

Influence of perinatal care on stillbirths in patients of low socio-economic class

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Summary

In a series of 12 587 deliveries in patients of low socio-economic class, there were 356 stillbirths; prospective analysis of these showed that 42,1% occurred in the 4,7% of cases in which the mother had received no antenatal care. When booked and unbooked patients were compared it was found that the rate of stillbirths due to infection and anoxia was significantly higher among unbooked patients, who also accounted for more intra-uterine deaths due to abruptio placentae and congenital abnormalities. We speculate that diet and nutrition might play a major part in the causation of these intra-uterine deaths.

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The high perinatal mortality rate in the lower socio-economic groups in this country is a matter of great concern. As is the case in all developing countries, the intra-uterine death rate is far in excess of the neonatal death rate. Major efforts are therefore needed to improve the perinatal mortality rate. Such a study, however, cannot be embarked upon unless a careful assessment is made of the cause of the stillbirths. The first purpose of this study was therefore to ascertain which factors contribute to the high stillbirth rate. Secondly, an attempt was made to establish what role antenatal care played in the prevention of stillbirths by comparing booked with unbooked patients.

Subjects and methods

All stillbirths that occurred between January 1984 and June 1985 in a coloured population were studied prospectively. No patient referred from a rural area was included in the study, and unbooked patients from areas other than those served by the hospital were also excluded. The study was therefore limited to patients in the Tygerberg Hospital area, most of whom belong to the lower socio-economic classes. All neonates with a birth weight of 500 g or more were included.

When a stillbirth occurred during the day the infant was examined soon after delivery, but those delivered during the night were examined the following morning. The mother's hospital record was studied to obtain her age and marital status, the date of the last normal menstrual period, and information on clinic attendance and any complications that had occurred during the pregnancy. The infant was examined for any external abnormality. Maceration of the skin was noted and the abdomen was examined for hepatosplenomegaly or other masses. The placenta was examined for retroplacental blood clots, discoloration of the membranes, nodular appearance of the membranes and loss of the normal shine.

The probable cause of the stillbirth was established after physical examination of the placenta and fetus and careful

review of the antenatal records and observations made during labour and delivery. Results of special investigations such as serological tests for syphilis and chromosomal analysis were also used to categorise the cause of death. Autopsies were only performed on non-macerated infants with congenital abnormalities. Fetography was done in all cases of congenital abnormality or suspected syphilis. Once all the results were available the cause of the stillbirth was classified as follows:

1. Congenital abnormalities — when lethal congenital abnormalities were found on external examination or when specific chromosomal abnormalities were found.

2. Infections: (i) acute-amniotic fluid infection diagnosed on clinical grounds such as offensive amniotic fluid, maternal fever in the absence of any other cause when the fetus or placenta had an offensive odour, or when macroscopic infective changes of the membranes were noted; and (ii) congenital syphilis — diagnosed by the specific serological test and clinical and/or radiological signs.

3. Abruptio placentae — when a history of abdominal pain and antepartum haemorrhage followed by intra-uterine death was obtained, or when a retroplacental clot measured more than 15% of the placental surface, often accompanied by underlying compressed placental tissue.

4. Anoxia: (i) pre-eclampsia, eclampsia and severe hypertension; (ii) intra-uterine growth retardation — when the fetus demonstrated a loss of subcutaneous tissue, when there was meconium discoloration of the skin, cord and membranes, or when the placenta was small and thin with several infarcts; and (iii) problems such as prolapse of the umbilical cord, placenta praevia or obstructed labour.

5. Diabetes mellitus — when the infant was macrosomic and when an abnormal glucose tolerance or diabetes had been diagnosed in the mother.

6. Unknown — when no specific cause could be found on clinical grounds.

7. Miscellaneous — definite cause not included above.

Patients were classified as booked when they had attended the antenatal clinic more than once and as unbooked when they had attended no or only one antenatal clinic. The chi-square test was used for statistical analysis.

Results

During the 18-month study period 12 587 patients were delivered, of whom 356 had a stillborn infant weighing 500 g or more. Congenital abnormalities caused 7,6% of stillbirths, infections (including syphilis) 15,2%, anoxia 34,3%, miscellaneous factors 5,3% and diabetes mellitus 1,4%. In 36,2% of cases no specific cause could be found (Table I). Abruptio placentae was the single factor which caused most of the stillbirths (23,3%).

When booked patients were compared with unbooked patients the rates of all causes of stillbirth were much higher among the latter. Statistical significance was obtained in differences between congenital abnormalities, infections, anoxia and unknown factors. For the group as a whole the stillbirth rate for booked patients was 17,2/1 000 in contrast to 254,2/1 000 for unbooked patients (Table 1). Only 4,7% of patients were unbooked, but they accounted for 42,1% of all the stillbirths.

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TABLE I. CAUSES OF STILLBIRTH IN RELATION TO ANTENATAL CARE

Cause	Stillbirths		Stillbirth rate/1 000 deliveries	
	No.	%	Antenatal care (11 997 patients)	No antenatal care (590 patients)
Congenital abnormalities	27	7,6	1,58	13,56*
Infections	54	15,2	2,00	50,85*
Intra-uterine	31	8,7	1,08	30,51
Syphilis	23	6,5	0,92	20,34
Anoxia	122	34,3	6,82	67,71*
Abruptio placentae	83	23,3	4,68	45,76*
HT/PE	8	2,3	0,42	5,08
IUGR	20	5,6	1,3	6,7
Other	11	3,1	0,42	10,17
Miscellaneous	19	5,3	1,17	8,47
Diabetes mellitus	5	1,4	0,42	—
Unknown	129	36,2	5,17	113,6*
Total	<u>356</u>	<u>100</u>	<u>17,16</u>	<u>254,19*</u>

* $P < 0,001$.

HT/PE = hypertension/pre-eclampsia; IUGR = intra-uterine growth retardation.

Discussion

This study supports the findings of Woods and Draper¹ that abruptio placentae, infection and congenital abnormalities are major causes of intra-uterine death among coloured patients in the Cape. According to their study, abruptio placentae, infection and congenital abnormalities caused 40%, 9% and 6% respectively of intra-uterine deaths in comparison with 23,3%, 8,7% (excluding syphilis) and 7,6% in our study. We could not confirm the finding of Woods and Draper¹ that careful postnatal examination confirmed the cause of the stillbirth in all but 15,3% of cases. In a study on black patients in Durban, in which autopsy and not clinical examination was done to find the cause of death, Ross *et al.*² found that 29% of deaths were due to amniotic fluid infection, 9% to abruptio placentae and 4% to major congenital abnormalities. They were unable to find the cause of death in only 0,8% of cases, a much lower figure than the 36,2% in this study. Autopsy is therefore strongly recommended to establish a cause of death in the large majority of cases.³ However, histological examination of the placenta might provide more information about the cause of death without incurring the major expenses of a full autopsy.⁴

When the incidence of the different causes of intra-uterine death is considered, it becomes very clear that it is much more common among patients who receive no antenatal care. There was, for example, a 9-fold increase in the incidence of congenital abnormalities, a 25-fold increase in the incidence of infections and a 10-fold increase in the incidence of anoxia as causes of intra-uterine death when these patients were compared with those who received antenatal care. All these abnormalities could not have been prevented by antenatal care. It therefore seems that there is an additional cause for the higher perinatal mortality.

Various financial factors certainly influence attendance at antenatal clinics, as was found during the economic recession in the USA during 1982 when the proportion of patients who did not receive antenatal care increased from 6,2% in 1980 to 8,2% in 1982.⁵ Although antenatal care has been questioned in its present form, it is very definitely needed, but should be rationalised so that unnecessary visits are reduced.^{6,7} This will immediately mean that more time will be available to counsel the patient at risk. It is also interesting to note that no single model of antenatal care exists for countries with similar fetal and infant mortality rates.⁸

A recent study⁹ indicated that among white mothers who delivered in a private service inadequate antenatal care was

associated with an only slightly increased risk of producing a low-birth-weight infant, but that among black mothers who delivered in a general service it was associated with a substantially increased risk. This finding was substantiated by Greenberg,¹⁰ who also found that the efficacy of antenatal services was modified by social status and that the greatest reduction in adverse pregnancy outcome may be anticipated in antenatal services directed at lower socio-economic groups. Structured consultations, allocating more time to socially deprived women, should therefore be developed.¹¹

Poor socio-economic circumstances are often associated with malnutrition, which may be aggravated by pregnancy. In a study of abruptio placentae in Addis Ababa, Naeye *et al.*¹² found a strong correlation between fatal abruptio and severe poverty and postulated that poor nutrition might play a role. We speculate that in our patients in generally low socio-economic circumstances, a poor diet and malnutrition might play a significant role in the increased perinatal mortality.

We have demonstrated that the 4,7% of patients who had received no antenatal care accounted for 42,1% of all stillbirths. Much effort is therefore needed to educate the community and to provide adequate community obstetric services with the hope that more mothers will benefit from proper antenatal care.

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