

A Comparison of Mothers and Infants of Different Ethnic Origins Delivering in the British Military Hospital, Hong Kong, 1976-1985

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SUMMARY: The majority of infants being delivered in the British Military Hospital, Hong Kong are of British, Chinese or Nepalese origin. This paper compares perinatal data from these three groups of mothers and their babies, and in particular looks at the variations in perinatal mortality rates over the 10 year period 1976-1985. Mortality among the British babies has declined in a way similar to many areas of Britain. The Chinese have a very low perinatal mortality rate probably due to fewer preterm, multiple and abnormal births, but mortality has increased over the last 10 years and there is evidence that the rise may be due to changes in maternal health. The incidence of pregnancy associated hypertension has increased threefold among the Chinese. The Nepalese have a perinatal mortality similar to that of the British, much lower than that expected had they delivered in Nepal, and this probably reflects the application of modern obstetric care to these mothers. In all groups there has been a rise in instrumental deliveries but this is most marked among the Chinese in whom there has also been a significant increase in infants with low apgar scores. The Nepalese have the lowest incidence of forceps and operative deliveries and possible reasons for these differences are discussed.

Introduction

Perinatal mortality rates (stillbirths and first week deaths per 1000 total births) vary widely between different ethnic groups. In 1978 the rate for the Hong Kong Chinese was 12.2 compared with 16.0 in England and Wales and this difference has persisted¹. The perinatal mortality in Nepal is not accurately known but it would be expected to be higher than in more developed countries, amongst the most important factors being differences in maternal health, the incidence of preterm and multiple births and major congenital malformations². Variations in the standard and availability of obstetric and paediatric care will have a major effect on perinatal mortality and morbidity particularly in countries like Nepal where the problems of transportation mean that most of the population cannot reach medical help even if it were available. This variability in standard of medical services makes comparison of perinatal data between countries difficult to interpret.

The British Military Hospital, Hong Kong (BMH) delivers babies of several ethnic origins, most being British, Chinese or Nepalese. A number of Nepalese infants are also delivered in Gurkha Families Hospitals in the New Territories, Hong Kong, the criteria for delivery in these units being similar to those for GP confinements in UK. The antenatal care of these mothers is shared between BMH and their General Practitioner, usually a services medical officer attached to the Gurkha battalion. All problems are transferred to the hospital.

This study aimed to compare the perinatal data for the three major ethnic groups in BMH and to look at changes in perinatal mortality over the ten year period 1976-1985. Whether delivered in BMH or the Families Hospitals, these mothers and infants have all received similar standards of obstetric and paediatric care. This study therefore was a unique opportunity to compare

differences in perinatal outcome of three ethnic groups in whom the problem of variable maternity services has been minimised.

Method

Information was collected retrospectively on all deliveries in BMH from January 1976 to December 1985 inclusive, using the delivery books completed on the labour ward. Details included were maternal ethnic group, age and parity, gestation, birthweight, mode of delivery and apgar scores at 1 and 5 minutes. Complications of pregnancy and delivery, in particular antepartum and postpartum haemorrhage (estimated blood loss >500 mls), and raised blood pressure, were also recorded. High blood pressure was defined as either a resting booking pressure >140/90 mmHg which persisted, or as a rise in systolic pressure >30 mmHg or diastolic >15 mmHg above baseline reading. However, in the delivery books there were no details of the severity of or the time of onset of hypertension, and the maternal notes were not studied. All stillbirths and deaths in the first week of life were noted and further details of these were obtained from hospital annual reports, paediatric and obstetric notes and pathology records.

The numbers of infants delivered in the Gurkha Families Hospitals were recorded but further details of the deliveries or of the infants were not known unless the infant was transferred after birth. However, all primips were delivered in BMH as were all multiple births and deliveries with significant complications. All Caesarian sections were done in the hospital and instrumental delivery was rare in the Families Hospitals.

Over the ten year period, BMH delivered between 900 and 1200 babies a year with approximately another 200 to 400 Nepalese from the Gurkha Families hospitals. In any individual year the numbers in each ethnic group were small and comparisons therefore difficult. Five year moving averages were used to show trends³, the

data being grouped into years '76–80, '77–81, '78–82, '79–83, '80–84, '81–85. The calculated five year averages were plotted against the mid year in the group, i.e. '78, '79, '80, etc.

Results

Table 1 shows the yearly delivery rates for each of the ethnic groups. In all other tables and figures the results are shown as five year moving averages and the Nepalese data from BMH and the Gurkha Family Hospitals has been combined.

Figure 1 shows the changes in perinatal mortality for the three groups of infants. The British mortality rate has fallen steadily from 21.5 to 11.6 per 1000 total births. The Chinese have a lower mortality rate than that of the British but there has been a rise from 6.7 in '76–80 to 9.8 per 1000 total births in '81–85. The perinatal mortality of the Nepalese infants born in BMH is greater than the other two groups (24.2 in '76–80 and 20.0 in '81–85). However, if the low risk pregnancies from the Families Hospitals are included, the rate in '76–80 is lower than that of the British (14.0 per 1000 total births). Over the years there has been a less dramatic fall in the perinatal mortality of the Nepalese to 12.4 per 1000 total births by '81–85.

Table 2 gives the numbers of lethal congenital abnormalities in each of the groups. The Chinese have the lowest rate of these major malformations but this has been on the increase while that of the other two groups has decreased. The Nepalese have fewer lethal

increase in the Chinese. First week deaths have fallen in the British but have risen in the others.

Table 3 shows some of the differences between the groups of mothers. As there were no details of age or parity for the mothers who delivered outside BMH, analysis of these factors has not been included, but are reported for the Chinese and British elsewhere⁴. The age at which the mothers are having their first baby appears to be rising in the British and the Chinese as shown by the increase in the proportion of primips older than 24 years. Only about one fifth of the Nepalese primips are aged above 24, a much lower proportion than in the other groups, and this number is declining, suggesting that the Gurkha mothers are having their first babies at a younger age. There has been an increase in instrumental deliveries in all the groups although this is most marked in the Chinese, rising from 8.6 to 11% of all births. Even making allowances for a small number of forceps that may have occurred outside BMH the rate of instrumental deliveries in the Nepalese is very low compared with other groups. The Nepalese have a very low caesarian section rate but this has risen from 2.5% to 3.6% of total deliveries. The Chinese and British have an operation rate of around 5% which has not changed with time.

Table 4 gives some of the details of the infants. In all three groups the mean birthweight of full term babies has risen with the British remaining the heaviest. The number of small infants, whether analysed in terms of weight (more than two standard deviations below the mean) or gestation (less than 37 weeks), is lowest in the

Table 1
Numbers of deliveries in each of the ethnic groups for the years 1976 to 1985.

	'76	'77	'78	'79	'80	'81	'82	'83	'84	'85
British	276	259	284	310	218	285	267	286	232	221
Chinese	165	299	281	440	695	632	573	596	615	657
Nepalese BMH	371	348	370	354	331	306	362	310	378	329
GFH	370	234	259	218	289	273	207	191	188	187

BMH – British Military Hospital

GFH – Gurkha Family Hospitals

abnormalities than the British due, like the Chinese, to a low number of neural tube defects. If these abnormal infants are excluded the Chinese still have a much lower perinatal mortality rate than the other groups.

Changes in numbers of stillbirths (per 1000 total births) and first week deaths (per 1000 live births) are also shown in Table 2. Stillbirths have decreased among the British and Nepalese while there has been an

Chinese, and, as with the British, the proportion of these infants has fallen. In particular there has been a significant drop in the numbers of very low birthweight infants (<1500 grms). In the Nepalese there has been an increase in the number of small babies so that by '81–85 the proportion of these infants is similar to that of the British. The Nepalese however have a larger number of the very small babies (<1500 grms).

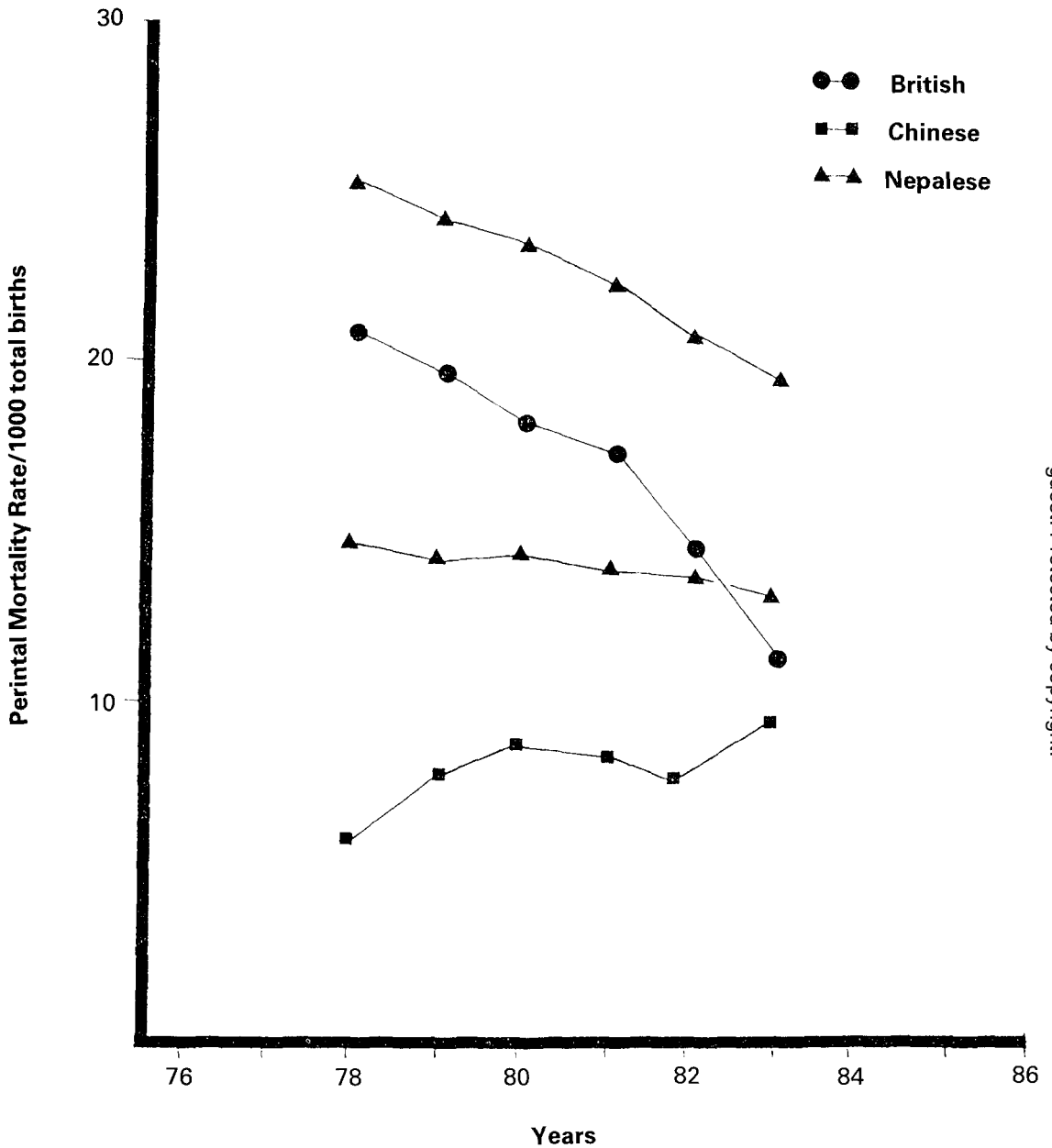


Fig. 1. Changes in perinatal mortality rates (per 1000 total births) for the three ethnic groups from 1976–1985. Figures are 5 year moving averages plotted against the mid year of the group.
Nepalese – Upper trace for infants delivered in BMH only
Lower trace includes deliveries from Gurkha Families Hospitals.

Table 2

Changes in lethal congenital abnormalities (per 1000 total births), stillbirths (per 1000 total births) and first week deaths (per 1000 live births) in each of the ethnic groups. Figures are 5 year moving averages over the 10 years 1976-1985.

	'76-'80	'77-'81	'78-'82	'79-'83	'80-'84	'81-'85
Lethal Congenital Abnormalities						
British	7.4	6.6	5.9	5.1	3.1	3.1
Chinese	1.1	1.0	1.1	1.0	1.6	2.3
Nepalese	4.1	4.4	4.0	4.2	3.9	2.6
Stillbirths						
British	11.1	10.3	10.3	9.5	7.0	4.6
Chinese	3.7	4.3	4.6	3.7	3.2	4.6
Nepalese	8.0	7.0	7.4	7.4	6.3	5.5
Neonatal Deaths						
British	10.5	9.7	8.1	8.9	7.8	7.8
Chinese	3.7	3.8	4.6	5.5	5.8	5.6
Nepalese	7.4	7.8	7.8	8.5	8.5	7.7

Table 3

Differences between the three ethnic groups of mothers. Figures are 5 year moving averages and include all the deliveries in BMH and the Gurkha Families Hospitals.

	'76-'80	'77-'81	'78-'82	'79-'83	'80-'84	'81-'85
Primips (%)						
British	45.9	45.2	45.3	44.7	45.1	45.2
Chinese	56.4	57.9	57.0	56.9	57.6	57.9
Nepalese	26.6	26.7	27.4	27.4	29.0	30.5
Proportion primips aged >25 yrs (%)						
British	46.8	50.0	50.1	52.4	52.4	53.0
Chinese	53.3	55.3	56.8	59.1	62.5	64.8
Nepalese	23.1	23.6	22.4	22.1	21.9	20.8
Instrumental delivery (%)						
British	6.9	6.8	7.1	7.0	8.1	7.9
Chinese	8.6	8.1	8.5	9.1	9.9	11.0
Nepalese	4.3	3.4	3.5	3.9	4.2	5.1
Caesarian Section (%)						
British	4.8	5.8	5.4	5.5	5.0	5.0
Chinese	5.1	5.4	5.3	5.2	5.3	4.7
Nepalese	2.5	3.0	3.2	3.5	3.5	3.6

Table 4

Details of the three groups of infants. Figures are 5 year moving averages and include all deliveries in BMH and the Gurkha Families Hospitals.

	'76-'80	'77-'81	'78-'82	'79-'83	'80-'84	'81-'85
Number						
British	1347	1356	1364	1366	1289	1291
Chinese	1880	2347	2621	2936	3111	3073
Nepalese	3144	2982	2969	2841	2835	2731
Mean Birthweight (grms)						
British	3369	3389	3407	3408	3426	3438
Chinese	3165	3184	3206	3230	3247	3253
Nepalese	3282	3294	3314	3318	3321	3334
Birthweight >2xSD below mean (%)						
British	4.9	4.7	4.5	4.5	4.3	4.3
Chinese	3.6	3.3	3.4	3.3	3.2	2.9
Nepalese	2.8	3.4	3.2	3.7	3.7	3.6
Birthweight <1500 grms (%)						
British	1.5	1.5	1.2	1.0	0.6	0.3
Chinese	0.5	0.4	0.5	0.5	0.4	0.3
Nepalese	1.2	1.4	1.3	1.2	1.0	1.0
Gestation <37 weeks (%)						
British	4.8	4.2	4.0	4.2	3.8	3.7
Chinese	3.1	2.7	3.0	3.0	2.6	2.6
Nepalese	3.3	3.6	3.5	3.9	3.8	3.8
Multiple Births (%)						
British	1.2	1.1	1.0	1.0	0.9	1.1
Chinese	0.6	0.6	0.7	0.6	0.5	0.6
Nepalese	0.8	1.0	0.9	1.0	1.1	0.9

(SD = Standard Deviation)

Some of the pregnancy related problems are shown in Table 5. These are analysed for the BMH deliveries only and may not be truly representative of the total Nepalese population in Hong Kong. The Chinese have the lowest incidence of raised blood pressure in pregnancy but the proportion has almost trebled in the past ten years, while in the other two groups there has been little change. The Nepalese have the highest incidence of low apgar scores but as only the BMH deliveries are included this may be an overestimate. The number of infants with low apgar scores has increased in all the groups but the most noticeable rise is in the Chinese from 3.2 to 4.9% of all deliveries.

Discussion

This study shows many differences between the three ethnic groups delivering in one hospital in Hong Kong

but care must be exercised in the interpretation of the results as the groups are not truly comparable. Also they do not represent the more general populations of their countries of origin and wider extrapolation of the data must be guarded.

The British mothers are wives of military personnel and also civilian expatriates employed by the Hong Kong Government. The former are skewed towards the lower socioeconomic groups while the latter over represent the upper professional categories. The Chinese are all local Hong Kong civilians who are Government employees. A wide range of socio-economic groups are represented but there are none from the poorer, and very few from the richer sections of the community. Wives of the Gurkha soldiers make up the Nepalese group. They come from a varied background but predominantly from villages throughout Nepal and the

Table 5

Comparison of pregnancy associated problems in the three ethnic groups. Figures are 5 year moving averages and are analysed for the BMH deliveries only.

	'76-'80	'77-'81	'78-'82	'79-'83	'80-'84	'81-'85
Raised Blood Pressure (%)						
British	1.5	1.8	1.2	1.5	1.9	2.0
Chinese	0.5	0.6	0.4	0.5	0.8	1.2
Nepalese	2.1	2.1	2.0	2.0	2.2	2.2
APH/PPH (%)						
British	5.3	5.7	4.8	4.0	4.3	3.9
Chinese	5.6	5.9	5.6	5.8	6.0	5.7
Nepalese	4.6	4.9	4.6	3.9	3.6	3.1
Apgar <5 at 1 minute (%)						
British	1.9	1.9	1.7	1.7	2.0	1.7
Chinese	1.7	1.9	1.8	2.2	2.4	2.7
Nepalese	2.9	2.8	2.5	2.8	3.3	3.5
Apgar <7 at 5 minutes (%)						
British	0.8	0.9	0.5	0.8	1.5	1.5
Chinese	1.5	1.7	1.5	1.7	2.0	2.2
Nepalese	1.9	1.9	1.5	1.6	1.8	1.8

APH = antepartum haemorrhage

PPH = postpartum haemorrhage

professional classes are not represented in the group. These mothers are also exposed to a way of life and to medical care which is totally different from that in Nepal. These limitations notwithstanding and with an awareness of the nature of the three groups, their differences and similarities, some speculation on the findings is justified, particularly since the same obstetric practice was delivered to all the mothers.

The good perinatal mortality figures of the Chinese are in part due to the low incidence of lethal congenital abnormalities, preterm delivery and multiple births. Many of the factors associated with preterm delivery and growth retardation are less common amongst the Chinese, in particular smoking, excess alcohol consumption, genital infections and teenage pregnancy^{5,6,7}. Raised blood pressure in pregnancy is associated with poor fetal outcome² and, as shown in this study, this is much less of a problem in the Chinese.

In Hong Kong as a whole the perinatal mortality rate has actually fallen from 12.2 in 1978 to 10.6 per 1000 total births in 1982¹, but there are no published figures for perinatal mortality amongst the different socio-economic groups in the colony. The birthrate in Hong Kong has fallen from 18 per 1000 in 1975 to 14 per 1000 in 1985⁸ and in part this may be due to increasing economic pressure on the family. The standard of living

in Hong Kong has been rising, but the cost is high. Both parents often have to work and, because mothers rapidly return to work after delivery, breast feeding is very uncommon. The Chinese women in Hong Kong no longer seem to lead a passive role in life, protected from the stresses of the outside world. The effect of this is unknown but could the rise in hypertensive disease in pregnancy seen in this study be related to changes in lifestyle and health of the mother? The Chinese delivering in BMH are predominantly from the skilled occupations, similar to British social class III, and it is possible that this group has been more affected by the socioeconomic changes in Hong Kong. Among the group in this study there has been an increase in the proportion of primips and a steady increase in the age of the mother when she has her first baby. Analysis of parity data⁴ has shown that in this particular group of Chinese there has been a significant fall in family size over the last 10 years. These changes may all be related to economic pressures.

The fall in British perinatal mortality is due in part to the decrease in lethal congenital abnormalities as a result of selective termination following early detection of malformations with better antenatal ultrasound and α -fetoprotein screening for neural tube defects. Stillbirths have also fallen, reflecting better antenatal

care and there has been a decrease in neonatal deaths along with fewer preterm infants, particularly the very small babies of birthweight <1500 grms. As in the Chinese group these mothers are having their first baby at an older age but parity data does not suggest any change in family size⁴.

Accurate figures are not available for the perinatal mortality in Nepal but the low rates in this study are surprising and probably reflect the effects of modern obstetric care on this population. The fall in perinatal mortality has been less marked than that of the British and although stillbirths have decreased there has been a rise in first week deaths along with an increase in small and preterm births. These changes may reflect the effects of the new lifestyle on women who are a long way from home and extended family and who are exposed to stresses for which they are ill prepared. The primips in this group are having their babies at an earlier age than in the others and this may have some influence on preterm delivery and perinatal mortality. The Nepalese have the highest incidence of raised blood pressure in pregnancy which may be a marker of maternal health.

The rise in instrumental deliveries amongst the Chinese may be a reflection of relative disproportion between increasing birthweight and a small maternal pelvis. There is no hard evidence for this theory, but some obstetricians in Hong Kong have commented on an apparent increase in forceps and difficult deliveries amongst Chinese⁸. Any increase in pelvic disproportion may explain the rising incidence in lower apgar scores in the Chinese infants. Birth asphyxia is a major determinant in neonatal death^{9,10}.

In all groups the caesarian section rates were low. This may reflect the fact that, with no middle grade staff, all decisions were made by an experienced consultant. All "at risk" pregnancies had continuous electronic monitoring and in most cases previous sections were allowed a trial of scar. Repeat operation is a major contributor to the section rate in UK and North America¹¹. The low section rate amongst the Nepalese may have been because few of them were repeats – a mother whose previous children were born in Nepal was unlikely to have had a caesarian section. Many other factors affect the section rate – number of pregnancies monitored, breech presentation and cephalopelvic disproportion – but these did not differ between the groups. Medicolegal considerations are becoming an increasingly important factor, particularly in USA but also in UK¹¹.

The Nepalese will return to the hills of Nepal and often have further babies far away from adequate obstetric care. There is a natural wish to avoid sending them back with a scar in their uterus. This has not prevented necessary sections being done but might make the obstetrician wait until the indications are certain. If necessary operations were not being done then it might be expected that the forceps rate would be high because of problems in labour but in this study the Nepalese also had the lowest incidence of instrumental delivery. Despite the low rate of interference in labour the outcome for the Nepalese infants in terms of mortality and morbidity was similar to that of the British in whom the section and instrumental delivery rates were higher.

As already discussed care must be exercised in comparing these three groups with each other and with the general populations of their countries of origin. There are many interesting differences which may partly explain the trends in perinatal mortality of the groups but further larger studies would be needed to determine if these reflect true changes in the population as a whole.

REFERENCES

1. LAU S P and FUNG K P. Ethnic variables in perinatal mortality rates. *Lancet* 1984; **ii**: 402.
2. CHAMBERLAIN G. Background to perinatal health. *Lancet* 1979; **ii**: 1061–3.
3. OWEN F and JONES R. Statistics 2nd edition. Polytech Publishers Ltd., Stockport UK. 1982; 101–3.
4. LYON A J. Trends in perinatal mortality of British and Chinese infants delivered in the British Military Hospital, Hong Kong, 1976–1985. *Hong Kong J Paediatr* 1987; **4**: 20–27.
5. CHALMERS K. Shanghai. *Lancet* 1980; **i**: 137–9.
6. BEISCHER N A and LIANG S T. A glimpse at Chinese obstetrics 1984 – why do the Chinese have a low incidence of prematurity? *Aust NZ J Obstet Gynaecol* 1984; **24**: 233–4.
7. LAU S P. Birthweight distribution of liveborn infants in Hong Kong. *Aust NZ J Obstet Gynaecol* 1984; **24**: 235.
8. DAVIES D P. Personal communication.
9. HONG KONG YEAR BOOK 1986. Hong Kong Government Publishers.
10. LAU S P, *et al*. Major determinants of neonatal mortality in Hong Kong. *Hong Kong J Paediatr* 1984; **1**: 22–9.
11. KENNEDY R and PATEL N. The significance of increasing caesarian section rates. *Br J Hosp Med* 1986; **36**: 336–41.