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Caesarean Section Rates in South Africa: evidence of bias among different ‘population groups’

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Abstract

Objective—The aim of this study was to assess the effect of ‘population group’ classification, as a specific instance of ‘racial’ categorization, on caesarean section rates in South Africa.

Design—Information on ‘population group’ classification (‘Black’, ‘Coloured’, ‘Indian’ or ‘White’, as defined under apartheid legislation) and place of delivery, together with basic obstetric, sociodemographic and perinatal data, were extracted from the birth notification forms of 5456 children who made up the birth cohort of the Birth to Ten longitudinal study. This cohort included all births that occurred to mothers resident in Soweto-Johannesburg during a 7-week period in 1990.

Results—After accounting for differences in maternal age, gravidity, birth weight and gestational age at delivery, the rate of caesarean sections at private facilities was more than twice that at public facilities. Although there were significant differences in the utilisation of private facilities by women from different ‘population groups’, there was an independent effect of ‘population group’ classification on caesarean section rates: caesarean section rates among women classified as ‘White’ and ‘Coloured’ were significantly higher (95% confidence intervals for odds ratios: 1.40–2.42 and 1.05–1.81, respectively) than among women classified as ‘Black’.

Conclusion—‘Population group’ differences in caesarean section rates among South African women are not explained by differences in demographic risk factors for assisted delivery, nor by differences in access to private health care. Instead, the differences in section rates may reflect the effect of bias in clinical decision-making, and/or differences among women from different ‘population groups’ in their attitude towards assisted delivery, and their capacity to negotiate with clinicians.

Keywords

Caesarean section; race; South Africa

INTRODUCTION

'Racial' explanations for social disparities in health have often been criticized¹ because there are no genetically distinct human subspecies that can be classified as separate 'races'.² Nevertheless, there remain substantial disparities in health between different groups of people classified using traditional 'racial' criteria (such as skin colour).³ To some extent, these disparities in health can be explained by socioeconomic differences between different 'racial' groups:^{3,4} if poverty predisposes people classified in certain 'races' to live in less healthy environments, with less healthy lifestyles, and limited access to health care, then it seems plausible that poverty alone might explain the relationship between 'race' and ill-health. However, this explanation ignores the underlying, historical cause of socioeconomic differences between different 'racial' groups.^{5,6} These differences result from racism and ethnic discrimination which influence access to society's resources and the 'allocation of social position'.³

In fact, there is growing evidence that discrimination might also have a direct effect on the health and health care of different 'racial' groups, because poverty alone cannot explain the differences in health observed among different 'racial' groups.^{4,7} For example, there are clear differences in caesarean section rates between women from different 'racial' groups, irrespective of their socioeconomic and medical characteristics.⁸⁻¹¹ In fact, caesarean section rates provide an ideal opportunity for identifying bias in medical decision-making, because a variety of nonclinical factors, including 'race', have been found to influence the prevalence of caesarean sections at different health facilities¹²⁻¹⁵ and among different physicians.^{16,17}

The aim of the present study was to examine differences in caesarean section rates within South Africa, where the population was categorized into four 'population groups' ('Black', 'Coloured', 'Indian' and 'White') under the 1950 Population Registration Act (repealed in 1992). These categories were used to formalize social and political discrimination under apartheid and created a social hierarchy of 'population groups' ('Black' < 'Coloured' < 'Indian' < 'White') with unequal access to education, employment, land tenure and health care.¹⁸ Differences in health status between these groups remain pronounced, and they are strongly associated with differences in socioeconomic status and environmental conditions within each of the different areas traditionally 'reserved' for the four 'population groups' under the 1950 Group Areas Act (repealed in 1991). Indeed, it has been argued that 'population group' categories should not be used in health research, because they reinforce erroneous 'racial' explanations of aetiology and perpetuate the 'racially structured' view of South Africa created by apartheid.¹ However, the use of 'population group' in the present study is justified because it is used specifically to assess whether formalized discrimination and institutionalized racism influenced caesarean section rates.

METHODS

The present analyses were conducted using archived data from the birth notification forms of 5456 children who made up the birth cohort of the Birth to Ten longitudinal study.¹⁹ This cohort included all births that occurred to mothers resident in Soweto-Johannesburg during a 7-week period from 23 April to 8 June 1990.²⁰ As Birth to Ten is a cohort of all children born during this period, it does not contain equal numbers of children from each 'population group'. Instead, the cohort reflects the population of the Soweto-Johannesburg metropole, which contains different proportions of individuals from each of the four 'population groups'.²⁰

Information on the date and place of birth, gestational age at delivery, birth weight, sex and mode of delivery for each of these children was transcribed from the official notification forms, together with their mother's age, gravidity and 'population group' classification. Birth notification was a requirement in the Soweto-Johannesburg area under a Local Government Ordinance, according to which, a birth notification form must be completed by delivery personnel for all deliveries and sent to the local authority for compilation. Every effort was made to ensure that all births that occurred, including a small number that were not notified,^{19,20} were included in the final database. Cases that were missing essential information were excluded from the study ($n = 154$) as were deliveries that took place at home ($n = 19$). The final number of births examined in the present study was 5283, which included live births, stillbirths and perinatal deaths.

Chi-square analyses and logistic regression models were used to identify factors that were significantly associated with an increased risk of caesarean delivery.²¹ Ethical permission for the Birth to Ten study was obtained through a Human Subjects Clearance issued by the University of the Witwatersrand.

RESULTS

Seventy-four per cent of the mothers examined in the present study were classified as 'Black', 12% as 'White', 10% as 'Coloured' and 3% as 'Indian'. The majority (85%) of these mothers delivered their babies in public delivery facilities while only 15% gave birth at private delivery facilities (see Table 1). However, more of the women classified as 'White' and 'Indian' delivered their babies in private facilities (55% and 78%, respectively), while most of the women classified as 'Black' and 'Coloured' delivered their babies at public facilities (95% and 75%, respectively). Significantly more of the deliveries at public facilities resulted in stillbirths or perinatal deaths (226 of 4468 deliveries—5%) than those which took place at private facilities (23 of 815 deliveries—3%; $\chi^2 = 7.67$, $p < 0.006$). A disproportionate number of stillbirths and perinatal deaths were delivered vaginally than by caesarean section, although the proportion of stillbirths and perinatal deaths delivered vaginally was slightly higher at public delivery facilities (87.2% normal vertex deliveries (NVD)) than at private facilities (73.9% NVD), (see Table 2).

Overall, 88% of births were vaginal deliveries, whether or not these were assisted by other procedures such as vacuum extraction or forceps (see Table 3). Twelve per cent of the infants were delivered by caesarean sections, elective and emergency procedures combined. There was a tendency towards a decline in deliveries, particularly caesarean deliveries, at weekends compared to weekdays at both private and public delivery facilities (see Figure 1). This decline was not accounted for by inadequate or incomplete reports of deliveries conducted at different times of the week. However, the caesarean section rates in private delivery facilities were, on average, more than double those at the public facilities both on weekdays and at weekends (see Figure 2). Indeed, the overall section rate was significantly higher in private delivery facilities (25%) than at public delivery facilities (10%; $\chi^2 = 169.16$, $p < 0.001$).

Using multiple logistic regression models (see Table 4), it was possible to establish that, relative to a baseline birth weight of between 2500 and 3999 g, mothers with low (1500-2500 g) and very low birthweight (<1500 g) babies were significantly more likely to have a caesarean delivery, as were mothers with macrosomic infants weighing 4000 g or more. There was no significant effect of gestational age at delivery on caesarean section rate. However, maternal age and gravidity were both significantly associated with caesarean section rates: older mothers were more likely to have a caesarean delivery, while there was a reduced risk of caesarean section with increasing gravidity.

Even after accounting for the effects of birthweight, gestational age at delivery, maternal age and gravidity, the section rates observed at private facilities were more than twice those at public facilities (odds ratio (OR) = 2.34; 95% confidence interval 1.81–3.02). There was also a significant independent effect of ‘population group’ membership: caesarean section rates among women classified as ‘White’ and ‘Coloured’ were substantially higher than among women classified as ‘Black’. In particular, women classified as ‘White’ were almost twice as likely to deliver by caesarean section as were those classified as ‘Black’ (OR = 1.84; 95% confidence interval 1.40–2.42). There was no significant difference in section rate between women classified as ‘Indian’ and those classified as ‘Black’, although the small proportion of ‘Indian’ mothers within the population as a whole provided too small a sample to assess confidently any statistical difference in section rates. Additional models were fitted to determine whether there was a ‘population group’ by place of delivery interaction, but there was no statistical evidence of such an effect.

DISCUSSION

The patterns of health care utilisation observed in the present study clearly illustrate the social and economic disparities in access to health care which accompanied ‘population group’ classification under apartheid.¹⁸ More women classified as ‘White’ and ‘Indian’ delivered in private facilities than in public hospitals, while the overwhelming majority of women classified as ‘Black’ and ‘Coloured’ gave birth to their babies in public facilities. The higher rates of perinatal death observed among women attending public hospitals probably reflects the impact of poorer environmental and socioeconomic conditions on the obstetric outcomes experienced by these women. However, the higher incidence of perinatal death might also reflect the poorer quality of care available, not only within the public sector as a whole, but more specifically at the inferior public facilities traditionally ‘reserved’ for ‘Black’ and ‘Coloured’ ‘population groups’.²²

The overall prevalence of caesarean sections observed in this study (12%) is similar to that recorded in the USA during the mid-1970s¹⁴ and the moderate caesarean section rates observed in European countries during the mid-1980s.²³ However, the overall section rate obscures the disparity in the number of caesarean sections performed at public and private facilities catering for women from different ‘population groups’. In particular, the high prevalence of caesarean deliveries among women classified as ‘White’ who delivered at private clinics (35%) exceeds that recorded in Brazil, where the increasing rate of caesarean sections has been described as an epidemic.²⁴ Price and Broomberg²⁵ have previously reported high rates of caesarean sections (28.7%) among ‘White’ South African women delivering babies in the private sector. In their study, the elevated rates could not wholly be explained by medically relevant factors. They suggested that fee-for-service reimbursement of doctors might have led to an increase in medical intervention during delivery, and thereby an increase in section rates.²⁵

A variety of known risk factors (maternal age, gravidity and birth weight) were significantly associated with caesarean section rates among the women examined in the present study. These findings suggest that some of the sections conducted on pregnant women in Soweto-Johannesburg were probably justified on medical grounds. According to Haynes de Regt¹⁶ there is considerable consensus regarding the indications for caesarean delivery, which include: dystocia, malpresentation and previous caesarean delivery. As these conditions are more prevalent among older women, primigravida and high multigravida, the significant associations between these risk factors and section rates observed among South African women in the present study appear to reflect the patterns of assisted delivery observed elsewhere.^{14,26} Likewise, mothers of high birth weight babies, like those in South Africa, have previously been shown to be at increased risk of caesarean section,²⁶ while the

elevated section rate observed among mothers delivering low and very low birth weight babies might reflect an increase in medical intervention that accompanies the higher incidence of fetal distress in smaller babies.

Identifying the importance of established risk factors for caesarean section among women in Soweto-Johannesburg indicates that the decision to conduct a proportion of these caesarean sections was probably based on clinically relevant factors. However, there remains substantial evidence that caesarean section rates were also influenced by non-medical and potentially inappropriate factors. For example, there was clearly an uneven distribution in the proportion of sections conducted during the week and at weekends. This phenomenon has been observed in a number of other countries²⁷ and is largely ascribed to the practice of scheduling elective caesareans at the most convenient times.¹² Although this would not necessarily mean that inappropriate care was being provided, it is possible that the weekday-weekend differences in caesarean section rates observed in the present study reflect the impact of non-medical factors on the decision to conduct emergency caesarean sections. Indeed, Price and Broomberg²⁵ argued that only a quarter of the excess caesareans they observed during weekdays could be accounted for by elective procedures.

Stronger evidence that non-clinical factors influenced caesarean section rates was provided by the higher rates observed within the private sector, even after accounting for differences in birthweight, maternal age and gravidity. Again, similar disparities in section rates between private and public facilities have been found in a number of countries throughout the world, including the USA.¹²⁻¹⁶ Australia²⁶ and Brazil.²⁴ Although one explanation of this phenomenon is that private physicians are performing unnecessary procedures to earn more money. Sakala²³ has described a variety of other reasons why private physicians might be more likely to conduct caesarean sections. For example, private physicians may have greater scheduling pressures, and greater freedom to intervene during delivery than their colleagues in the public sector. They may also develop stronger relationships with their clients and be more likely to make use of technology-intensive procedures in the belief that they provide the safest and highest quality care with the lowest risk of subsequent litigation.²³ Certainly, recent surveys of South African gynaecologists suggest that fear of litigation and the desire for safer deliveries are the primary reasons for conducting non-essential caesarean sections.^{28,29}

The quality of health care available within South Africa's previously segregated public hospital system often reflected the inequitous distribution of State resources under apartheid legislation,²² and it is therefore not surprising that section rates differed between the public delivery facilities reserved for each 'population group'. However, the differences in caesarean section rates between these groups were still evident among women sharing very similar, if not the same, private facilities. This observation suggests that 'population group', irrespective of medical indications or ability-to-pay, influenced the decision to conduct caesarean sections among women in Soweto-Johannesburg.³⁰ Whilst this provides strong evidence of bias in clinical decision-making,⁴ the inextricable association between 'population group' and social class,³¹ which in South Africa was reinforced by the social engineering conducted under apartheid,³² provides an alternative explanation for this phenomenon. Indeed, while a number of studies purport to show 'racial' bias in caesarean section rates among 'White' and 'Non-white' American women⁸⁻¹⁰ the observation of differences in caesarean section rates among 'White' women from different social classes delivering within the British National Health Service¹¹ illustrates how differences in class, irrespective of 'race', appear to influence the decision to conduct a caesarean section even within a health system that aims to treat everyone equally.

Why do differences in caesarean section rates occur between women from different classes, different 'races' and, in South Africa, different 'population groups'? Two interacting processes are at work: the clinician's decision to intervene during childbirth and each woman's attitude towards assisted delivery.²³ Because 'poor black patients are openly regarded as objects of scorn'³³ by clinicians working in modern hospitals, then it would not be surprising if traditional stereotypes continue to reinforce the 'popular European belief that African women give birth easily'.³⁴ To what extent these beliefs and attitudes influence modern clinical decision-making remains unclear, particularly because the decision to intervene during labour is also influenced by two maternal characteristics: (i) their attitude towards surgery and assisted labour,³⁵ and (ii) their ability to negotiate with clinicians (who are usually from highly selected social groups).³⁶ Differences in these characteristics between mothers from different social classes, 'races' and 'population groups' might therefore create differences in caesarean section rates that are misattributed to bias in clinical decision-making.²³

Irrespective of the specific cause, the clear evidence of bias in caesarean section rates among South Africa's different 'population groups' poses two important questions that clinicians need to address: to what extent does the 'population group' of a patient influence a clinician's decision to conduct a caesarean section, and to what extent do differences in the attitudes of women from different 'population groups' influence their preference for caesarean sections and their ability to negotiate with clinicians? If the 'population group' of a patient influences a doctor's decision to conduct a caesarean section, then obstetricians and gynaecologists need to reconsider whether they are providing appropriate medical care by over-servicing women from some 'population groups' and/or under-servicing those from others. If, instead, differences in maternal attitudes towards caesarean sections, and their ability to negotiate preferred options, influence the decision to conduct caesarean sections, then health care professionals need to ensure that women from all 'population groups' understand the relative risks and benefits of assisted delivery, and need to empower all women to make informed decisions regarding the type of care they receive.

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FIGURE 1.
Caesarean sections and normal vertex deliveries (NVD) at private and public delivery facilities by day of the week.

FIGURE 2.
Caesarean sections as a proportion of all deliveries at public and private delivery facilities by day of the week.

TABLE 1

Differences between 'population groups' in the use of private and public facilities

'Population group'	Private, <i>n</i> (%)	Public, <i>n</i> (%)	Total, <i>n</i>
'Black'	184 (4.7)	3738 (95.3)	3922
'Coloured'	130 (24.6)	399 (75.4)	529
'White'	361 (55.3)	291 (44.7)	652
'Indian'	140 (77.8)	40 (22.2)	180

TABLE 2

Stillbirths and perinatal deaths following caesarean sections and normal vertex deliveries (NVD) at private and public facilities

	Private, <i>n</i> (%)	Public, <i>n</i> (%)
Total deliveries	815 (15)	4468 (85)
Total deaths	23 (3)	226 (5)

	Private, <i>n</i>		Public, <i>n</i>	
Type of death	Caesarean	NVD	Caesarean	NVD
Stillbirth	3	6	12	68
Perinatal	3	11	17	129

TABLE 3

The relative proportion of caesarean sections and normal vertex deliveries (NVD) within each 'population group' at private and public delivery facilities

'Population group'	Private, <i>n</i> (%)		Public, <i>n</i> (%)	
	Caesarean	NVD	Caesarean	NVD
'Black'	34 (18)	150 (82)	327 (9)	3411 (91)
'Coloured'	30 (23)	100 (77)	47 (12)	352 (88)
'White'	125 (35)	236 (65)	48 (17)	243 (83)
'Indian'	20 (14)	120 (86)	4 (10)	36 (90)

TABLE 4

Odds ratios (OR) (95% CIs) for caesarean section among mothers from different 'population groups' at private and public delivery facilities, after controlling for maternal age, gravidity and birth weight

	OR	(95% CI)
Public delivery facility	1.00	
Private delivery facility	2.34	(1.81 3.02) ^d
'Black'	1.00	
'Indian'	0.78	(0.48 1.27) ^a
'Coloured'	1.38	(1.05 1.81) ^b
'White'	1.84	(1.40 2.42) ^d
Maternal age	1.00	
Maternal age + 10 years	1.74	(1.48 2.05) ^d
Gravidity 2 +	1.00	
Gravidity 1	1.39	(1.12 1.73) ^c
Birth weight ≥ 2500 g	1.00	
Birth weight < 2500 g	1.35	(1.04 1.72) ^b

^aNot statistically significant

^b $p < 0.05$

^c $p < 0.01$

^d $p < 0.001$.