

General practitioner obstetrics: does risk prediction work?

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SUMMARY. *The effectiveness of antenatal risk prediction based on maternal characteristics at booking was examined among 5730 pregnant women booked in an integrated general practitioner obstetric unit over a seven-year period. High rates of transfer to consultant care were found especially for nulliparae. Apart from parity, maternal factors associated with transfer before labour were weight, smoking and social class. Factors associated with transfer in labour were maternal stature and marital status. Reasons for transfer were also identified. The validity of the present booking criteria, which were developed in the 1950s, is questioned.*

Introduction

GENERAL practitioner obstetrics, once the cornerstone of family practice in the United Kingdom, has progressively declined in the second half of the twentieth century and by 1985, only 10.7% of women in England and Wales¹ were delivered in the care of their own doctors. In 1985 Marsh reported that only 25% of general practitioners in the northern region of England were involved in the provision of intranatal care.² One of the reasons for this decline has been the apparent disenchantment of general practitioners with practical obstetrics.³ This attitude is difficult to understand because a high proportion of vocationally trained new entrants into general practice have held a postgraduate appointment in obstetrics and gynaecology and have also acquired the Diploma of the Royal College of Obstetricians and Gynaecologists. In spite of these qualifications, fewer general practitioners have continued to employ their acquired obstetric skills except for antenatal and postnatal care of patients. This may be due to the present day training bias towards high technology obstetrics in hospitals and to the absence of low risk obstetric training for general practice.

The decline in general practitioner obstetrics would not matter if general practitioner obstetric care did not have something positive to offer to women or if there were no demand for it. However, Klein and colleagues have demonstrated that general practitioner care for low risk women has definite advantages^{4,5} and also that there is still a demand from women for this style of care.⁶ The safety of general practitioner obstetrics in terms of neonatal outcome has been clearly demonstrated both in integrated as well as in isolated general practitioner units.⁷⁻¹⁰

In selecting women suitable for general practitioner care, the definition of 'low risk' is of central importance. The traditional criteria for patients booked for isolated general practitioner units and home confinements — height greater than 152 cm, age of

nulliparae less than 30 years, age of multiparae less than 35 years and with less than four children, and normal medical and obstetric history — were proposed by the Cranbrook committee report of 1959¹¹ and were based on the findings of the maternal mortality report of 1952-54.¹² The validity of these criteria 30 years later when maternal mortality is an extreme rarity and when most general practitioner obstetrics takes place in integrated hospital settings is debatable. It is also questionable what relevance these criteria have to perinatal mortality and morbidity levels of the 1980s.

Despite the general application of these booking criteria, high transfer rates from general practice to consultant care before and during labour have repeatedly been reported,^{10,13} the rates being as high as 50% for nulliparae and 15% for multiparae. The much higher transfer rates for nulliparae reflect the fact that nulliparae are more at risk of certain complications, for example toxæmia and dystocia. Some authors have suggested that nulliparae should not be booked for general practitioner care at all.^{14,15}

Against this background, the purpose of this study was to examine the relationship between maternal characteristics evident at booking and transfer patterns. Our aim was to determine whether the selection of women suitable for delivery in general practitioner maternity units can or should be improved.

Method

The records of the 38 980 women who delivered at the John Radcliffe Hospital, Oxford, between 1978 and 1984 were analysed. Of these, 5730 (14.7%) were booked for delivery in the general practitioner unit at the hospital. About 3% of all general practitioner bookings were home confinements and these are not included in the study.

The John Radcliffe Hospital serves the city of Oxford and the surrounding rural area which together form the Oxford health district. It is also a major referral centre for the Oxford region. During the study period, 25% of women delivering at the John Radcliffe Hospital lived in Oxford itself, 66% resided in the rest of the health district and 9% were referred from outside the normal catchment area (mainly for high risk reasons). General practitioners using the general practitioner unit must practice within 12 km of the John Radcliffe Hospital; therefore all patients delivering at the unit live within the Oxford health district, the majority in Oxford itself. Just over 42% of maternities in Oxford and 6.5% of maternities in the health district were booked for delivery at the general practitioner unit.

The organization of the general practitioner unit has been described by Bull.⁷ The booking criteria used are generally those listed previously but they are applied with some flexibility. Women not using the general practitioner unit are booked for consultant delivery and their antenatal and postnatal care is shared between their general practitioner and the hospital antenatal clinic.

The data used in the study came from the Oxford obstetric data system, which routinely records detailed information abstracted from patient records for all maternities. Coding is by trained staff with supervision by a senior physician. The data are subjected to rigorous error checks for both accuracy and completeness. (Full details available from the authors on request.) The data were analysed using a specially written computer package.

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The chi-square test was used for comparison between rates and the t-test for comparison between means. The odds ratio was used to estimate relative risk.

Results

Maternal characteristics

As expected from the booking criteria, women booked in the general practitioner unit were younger and taller than women booked for shared care (Table 1). However, they were also more likely to be nulliparous, to weigh less at booking and to book earlier. There were no differences in smoking behaviour between the two groups.

There was only one noticeable trend in maternal characteristics over the study period. The proportion of women aged 30 years or more increased from 12.6% to 22.5% for women booked at the general practitioner unit and from 27.4% to 32.9% for women booked for shared care.

Table 1. Characteristics of women booked at the general practitioner unit (GPU) and for shared care, 1978–84.

	Percentage of women	
	GPU (n = 5730)	Shared care (n = 33 250)
Age (years)		
<20	8.9	7.3
20–29	72.1	62.4
>29	19.0	30.3
Parity		
Nulliparous	46.2	43.0
Marital status		
Married	88.8	90.7
Height (cm)		
<156	9.8	16.7
156–167	68.3	65.2
>167	21.9	18.1
Booking weight (kg)		
<55	24.0	20.4
55–70	60.6	58.5
>70	15.4	21.1
Social class		
1,2	34.2	35.2
3	37.5	38.4
4,5	18.9	16.1
Unclassified	9.4	10.3
Gestation at booking^a		
<16 weeks	69.1	45.4

n = number of women. Where results were missing, percentages are based on a number smaller than the total. ^aFor 1981–84. Note: because of the very large sample size the significance of the difference between GPU and shared care is less than 0.001 for all characteristics.

Factors associated with transfer of care

The most important factor associated with transfer from care in the general practitioner unit to shared care, both in the antenatal period and in labour, was nulliparity. The transfer rate before labour was 30.1% for nulliparae compared with 13.7% for multiparae (relative risk 2.7; 95% confidence limits 2.4, 3.1), while the transfer rate in labour was 29.6% for nulliparae compared with 5.0% for multiparae, (relative risk 8.0; 95% confidence limits 6.6, 9.7). Transfer in labour includes transfer within 24 hours of spontaneous rupture of membranes. Overall, 50.6% of booked nulliparae and 18.0% of multiparae were transferred either before or during labour.

Maternal factors other than parity associated with antenatal transfer are shown in Table 2. For both nulliparae and multiparae, smoking, weighing more than 70 kg at booking and lower social class were significantly associated with increased rates of antenatal transfer. Short stature and an age of less than 20 years were significant only for nulliparae, while being unmarried was significant only for multiparae. The only factors significantly associated with transfer in labour were short stature (multiparae $P < 0.05$, nulliparae $P < 0.01$), and unmarried status (multiparae $P < 0.01$, nulliparae $P < 0.05$).

The transfer rate among nulliparae with none of these adverse characteristics was calculated. Nulliparae weighing less than 71 kg at booking who were more than 156 cm tall, aged between 20 and 34 years, non-smokers, married, and with a husband in employment, had a transfer rate before labour of 24.8% (compared with 30.1% for all nulliparae) and a transfer rate in labour of 27.7% (compared with 29.6% for all nulliparae).

Reasons for transfer of care, 1981–1984

The reasons for transfer of care were only available from 1981. There were no major changes in the reasons for transfer before or during labour over the period 1981–84. Among women

Table 2. Maternal characteristics associated with antenatal transfer rate among women booked at the general practitioner unit, 1978–84.

	Nulliparae		Multiparae	
	n	Percent- age transferred	n	Percent- age transferred
Overall	2646	30.1	3084	13.7
Booking weight (kg)				
<55	589	29.4	658	12.3
55–70	1476	28.2	1669	12.9
>70	349	40.7	451	17.3
		$P < 0.001$		$P < 0.05$
Smoking (no. of cigarettes per day)				
0	1826	28.7	2142	12.4
1–10	397	30.2	378	16.7
>10	282	37.2	446	17.3
		$P < 0.02$		$P < 0.01$
Social class				
1 and 2	813	23.6	999	11.9
3	913	33.6	1075	13.3
4 and 5	392	33.9	611	14.6
Unclassified	271	30.6	225	18.7
		$P < 0.01$		$P < 0.05$
Age (years)				
<20	412	35.4	98	19.4
20–29	2055	29.1	2074	13.5
>29	179	29.6	912	13.8
		$P < 0.05$		NS
Marital status				
Married	2206	29.4	2872	13.2
Unmarried	433	33.5	209	21.1
		NS		$P < 0.01$
Height (cm)				
<156	176	35.2	350	14.0
156–167	1726	31.1	1946	14.3
>167	583	25.7	597	13.2
		$P < 0.02$		NS

NS = not significant. Note: numbers do not always add to total because of missing results. n = number of women in group.

transferred before labour (Table 3) hypertension and high fetal head at term were more common indications among nulliparae than multiparae, whereas malpresentation, postmaturity and antepartum bleeding were more common among multiparae. Among those transferred in labour (Table 4) delay in the first and second stage of labour were more common indications among nulliparae than multiparae, while requests for epidural analgesia, and malpresentation were more common among multiparae.

Several associations between maternal characteristics and reason for transfer before labour were found. The rate of transfer for hypertension was significantly higher among women weighing more than 70 kg at booking than among lighter women (34.8% versus 25.3%, $P < 0.05$). For women smoking more than 10 cigarettes per day, the rate of transfer for concern about the

fetus was significantly higher than the rate in women smoking less than 10 cigarettes per day (18.9% versus 6.7%, $P < 0.001$). The rate of transfer for postmaturity was significantly higher among non-smokers than smokers (8.8% versus 4.8%, $P < 0.05$).

Management of labour and mode of delivery

It is clear from Table 5 that management of labour is quite different for women booked at the general practitioner unit compared with those booked for shared care, with less use of induction, augmentation of labour and epidural analgesia and much less electronic fetal monitoring among the former. These differences are greatly magnified when women delivered in the general practitioner unit are compared with those delivered in the consultant unit. Of necessity, women transferred both antenatally and in labour undergo a very high rate of obstetric intervention.

Table 5 also shows differences between the groups in mode of delivery. The proportion of women booked for shared care delivering by Caesarean section was over twice that of women booked at the general practitioner unit.

Table 3. Indications for transfer of care before labour for women booked at the general practitioner unit (GPU), 1981–84.

Indication for transfer	Percentage of all women booked at GPU (n = 3386) ^a	Percentage of women transferred by parity	
		Nulliparae (n = 457)	Multiparae (n = 232)
Raised blood pressure	5.5	32.9	16.0
Breech/ malpresentation	2.2	9.7	13.8
Postmaturity	2.2	9.2	13.4
Antepartum haemorrhage	2.0	8.8	12.1
IUGR, fetal concern	1.7	8.1	9.5
Threatened premature labour, PROM	1.3	7.0	5.5
High fetal head at term	1.1	7.5	1.7
Multiple pregnancy	0.7	2.0	6.9
Other ^b	3.5	14.8	21.1
Total	20.3	100.0	100.0

n = number of women. IUGR = intrauterine growth retardation. PROM = premature rupture of membranes. ^a1571 nulliparae, 1815 multiparae. ^bIncludes abdominal pain, urinary tract infection and miscellaneous maternal problems.

Table 4. Indications for transfer in labour for women admitted to the general practitioner unit (GPU), 1981–84.

Indication for transfer	Percentage of all women admitted to GPU (n = 2697) ^a	Percentage of women transferred by parity	
		Nulliparae (n = 332)	Multiparae (n = 70)
1st stage delay	4.4	32.8	14.3
2nd stage delay	3.2	22.6	14.3
Epidural analgesia requested	2.0	12.4	17.1
Premature labour	1.3	8.1	12.9
Fetal distress	1.3	8.7	10.0
Malpresentation	0.9	4.8	12.9
Disproportion	0.3	2.4	0.0
Haemorrhage	0.2	0.6	4.2
Other ^b	1.3	7.5	14.3
Total	14.9	100.0	100.0

n = number of women. ^a1114 nulliparae, 1583 multiparae. ^bIncludes premature rupture of membranes, hypertension, pyrexia and so on.

Table 5. Management of labour and mode of delivery by transfer and booking, 1981–84.

	Percentage of women				
	Delivered in GPU (n = 2295)	Antenatal transfer (n = 689)	Transfer in labour (n = 402)	All GPU bookings (n = 3386)	All shared care bookings (n = 13 394)
<i>Management of labour</i>					
<i>Electronic fetal monitoring</i>					
Induction	8.4	77.2	74.2	29.7	57.6
Augmentation	7.9	31.6	57.6	18.7	22.4
Epidural analgesia	0.8	42.0	64.3	16.8	27.2
<i>Mode of delivery</i>					
Spontaneous	97.2	60.5	39.5	82.6	72.3
Forceps	2.6	16.9	45.2	10.7	13.5
Caesarian section	—	16.2	11.9	4.8	11.8
Vaginal breech	0.2	6.4	3.4	1.9	2.4

n = number of women.

Discussion

One of the central questions that needs to be answered in any study of risk prediction and patient selection is 'What does risk prediction do?' Does it actually predict outcome? The results of this study demonstrate some relationship between booking criteria and delivery by Caesarean section, but few other associations between booking criteria and outcome as measured by transfer before and during labour.

The booking criteria identify women at increased risk for Caesarean section in that the rate of non-elective Caesarean section among women booked at the general practitioner unit was approximately one-half the rate among women booked for shared care. This is probably due to the height and age criteria and exclusion of women who had previously had a Caesarean section.¹⁶ Perhaps the most striking failure of the booking criteria is the inability to identify women who will continue at-

tending the general practitioner unit through their entire pregnancy and delivery. This is particularly true for nulliparae. There are of course other factors related to transfer rates including the confidence of general practitioners and cooperation between general practitioners and consultants. It would be relatively easy to reduce transfer rates by reviving the concept of consultation with return of patient care to the referring general practitioner, and by developing and promoting simple protocols for induction of labour, augmentation of labour and epidural management in the general practitioner unit.¹⁷

This study raises questions about the continuing utility of booking criteria based on the recommendations for maternity care made in the 1950s. It would seem reasonable that they could be revised to include social class, weight and smoking although our results show that this would reduce transfer rates only slightly. There could also be less emphasis on the chance of an operative delivery. The risks of operative delivery are less of a concern where the standards of antenatal care and cooperation between general practitioners and specialists in integrated units are high. The questions about the validity of the booking criteria can only be answered by further study and this will depend on cooperation between general practitioners and specialist obstetricians, and on the continuing confidence among general practitioners that they do have a useful role in the provision of obstetric care both now and in the future.

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