examined by a maternal mortality expert committee for substandard care analysis.

Results The national maternal mortality ratio was 226 per 100,000 live births, which is six times higher than the official maternal mortality ratio of 38 for the preceding three year period. The main causes of death were haemorrhage (30%) and pre-eclampsia (20%). In 95% of analysed cases, substandard care factors which had contributed to the deaths were present at one or more levels of maternity care.

Conclusions Maternal mortality was found to be several times higher than had been officially reported for Surinam during the previous three decades. Improvement of maternity care services in Surinam is needed, and has to be addressed at all levels, from the community, health centre and hospital to the highest level of organisation.

INTRODUCTION

Maternal mortality is known to be a major public health problem in the developing world[1,2]. Today, the ratios of maternal mortality in rich and poor countries show a greater disparity than any other health care indicator, including infant mortality, which is most often taken as the measure of comparative disadvantage[3,4]. While the need to improve health services for women in the developing world is now generally recognised, one of the principal obstacles to appropriate maternal health care interventions is the lack of valid data on the numbers, causes and factors influencing maternal mortality[5]. Most of the data on maternal mortality for Latin America are based on civil registration, but maternal mortality ratios of up to twice the official figures have been reported for countries in the region[4,6,7].

In Surinam, most of the official maternal mortality ratios reported for the past three decades are under 100 per 100,000 live births. In the 1980s, vital statistics even indicated a decreasing trend[8–10]. Despite this, there was continuing concern about the true level of maternal mortality in Surinam. In 1991 a confidential enquiry into all maternal deaths in Surinam was initiated by the first two authors. The aim of the study was to identify the true number of maternal deaths in Surinam, the characteristics of the women who were dying, the major underlying causes of death and substandard care factors relating to these deaths, so that locally relevant and affordable solutions for the improvement of maternal health care in Surinam could be proposed.

Surinam, formerly Dutch Guyana, is a country in the Amazon region of Latin America, with a population of 400,000. Ninety percent of the population lives in a small coastal area, where there are five large hospitals, covering 78% of all births nationwide. Primary health care services in this area are provided mainly by the Government primary health centres, within easy reach of most of the coastal population. The remaining 10% of the population lives in the interior, which covers 80% of the land surface. Health care in this vast area is co-ordinated and delivered by the Medical Mission. The health centres and two small hospitals in the interior are widespread and situated mainly near airstrip facilities.

SUBJECTS AND METHODS

The World Health Organisation defines maternal mortality as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. A late maternal death is more than 42 days but less than one year after termination of pregnancy[11]. Cases of possible maternal death were identified nationwide, for the period 1 January 1991–31 December 1993 using various methods and sources.

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A national maternal mortality survey was conducted in the following manner. At the start of the study, medical workers providing obstetric care in Surinam were asked to cooperate in the survey by reporting cases of maternal death (according to WHO definitions) to one of the authors (A.M.). These medical workers were obstetricians and midwives in the five hospitals in the coastal area, medical officers and health care workers of the Government primary health centres and private midwives in the coastal area, and medical officers and health care workers of the health centres and the two hospitals of the Medical Mission in the interior. The heads of the two public mortuaries in the capital reported cases of those women aged between 10–50 years who died outwith a hospital environment where the cause of death was maternal or unknown. To verify the completeness of reporting, these medical workers were contacted regularly, either personally or by telephone or radio contact, with the assistance of the Bureau of Public Health and the Medical Mission.

At the end of each year of the study period, the medical records of all women aged 10–50 years who had died on all wards in the five hospitals in the coastal area were retrospectively reviewed by one of the authors (A.M.), in order to cross-check for unreported cases and for cases which occurred in non-obstetric departments. The deaths were linked to pregnancy and birth using information from the medical records and the hospital's birth register. If the cause of death was not clear from the records and more detailed information was required, this was obtained from the medical staff involved in the case.

In addition to the national survey, we reviewed all deaths of women aged 10–50 years through the national Register of Causes of Death, located at the Bureau of Public Health. The deaths coded as maternal, uncertain or ill-defined, and not already known to us from the national survey were further examined by looking up the medical certificates and contacting the doctors who had signed the certificates, who were then asked for further details.

All cases of possible maternal death were discussed with the obstetricians, medical officers, midwives and other health care workers involved. If additional information was needed, the relatives of the deceased were traced and, after verbal informed consent, were interviewed.

For every possible maternal death identified in the enquiry, a case-summary was prepared including maternal age, parity and marital status, gestational age at death or delivery, place and date of delivery, place and date of death, details of antenatal care (if any) and all available information regarding the specific circumstances leading to death. Strict confidentiality was observed during every stage of the study. The cases were classified according to WHO definitions by the four authors. A single underlying cause of death was assigned to each case. The underlying cause of death was defined as the disease or complication which initiated the chain of events leading directly to death. All case-summaries were reviewed confidentially by a nine person maternal mortality expert committee (seven obstetricians, one midwife and the principal author). For each case the assessors filled in a form, on which they were asked to comment whether there were any substandard care factors in the case which, in their opinion, had contributed to the death. They were asked to bear in mind that, in the context of this enquiry, substandard care means that the care that the patient received, or the care that was made available to her, fell below the standard which they consider should have been offered to her under the circumstances and during the period that the enquiry took place. The term substandard care in this enquiry is also used for situations produced by the actions of the woman and her relatives, which may be outside the control of the clinicians. After analysis of the data, for each item on the form with a positive substandard score by the majority (five or more) of the assessors, substandard care was considered to be present.

RESULTS

For the study period, 1991–1993, 70 possible maternal deaths were identified. After analysis six deaths were excluded: four were found to be from incidental causes, while the other two were related to pregnancy but occurred more than one year after termination of pregnancy. There were 64 maternal deaths, including one 'late death'. The national maternal mortality ratio was found to be 226 per 100,000 live births. In Table 1, maternal mortality during the study period is compared with that reported for the preceding 18 years.

There were two deaths (3·1%) from ectopic pregnancy. A further seven women (10·9%) died before the 28th week of gestation, from haemorrhage ($n = 2$), sepsis, other than from genital tract infection ($n = 2$), eclampsia ($n = 1$), obstructed labour ($n = 1$) and gonorrhoeal disease ($n = 1$). Fifteen women (23·4%) died before the birth of a potentially viable child and a further 40 women (62·5%) died after being delivered of a potentially viable child. There were no cases of death from abortion. In Table 2, maternal mortality is shown in relation to duration of pregnancy. In the context of Surinam and the viability of the fetus a cut-off point of 28 weeks of gestation is used.

Forty-nine (76·6%) direct and 15 (23·4%) indirect maternal deaths were identified. The underlying causes of all maternal deaths are given in Table 3. The causes in the four cases of incidental death were leptospirosis, sickle cell disease, complication of anaesthesia during postpartum tubal ligation and epilepsy.

Table 1. Maternal mortality in Surinam, 1973–1993.

Year	No. of live births*	No. of maternal deaths	Maternal mortality per 100,000 live births (95% CI)
1973–1975	33·785	30**	89 (57–120)
1976–1978	32·948	28**	85 (54–116)
1979–1981	30·528	21**	69 (40–98)
1982–1984	34·548	30**	87 (56–118)
1985–1987	31·540	17**	54 (28–79)
1988–1990	28·856	11**	38 (16–60)
1991–1993	28·337	64†	226 (171–281)

*Source: Central Bureau for Civil Registration (CBB), Surinam.
**Source: Bureau of Public Health (BOG), Ministry of Health, Surinam.
† Identified number of maternal deaths in this Enquiry.

Fifty-six women (87·5%) died in the densely populated coastal area and eight (12·5%) died inland. Fifty-three women (82·8%) died in hospital, 19 having been admitted in life-threatening conditions. A further two (3·1%) died in health centres. The remaining nine women (14·1%), six of whom lived inland, died at home or during transport to a health centre or hospital. The underlying causes of death in these cases were haemorrhage (n = 4), ectopic pregnancy (n = 2), eclampsia (n = 2) and malaria (n = 1).

Forty-six women in this study died after delivery. Thirty-three (71·7%) had vaginal births, including two instrumental deliveries, and thirteen (28·3%) were delivered by caesarean section. In five cases there was an emergency indication for the operation and in eight the indication was elective. Ten women in this study gave birth at home, eight of whom died from haemorrhage, the other two from pre-eclampsia.

There were inadequacies in the antenatal care of many women. For two cases no detailed information on antenatal care was available, and a further three women died before the twentieth week of gestation. Of the remaining 59, 13 women (22·0%) were unbooked, 27

Table 2. Category of maternal deaths in Surinam in relation to stage of pregnancy, 1991–1993 (n = 64).

	<28 weeks of gestation		28 weeks of gestation–6 weeks postpartum		
Category	Ectopic	Others	Undelivered	Delivered	>6 weeks postpartum
Direct	2	4	7	35	1
Indirect	–	3	8	4	–
TOTAL	2	7	15	39	1

Table 3. Maternal deaths by underlying cause of death, Surinam 1991–1993 (n = 64).

Direct maternal deaths		Indirect maternal deaths	
Underlying cause	n (%)	Underlying cause	n (%)
Haemorrhage	19 (29·7)	Sepsis, other than from genital tract infection	6 (9·4)†
Pre-eclampsia	13 (20·3)	Malaria	3 (4·7)
Complication from caesarean section	5 (7·8)	Cerebrovascular accident	2 (3·1)
Sepsis from genital tract infection	4 (6·3)*	Sickle cell disease	1 (1·5)
Ectopic pregnancy	2 (3·1)	Heart disease	1 (1·5)
Others	5 (7·8)**	Gonorrhoeal disease	1 (1·5)
Unclassified	1 (1·5)	Varicella	1 (1·5)
TOTAL	49 (76·6)	TOTAL	15 (23·4)

*Includes one late death.
**Including (each one case): complication of anaesthesia; administration of toxic dose of medication in labour; obstructed labour; complication of instrumental delivery; pulmonary embolism.
†Including clinical sepsis from: gastro-enteritis (n = 3); pyelitis (n = 1); unknown origin (n = 1).

(45·8%) had their first antenatal control in the second half of pregnancy, and only 19 (32·2%) initiated antenatal visits before the twentieth week of gestation. The medical history was known for 63 women in this enquiry. For 39 of them (61·9%) both their general and obstetric histories were uneventful. Eight women (12·7%) were known to have general health risk factors such as sickle cell disease ($n = 4$), hypertension ($n = 3$), rheumatic heart disease ($n = 1$), and 20 (31·7%) had a complicated obstetric history.

For two cases the maternal mortality expert committee judged the available information to be insufficient for analysis of the standard of care. Of the 62 maternal deaths in this enquiry which could be analysed by the expert committee, in only three cases (4·8%) were no substandard care factors present. In the remaining 59 cases (95·2%) substandard care factors which had contributed to the deaths were present at one or more levels of maternity care such as inadequate use of antenatal care services, non-cooperation with medical advice and delays in seeking care at critical moments by women and their relatives; inadequacies in care and delays in recognising the seriousness of complications (and in referring women) by midwives, general practitioners and medical workers at primary care level; delays in diagnosis and inadequacies in care and case-management by obstetricians and other doctors in hospital; inadequacies in care and in monitoring the women's condition at both obstetric and non-obstetric departments in hospital; inadequacies in the organisation of health care, concerning non-availability of adequate maternity services out of hospital, lack of adequate transport facilities in the community and lack of blood and blood transfusion facilities in hospital. In Table 4 the numbers of cases with substandard care factors are shown for different levels of maternity care.

Haemorrhage and pre-eclampsia were the most frequent underlying causes and accounted for 50% of all maternal deaths in this study. For nineteen women (29·7%), the underlying cause of death was haemorrhage, either postpartum haemorrhage ($n = 13$), placenta praevia ($n = 3$), placental abruption ($n = 2$) or twin delivery with a birth interval of 24 hours ($n = 1$). Five women died out of hospital and 14 women died in hospital. In most of these cases there were delays in blood transfusion. Seven women died before blood was available for transfusion. In a further two cases the blood was given too late, even though it was readily available, and in the remaining five cases the time from the request of blood to the start of transfusion varied from 1 to 8·75 hours, with an average delay of 3·75 hours. For thirteen women (20·3%), the underlying cause of death was pre-eclampsia. There were nine cases of eclampsia. Seven of these women had their first eclamptic seizure at home. One of them died at home, another died during transport. The remaining five were all admitted in hospital more than 6 hours after their first seizure.

Table 4. Cases with substandard care factors (SCF) by level of maternity care ($n = 62$). Values are given as n (%).

Level of maternity care	Cases with SCF
Patient and family	36 (58·1)
Primary health care	14 (22·6)*
Obstetrician	28 (45·2)
Other doctor in hospital	13 (21·0)
Hospital care	26 (41·9)
Organisation of health care	24 (38·7)
At least one level of maternity care	59 (95·2)

*Includes the following primary health care providers: general practitioner ($n = 7$); midwife ($n = 5$); health assistant ($n = 2$).

DISCUSSION

Two-thirds of the world's population live in areas where civil registration is incomplete or nonexistent[12]. Even in countries where death registration is relatively complete, there can be significant under-reporting of maternal deaths as registered by death certificates[13,14]. The use of a variety of methods to identify maternal deaths in such countries can provide far more reliable information on the national maternal mortality ratio than the use of vital statistics alone[7]. By using various methods and sources to identify maternal deaths in Surinam, we found a maternal mortality ratio of 226 per 100,000 live births, which was six times higher than the official ratio for the preceding three years (1988–1990) of 38 per 100,000 live births. This great discrepancy is difficult to understand, especially since 85% of all registered deaths in Surinam are medically certified[10]. For the study period we found an under-reporting rate of 63% for maternal deaths in the official death cause register, which is dealt with in greater detail elsewhere[15].

In this study, no deaths from abortion were identified. Induced abortions are illegal in Surinam, but it is known that the majority of abortions within this society are performed by qualified doctors under safe conditions. Although our findings are in agreement with a previous hospital study in Surinam[16], our methodology did not include a consequent review of all deaths of women of reproductive age in the community. Thus, under-reporting of maternal deaths, especially of those associated with abortion which are known to be difficult to identify, is still possible in our study.

In 95·2% of the cases which we analysed, substandard care factors which had contributed to the deaths were present at one or more levels of maternity care. Substandard care was significant at some levels: the women and their families, the obstetricians, the hospital care, and

the organisation of health care. Some substandard care factors were closely related to specific causes of death. For instance, in most of the deaths from haemorrhage there were delays in blood transfusion, and most of the women who died from eclampsia suffered serious delays in transport. It can be concluded from our findings, therefore, that the improvement of maternity care services in Surinam needs to be addressed at all levels, from the community, health centre and hospital to the highest level of organisation.

The decline in maternal mortality over the last 50 years is one of the most impressive health achievements in the industrialised world[17]. Only in some developed countries are regular enquiries made into all maternal deaths and attempts to address all substandard care factors made[18,19]. With this approach, maternal mortality in these countries has been reduced to almost negligible levels. Although most of the maternal deaths in Third World countries are preventable, little has been done to reduce maternal mortality there[2,20]. The high national maternal mortality ratio revealed by our study indicates that maternal health care in Surinam could be improved. In addition, it shows that even in those countries where death cause registration is satisfactory, passive systems of vital registration do not capture the true dimension of maternal mortality, and that this tragic outcome can be most seriously under-estimated in the official statistics. The fact that substandard care factors were present in the vast majority of cases of maternal death indicates that there are opportunities to improve maternal health care in Surinam. Such efforts need to focus on all levels of the maternity care system, but especially on those which were found to be weakest, and should involve all relevant health professionals and community groups. It is estimated by the World Bank that an investment of less than $2 per capita per year is required to cut maternal mortality ratios by half in one decade[21]. Investments in locally relevant programmes to strengthen maternity care services in Surinam would reduce maternal mortality to a more acceptable level.

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