A PROSPECTIVE INTERRACIAL STUDY OF HYPERTENSIVE TOXAEMIA OF PREGNANCY*

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For a number of years there has been an impression among certain obstetricians in Cape Town that hypertensive toxaemia of pregnancy is more common among the Cape Malays. This impression was supported by a retrospective study by Dr. L. Oosthuysen in 1953 who found that toxaemia had occurred in 16·9% of pregnancies in Cape Malay women compared with an incidence of 12·6%, 12·8% and 7·8% in Whites, Cape Coloureds and Africans, respectively.

Reports from Scotland and the United States of America suggested that the development of hypertensive toxaemia was related to the blood-pressure level of the mothers of the pregnant women. The mothers of women with toxaemia of pregnancy tended to have higher blood pressures than the mothers of women who did not develop pregnancy toxaemia. These observations were also derived from retrospective studies.

The present study was designed to test these 2 sets of observations by means of a prospective study. In other words, we set out to seek answers to 2 questions: firstly, is hypertensive toxaemia of pregnancy more common in Cape Malay women than in White women?; and secondly, is there a connection between the level of the blood pressure in the mother and the development of hypertensive toxaemia in her pregnant daughter?

The investigation was restricted to primigravidae. Patients were ascertained through the municipal antenatal clinics and through the antenatal clinics of the 4 teaching maternity hospitals. All the patients were examined before the 26th week of their pregnancy. The preliminary interview and examination were devoted to establishing the patient's ethnic background, the duration of pregnancy, her blood-pressure level, and the whereabouts of her mother.

Patients were regarded as 'White' if they were accepted as such at the antenatal clinics. Patients were regarded as 'Malay' on the basis of a detailed questionnaire dealing with their social, religious and cultural background and if both their parents and at least 3 of their grandparents were Malays. In 95% of the Malay patients both parents and all 4 grandparents were Malays.

The blood pressure was measured 3 times, at intervals of 5 minutes, with the patient semi-recumbent. The lowest of the 3 readings was used for diagnostic purposes. Patients whose diastolic blood pressures were 90 mm.Hg or more before the 26th week of pregnancy were excluded from the study.

The patients' mothers were interviewed and examined in the same way. If the mother was dead, a copy of her death certificate was obtained and, where possible, her doctor or her hospital records were consulted. If the mother could not be examined (usually because she lived too far away) the patient was excluded from the study. The mothers were classified into 4 groups: Group A had diastolic blood pressures of less than 90 mm.Hg. Group B had diastolic blood pressures of 90 mm.Hg or more, but without any evidence of hypertensive disease. Group C had diastolic blood pressures of 90 mm.Hg or more together with clinical, radiological or electrocardiographic evidence of hypertensive disease. Group D consisted of the women who were already dead when their daughters were first examined (Table I).

TABLE I. BLOOD PRESSURES OF THE MOTHERS OF THE PREGNANT WOMEN

Blood pressure group	*Whites*	*Malays*
A. Normal blood pressure	58	38
B. Elevated blood pressure only	15	21
C. Hypertensive disease	18	28
D. Dead i. Hypertensive	2 } 9	4 } 13
ii. Unknown or normotensive	7 }	9 }

More than 700 pregnant women were interviewed and examined until 100 White and 100 Malay patients were ascertained who fulfilled all the necessary criteria for this investigation. The mean age of the White women was 21·8 ± 3·8 years, while that of the Malay women was 21·5 ± 4·4 years; the difference between the two groups was not significant ($p>0.10$).

The 200 selected women were then kept under regular observation throughout their pregnancies and until about 2 weeks after their baby was born. They were examined at about the 32nd week of their pregnancy and again between the 36th and 38th weeks. These examinations were in addition to their usual attendances at the antenatal clinics. At each examination the blood pressure was recorded 3 times, at 5-minute intervals; the lowest diastolic reading was used for diagnostic purposes. The presence or absence of oedema was noted, the patient's weight was checked and the urine examined for the presence of albumin. About one week after the baby was born the examination was repeated. At this postnatal examination the patient's antenatal and obstetrical records were scrutinized for any additional evidence of hypertensive toxaemia.

Hypertensive toxaemia was diagnosed when a previously normal blood pressure rose to a diastolic level of 90 mm. Hg or more after the 26th week of pregnancy and before the 10th day of the puerperium.

RESULTS

1. Contrary to what had been suggested by the retrospective study, in this investigation hypertensive toxaemia occurred

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more often in the White than in the Malay women. 20 of the White women developed toxaemia and only 9 of the Malay group ($chi^2=4.8$; $p<.05$).

2. On the other hand—and again contrary to expectation—there were more mothers with raised blood pressure and more mothers with hypertensive disease in the Malay than in the White group (Table I). The mean diastolic blood pressure of the White mothers was 87·0±16·2 mm. Hg; for the Malays it was 93·1±16·1 mm. Hg—a significant difference ($p<.02$). In the White group the mothers of toxaemic patients and non-toxaemic patients had almost identical mean diastolic blood pressures: 87·3±17·8 and 86·9±15·9 mm. Hg respectively. Similarly, among the Malay group there was no significant difference between the mean diastolic blood pressures of the mothers of the toxaemic and non-toxaemic patients: 94·6± 25·7 and 93·0±15·7 mm.Hg respectively ($p>0.1$). So in neither group was there any association between the mothers' blood pressure and the development of toxaemia in their pregnant daughters.

Thus, as far as these two groups of women are concerned, clear-cut negative answers have been given to the two questions which were originally put to us. A great deal of additional information was collected in the course of this investigation. Some of this has been analysed and the results are summarized below:

ADDITIONAL INFORMATION

The Blood Pressure in the two Groups of Mothers

In an attempt to explain the higher mean diastolic pressure of the Malay mothers, the blood-pressure levels were correlated with age, weight and parity.

Age. In both the White and Malay groups there was a fairly close correlation between diastolic blood pressure and age. For the Whites, the correlation coefficient, $r=0.40$ ($p<.001$); for the Malays, $r=0.43$ ($p<.001$). However, the mean ages of the 2 groups were not significantly different: there were 91 living White mothers with a mean age of 49·1 ± 7·5 years and there were 87 living Malay mothers with a mean age of 48·2 ±7·9 years ($p>.10$). The difference in the blood pressure was therefore not due to a difference in the ages of the 2 groups of women.

Weight. There was no significant correlation between weight and diastolic blood pressure in either group. For the Whites, $r=-.08$ ($p>.10$); for the Malays, $r=.18$ ($p>.10$). There was no significant difference in the mean weights of the 2 groups: Whites 147·5 ± 28·0 lb.; Malays 142·6 ± 33·0 lb. ($p>.10$).

Parity. The parity of the Malay mothers (8·0 ± 3·8) was significantly greater than that of the Whites (4·4 ± 2·6; $p<.001$). At first sight this may be a factor associated with the higher blood-pressure level in the Malay mothers. Further analysis, however, tends to minimize the importance of this association because in neither group was there any significant correlation between parity and diastolic blood pressure (in both groups, $r=.02$; $p>.10$).

The Birth Weights of the Babies

Two sets of twins and a pair of conjoined twins were born to the White patients. The mean birth weight of the 97 single White babies was 7·3 ± 1·3 lb. There were no twins born to the Malay patients. The mean birth weight of the 100 Malay babies was 6·5 ± 0·9 lb. The difference was significant ($p<.001$), but further investigation will be necessary before this difference can be attributed to predominantly genetic or to predominantly environmental influences.

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