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## *Short reports*

# Ethnic differences in congenital malformations

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SUMMARY Perinatal deaths and major lethal and non-lethal congenital malformations occurring in this hospital from 1979–82 inclusive were related to the ethnic group of the 15 438 mothers. The highest crude perinatal mortality rates occurred in Indian and Pakistani populations (18·3 per 1000 and 24·1 per 1000 respectively). The highest incidence of congenital abnormality also occurred in these groups (13·3 per 1000 and 12·8 per 1000 respectively), but there was considerable variation in the distribution of different malformations.

The maternity department of this hospital serves a deprived, multiracial, inner city population. Previous studies here have shown an increased perinatal mortality in the Indian and Pakistani groups.[1] The two major causes of perinatal mortality are the problems associated with low birthweight and congenital malformations; the latter being commoner in underprivileged women and within certain ethnic groups.[2 3] The aim of this study was to analyse major congenital malformations occurring in a mixed ethnic community noting the pattern of malformation in the various groups and the contribution to perinatal and neonatal mortality. In addition the factors maternal age and consanguinity were noted and, although implicated, their precise influence on the incidence of abnormality was impossible to determine.

### Patients and methods

The ethnic origin of all 15 438 mothers who delivered in 1979 to 1982 was obtained from the labour ward register. This was based on recognisable sociocultural features, and mixed marriages occurred very rarely in all ethnic groups. Most of these women were Indian, Pakistani, West Indian, or European. The 699 mothers who did not belong to one of these groups (470 were Bangladeshi) were excluded. The diagnosis of an abnormal stillbirth, neonate, or normally formed perinatal death was made by the paediatricians or obstetricians with necropsy details where available.

Types of malformation were classified into multiple, chromosomal, central nervous system, cardiovascular system, alimentary system, genitourinary system, and 'other' malformations. Recognised syndromes were included in the multiple group unless they affected only one system. The single skeletal malformation was included in the 'other' group. No attempt was made to identify infants with major abnormalities (mainly cardiovascular) that were not diagnosed before discharge from hospital. The description of an abnormality as 'major' and hence its inclusion in this study, was, although subjective, usually obvious.

Information about maternal age was available for the two years 1979 and 1982. Details of consanguineous marriages were obtained during 1982 by an interpreter. Statistical comparison was by $\chi^2$ test with Yates's correction.

### Results

The Pakistanis had the highest perinatal mortality rate at 24·1 per 1000 (difference between European group $P<0·001$; difference between West Indian group $P<0·05$: Table 1) and a high rate of congenital abnormality at 12·8 per 1000 (difference between West Indian group $P<0·05$: Table 1), with the highest rate of increased maternal age and consanguinity (Table 2). In this group there was the highest incidence of lethal congenital abnormality at 7·8 per 1000 (difference between European group $P<0·02$; between West Indian group $P<0·01$: Table 1) mainly due to the highest congenitally abnormal neonatal death rate at 6.4 per 1000 (difference between European group $P<0·001$; difference between West Indians $P<0·01$: Table 1). The pattern of abnormality in the Pakistani group showed an increased number of multiple abnormalities (difference between European group $P<0·05$) and chro-



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Table 1 *Perinatal mortality and lethal and major non-lethal abnormality rates (per 1000) in the different ethnic groups (number in parentheses)*

| *Ethnic group* | *Perinatal mortality rate* | *Congenitally abnormal stillbirth rate* | *Congenitally abnormal neonatal death rate* | *Lethal congenital abnormality rate* | *Major lethal and non-lethal congenital abnormality rate* |
|---|---|---|---|---|---|
| Indian | 18·3† | 1·7 | 3·1§ | 5·2§ | 13·3* ** |
| (4203) | (77) | (7) | (13) | (22) | (56) |
| Pakistani | 24·1‡ § | 1·4 | 6·4‡ ** | 7·8† ** | 12·8§ |
| (2195) | (53) | (3) | (14) | (17) | (28) |
| West Indian | 13·5 | 1·1 | 0·0 | 1·1 | 5·4 |
| (1846) | (25) | (2) | (0) | (2) | (10) |
| European | 12·2 | 1·2 | 1·2 | 3·4 | 8·8 |
| (6495) | (79) | (8) | (8) | (22) | (57) |

Difference between European group: *P<0·05; †P<0·02; ‡P<0·001.
Difference between West Indian group: §P<0·05; **P<0·01.

Table 2 *Ethnic distribution of maternal age (1979 and 1982) and consanguinity (1982)*

| *Ethnic group* | *No* | *Age group (%)* | | | | | *No* | *Consanguinity (%)* | |
|---|---|---|---|---|---|---|---|---|---|
| | | *<20* | *20–24* | *25–29* | *30–34* | *35+* | | *First cousin* | *Distant relative* |
| Indian | 2079 | 10·3 | 41·4 | 33·6 | 11·2 | 3·5 | 962 | 2·3 | 1·5 |
| Pakistani | 1131 | 7·3 | 34·0 | 29·4 | 14·0 | 15·3 | 560 | 55·2 | 20·9 |
| West Indian | 979 | 32·1 | 38·3 | 17·0 | 6·0 | 6·6 | 564 | 0·0 | 0·0 |
| European | 3147 | 21·3 | 37·3 | 23·0 | 12·4 | 6·0 | 1460 | 0·0 | 0·0 |

mosomal abnormalities, with a low incidence of neural tube defects.

The Indian group had a high perinatal mortality rate at 18·3 per 1000 (difference between European group P<0·02: Table 1) and the highest rate of major congenital abnormality at 13·3 per 1000 (difference between the European group P<0·05; difference between West Indian group P<0·01: Table 1). In the Indian group, however, the incidences of increased maternal age and consanguinity were low (Table 2). The distribution of the types of abnormality was similar in the Indians and Europeans except for many more alimentary abnormalities in the Indians (20 *v* eight in the Europeans; P<0·001). These Indian alimentary abnormalities were mainly bowel atresia: oesophageal (4), multiple intestinal (3), and anorectal (4).

## Discussion

The Leicestershire group[4] showed a higher perinatal mortality rate in their Gujurati population, with a higher lethal congenital abnormality rate. Similarly the Bradford workers[5] have shown a higher perinatal mortality rate in their Pakistanis with a much higher infant death rate due to congenital abnormality and a high consanguinity rate.

In our study, the highest incidence of congenital abnormality in the Indian group cannot be explained on the basis of increased maternal age or consanguinity and, when compared with the Europeans, was almost entirely due to more alimentary malformations, which must have either an environmental aetiology, a genetic predisposition, or the occurrence of a cluster of these abnormalities during the study period. Increased maternal age and consanguinity, however, in the Pakistani mothers may be factors in their higher incidence of multiple and chromosomal malformations.

Although these results represent one community, we feel that detailed analysis over a four year period is worthwhile as an example of what seems to be happening nationally in mixed ethnic communities in industrial cities. In these areas where the incidence of low birthweight is high and lethal malformations an additional problem, it shows the fallacy of presenting the uncorrected crude perinatal mortality rate as an index of the standard of health care.

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### References

[1] Terry PB, Condie RG, Settatree RS. Analysis of ethnic differences in perinatal statistics. *Br Med J* 1980;**281**:1307–8.

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[2] Gatrad AR, Read AP, Watson GH. Consanguinity and complex cardiac anomalies with situs ambiguus. *Arch Dis Child* 1984;**59**:242–5.
[3] Talwalkar VC. Caution on preventing neural tube defects (letter). *Br Med J* 1981;**283**:917.
[4] Dhariwal HS. Leicestershire-decline in perinatal mortality. In: MacFadyen IR, MacVicar J, eds. *Obstetric problems of the Asian community in Britain*. London: Royal College of Obstetricians and Gynaecologists, 1982:101–7.
[5] Barnes R. Perinatal mortality and morbidity in Bradford. In: MacFadyen IR, MacVicar J, eds. *Obstetric problems of the Asian community in Britain*. London: Royal College of Obstetricians and Gynaecologists, 1982:81–7.

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# Birth size in Indian ethnic subgroups born in Britain

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SUMMARY Comparison in size at birth was made among Indian mothers of Hindu, Sikh, and Moslem origin living in Leicester and their infants, and white mothers and their infants. White infants were significantly heavier than infants from all Asian subgroups studied and had larger heads. Sikh babies were significantly longer and heavier than Moslem and Hindu babies, and in some respects were more comparable to white infants than their Indian peers. There were no important differences between the Moslem and Hindu babies.

Birthweight and other anthropometric measurements of newborn babies show considerable ethnic variation;[1] infants of mothers of Asian origin are lighter and shorter than those of white mothers.[2–4] Studies of variations in sizes at birth, however, have not taken into account the vast heterogeneity of ethnic groups comprising the Asian population. A recent study showed that there was no significant difference in birthweight between Moslem and white infants but that Hindu babies were significantly smaller.[5] We report the differences in size among healthy infants born in Leicester to mothers from three Indian subgroups and compare the sizes of these infants with those of white infants.

## Methods

Healthy postpartum mothers of Indian origin delivering full term healthy infants (38–41 weeks' gestation) at either the Leicester Royal Infirmary or the Leicester General Hospital were divided into one of three groups: Moslem, Hindu, and Sikh. They were matched for age (within five years) and parity, and 50 women were enrolled in each group. A fourth group of 50 healthy white women was also matched for similar factors. Babies of diabetic mothers were excluded from the study. Maternal height and weight at booking were recorded, and measurements of postpartum triceps and mid-arm circumference were made with Harpenden skinfold calipers and a non-stretchable linen tape measure, respectively. The infants were weighed naked at birth to the nearest 10 g and crown heel length measured on a neonatometer to the nearest millimetre; the average of three measurements were recorded. Maximal occipitofrontal head circumference was recorded to the nearest millimetre. The infants' triceps and subscapular skinfold thicknesses and mid-arm circumferences were also measured, and ponderal index was calculated as an index of relative growth.[6] Means and standard deviations were computed and comparisons of groups were made by the unpaired $t$ test. All maternal and neonatal measurements were made by one of two people (PC or SHS).

## Results

White mothers were taller ($P<0.001$) and heavier ($P<0.004$) than all Indian mothers. They also showed increased mid-arm circumferences when compared with Hindu and Moslem mothers ($P<0.001$) but not compared with Sikh mothers. Significant differences in skinfold thicknesses were noted only between white and Moslem mothers ($P<0.02$). Sikh mothers were heavier ($P<0.04$) than Moslem or Hindu mothers and had increased mid-arm circumferences ($P<0.04$) and skinfold thicknesses ($P<0.04$). There were no differences in maternal stature among the three Indian subgroups. No significant differences were noted between

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