Pregnant women at work: a study of ethnic minority risk in Leicestershire

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Abstract

Possible reasons for the excess risk of perinatal mortality experienced by Asian women living in Leicestershire who work during pregnancy were investigated. This entailed a detailed examination of the work undertaken locally by a group of pregnant Asian women and comparison with the work undertaken by an occupationally matched group of pregnant non-Asian women. A total of 306 pregnant women were interviewed. The results suggest that the two ethnic groups experienced similar working conditions, and most of the women continued working until the 29th week of pregnancy. The Asian women worked significantly longer hours on average than the non-Asian group, and were more likely to report financial dependence by the family upon their earnings.

As the participation of women in the labour force has continued to increase, the nature of the relation between working during pregnancy and outcome of pregnancy has become the focus of various research studies. Findings have often shown no adverse association,¹⁻³ whereas others have found associations between working during pregnancy and outcomes such as preterm delivery,^{4,5} birthweight,⁶⁻⁸ fetal death,⁹ and spontaneous abortion.¹⁰ Associations have also been shown between some specific occupations (such as leatherwork) and adverse outcome of pregnancy.¹¹⁻¹³

Ethnicity and its relation to the outcome of pregnancy have also been seen as an area worthy of investigation. For example, the study of Lumb, Congdon, and Lealman showed that Asian women in Bradford suffered a higher risk of perinatal mortality than non-Asian women.¹⁴ Studies carried out in other cities have also shown associations between ethnicity

and higher rates of perinatal mortality, stillbirths, and lower birthweights for children born to women described as "Asian" or "of Indian origin" compared with non-Asians.^{15,16} When examining the findings of such studies one must, however, be aware that definitions of terms such as "Asian" and "Indian" differ, along with the fact that there are considerable variations in the characteristics of ethnic minorities between cities in Britain. For example, the largest group within the "Asian" population in Leicester are Gujarati Hindus, whereas in Southall the majority group are Punjabi Sikhs. We believe that comparisons of studies concerning different ethnic populations in different cities must be made with caution, owing to this variation in local populations and how they are defined.

We have been undertaking a stratified case-control study of perinatal death since 1976.^{17,18} Cases are defined as perinatal deaths experienced by women whose place of residence is Leicestershire, regardless of the place of delivery. The next live birth to a Leicestershire woman in the intended place of delivery of the perinatal death is selected as the control to which the case relates. Case note reviews, interviews with the mother, and the comments of a review group attempting to identify avoidable factors in relation to the perinatal death are all used as sources of data.

Analysis of the data from this perinatal mortality survey suggests that Asian women have a significant excess perinatal mortality when compared with non-Asian women, even after adjusting for social class, parity, height, legitimacy, and whether or not the patients' general practitioners possess additional qualifications in obstetric practice. Furthermore, the results for 1976 to 1984 show a significant risk for

Table 1 Relative risk of perinatal death for Asian women working during pregnancy as compared with non-Asian women by social class in Leicestershire 1976-84

<i>Asian:non-Asian</i>	<i>Relative risk (95% CI)</i>
Non-manual work: Social classes I, II, and III NM	1.3 (0.7-2.2)
Manual work: Social classes IIIM, IV, and V	1.8 (1.2-2.6)

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perinatal death in Asian women who work during pregnancy compared with Asian women who do not work. This risk was increased for Asian women working in manual occupations (relative risk 1.8, 95% confidence interval (CI) 1.2–2.6; table 1).

The pregnant women at work study, funded by The Health and Safety Executive, was designed to test the hypothesis that more adverse working conditions would be found amongst female Asian workers than among non-Asians, and that these may account for part of the excess risk of perinatal mortality. Specifically it considered that:

- (1) this risk is caused by the nature of conditions and hours of work rather than the work itself.
- (2) Asian women continue to work longer during their pregnancies than non-Asian women.
- (3) Asian women work during pregnancy out of financial necessity.
- (4) Asian women have more responsibilities at home during pregnancy than non-Asian women.

To test these hypotheses and examine any differences within occupations the work undertaken by a group of pregnant Asian women was reviewed and compared with the work undertaken by an occupationally matched group of pregnant non-Asian women.

Methods

Data from the perinatal mortality survey were used to identify the 10 occupations most commonly held by both Asian and non-Asian women in Leicestershire. These occupations were targeted within the new study and are members of social classes III non-manual, III manual, and IV (according to classifications by the Office of Population Censuses and Surveys). These social classes include occupations such as clerks, typists, secretaries, visual display unit operators, and sales assistants through to jobs within the local hosiery and leatherwork industries, such as machinists, packers, and examiners. Three hundred and six pregnant women were interviewed in private in the antenatal clinic of a city centre maternity hospital between 1987 and 1988. Information concerning occupation recorded in patients' medical notes was used to identify women working in the 10 target jobs, and the response rate from women approached was good; 98.4% were willing to participate. Interpreters were available to assist in interviews of women who did not speak English or preferred to use their first language.

The questionnaire was comparable in some aspects to that used in Canada by McDonald and McDonald in considering the nature of work undertaken by pregnant women alongside the facilities of their working environment.¹¹ It also scrutinised additional aspects of the woman's situation that may have influenced or interacted with her experience of

working during pregnancy, such as employment history, management of income, and knowledge of welfare rights, as detailed below.

THE STRUCTURED QUESTIONNAIRE: LIST OF CONTENTS

<i>Section</i>	<i>Contents</i>
Background information	Place of birth; marital state; obstetric history
Medical care	Satisfaction with medical care
Clinic appointment	Services available/utilised
Present pregnancy	Whether planned/unplanned; feelings about the pregnancy; preference for the sex of the child etc
Domestic situation	Tasks undertaken at home; number of dependants; support available
Life events	Bereavements/illnesses over past 12 months
Employment	Employment history, conditions and hours in present job; relation with boss
Welfare rights	Knowledge/uptake of entitlements
Finances	Importance of subject's wages to family income/management of income

THE SAMPLE POPULATION

The sample comprised all pregnant women living in Leicestershire. Just under half the women interviewed were pregnant for the first time, a proportion similar to the Leicestershire perinatal mortality survey where 44% of the control subjects had experienced their first pregnancy. The women were mostly working five days a week, many within traditional local industries. The most commonly held educational qualifications were CSE/O levels and most of the women were living in family owned accommodation.

Alongside these broad similarities there were significant differences between the two groups which may reflect their different cultural backgrounds, values, and norms.

ASIAN SAMPLE

Almost all the Asian subjects interviewed were married (99%). Over 75% were Hindu and the modal age of the sample was between 25 and 26. More than half of the Asian women we interviewed were of east African origin, born in countries within the new Commonwealth, such as Kenya and Uganda. India was the birthplace of a further 29%. The average time spent living in Britain was just under 13 years, with 20% of the sample having entered Britain less than six years ago. Over half the

women spoke Gujarati as their first language. English was the first language for 30% of the Asian women we interviewed. These facts closely reflect the nature of the population of the county, and particularly of the city of Leicester where most of the Asian population live. The 1983 Survey of Leicester¹⁹ estimated that 22% of the 286 000 population of the city were of Asian ethnic origin. The Asian population had the highest proportion of young children and adults under 44 years, and Gujarati speaking Hindus made up the largest group within the Asian community.

NON-ASIAN SAMPLE

The non-Asian women were on average younger than the Asian women, with a modal age of 21. They were less likely to be married (69%) and almost all had been born in Britain and were permanent residents there. Over 75% described themselves as Christian with the remainder having no religious affiliation, which again reflects the nature of the non-Asian population of Leicester described in the 1983 Survey.

Results

CONDITIONS AT WORK

Detailed information collected concerning conditions at work were similar in many respects for both ethnic groups. Most pregnant employees were in jobs that they did sitting down, with 40% sitting for seven hours or more. Almost half reported no noise at work and 43% of the remainder experienced moderate noise. Only 17% of the sample experienced vibration at work. Most subjects described their jobs as repetitive (67%) and requiring periodic concentration (49%). Conversation with colleagues was permitted for 81% of the sample, and most subjects thought that their coffee breaks were sufficient (79%).

Significant differences were found in working conditions between the two ethnic groups. These included the finding that the Asians were less likely to report lifting weights at work ($p < 0.0005$) or an uncomfortable temperature at their workplace ($p < 0.0005$). The Asian women were also significantly less likely to perceive their jobs as being of low status ($p = 0.003$).

EQUIPMENT AT WORK

Photocopiers were used regularly at work by just under a third of the women interviewed (31%), and visual display units by 24% of the sample. The average time spent operating a visual display unit was 18 hours a week for both ethnic groups.

PROBLEMS AT WORK

The questionnaire incorporated the five sources of

occupational fatigue identified in 1984 by Mamelle *et al.*⁴ to examine potential difficulties at work. The women interviewed were asked whether during their pregnancy they had requested to move to a task with more time spent sitting; with less frequent or shorter periods of machine operation; that was less strenuous; that was more stimulating; in a less risky or hazardous environment. They were also asked whether the request had been granted.

Mamelle *et al.*⁴ described fatigue to be intense when three of the sources were simultaneously rated. In our analysis of the pregnant women at work data we found that these requests were rarely made, the only exception being that of movement to a less strenuous task. This was requested by 37% of the sample and 33% were successful. Furthermore we found no cases showing intense fatigue according to the criteria employed by Mamelle *et al.*⁴ Just over half (55%) of the sample had experienced difficulties at work during their pregnancies including backache, nausea, and tiredness. Most women had discussed this difficulty with their manager, and the Asian group were significantly more likely to report receiving a sympathetic response ($p = 0.019$).

TRADE UNION MEMBERSHIP

Only 27% of the sample were affiliated to a trade union at the time of interview, with little difference between the two ethnic groups.

WORKING HOURS

Most subjects worked five days a week during pregnancy (88%). The average number of hours worked per week by the Asian women (36.2) was significantly longer, however, than the hours (33.5) worked by the non-Asian sample ($p = 0.0056$). This difference was also significant in terms of working less than 35 hours, 35–40 hours, and 41 hours or over, with the Asian women more likely to work more than 35 hours a week ($p = 0.015$).

MATERNITY LEAVE OR FINISHING WORK

Information was collected to determine at which point during her pregnancy each subject intended to finish or actually finished work. On average the women interviewed ceased work during the 29th week of pregnancy, with 40% working beyond the 30th week. Only 8% were still at work after the 34th week of pregnancy. This pattern was similar for women who had worked during a previous pregnancy. During their first pregnancy most women interviewed had finished work in the 29th week. Those subjects who had had previous pregnancies were also asked at which point they had recommenced working, and the modal period was between six and 11 months (31%).

Just over 64% of the sample believed that they qualified for statutory maternity pay (SMP), and a

Table 2 Responses to selected questions by Asian and non-Asian Women

	Asian (%)	Non-Asian (%)
Qualification for statutory maternity pay:		
Qualifies	59.5	68.6
Does not qualify	26.8	28.1
Does not know	13.7	3.3
Importance attributed to subjects' earnings:†		
Able to manage without subjects' earnings	54.7	80.3
Not able to manage	45.3	19.7
Housework undertaken during pregnancy compared with before pregnancy; ironing:*		
Less	14.4	3.3
No change	85.6	96.1
More	0	0.6
Housework undertaken during pregnancy compared with before pregnancy; cleaning:*		
Less	15.7	5.3
No change	84.3	94.1
More	0	0.6

*Sample size = 153 each group.

†Sample size = 139 Asian and 127 non-Asian women.

significant difference between the two ethnic groups was found in relation to uncertainty regarding entitlement to SMP. The Asians were less likely to know whether they were entitled to SMP ($p = 0.004$; table 2).

EARNINGS

Subjects who were married or living with a partner were asked how their wages compared with those of their partner. Most (85%) reported that their partners' wages were greater than their own, and 72% thought that they would not be able to meet their financial commitments without his earnings.

Almost all the subjects interviewed contributed towards the payment of bills, and many (63%) shared a joint bank account with their partners; a further 30% had an individual bank account. Satisfaction with domestic financial arrangements was reported by 98% of the sample.

The two ethnic groups differed significantly in the importance they attributed to their own earnings. The Asians were more likely to feel unable to manage financially without the contribution made by their wage ($p < 0.0005$; table 2).

DOMESTIC SITUATION

Information was collected to describe the division of domestic responsibilities in subjects' homes before and during the current pregnancy. Changes to the usual routine, mostly resulting in a decrease in domestic tasks for the pregnant woman, had been made in 55% of homes. Almost all the women we interviewed expressed satisfaction with their domestic arrangements (91%).

The section of the questionnaire relating to domestic situation was designed to explore responsibility for five tasks in particular—namely, shopping, preparation of meals, washing, ironing, and cleaning. Significant differences were found between the two

ethnic groups in two of these tasks after adjusting for marital state. The Asians were likely to be doing less ironing ($p = 0.0026$) and less cleaning ($p = 0.0076$) during pregnancy compared with before pregnancy than the non-Asian sample (table 2).

The average number of adults living with Asian subjects (2.3) was significantly greater ($p < 0.0005$) than the average number living with non-Asian subjects (1.3). The size of homes occupied by Asian women was significantly larger in terms both of the number of bedrooms ($p = 0.0001$) and rooms in total ($p = 0.0004$) than the size of the homes occupied by non-Asian subjects.

Discussion

IS THE EXCESS RISK OF PERINATAL MORTALITY FOR WORKING ASIAN WOMEN CAUSED BY THE NATURE OF CONDITIONS AND HOURS OF WORK RATHER THAN THE WORK ITSELF?

As already noted, conditions at work were very similar for both ethnic groups. Most of the women reported either no noise or moderate noise, no vibration, and were sitting down at work. This suggests a low score for the sources of fatigue described by Mamelie *et al.*⁴ Most also expressed satisfaction with their coffee breaks and were able to talk with colleagues while working. Their jobs were described as repetitive, however, by 67% of the sample, a fact associated with mental stress by the women, the employment survey,²⁰ and Mamelie *et al.*⁴ The differences we found between the two ethnic groups suggest that the Asian women were more satisfied than non-Asian women with certain conditions of their job and workplace, such as the temperature and physical activities that necessitated lifting; they were also less likely to describe their jobs as being of low status. Although we did not find evidence of intense occupational fatigue that satisfied

the criteria of Mamelle *et al.*,⁴ 37% of the women requested less strenuous work during pregnancy, and most were successful in achieving this. Also, just over half had experienced other problems at work during their pregnancies, such as backache and tiredness, which may relate to the nature of the work and the position adopted to operate machinery.

The increasing use of visual display units within the workplace has generated some concern about possible associations between this work and outcome of pregnancy. Trades Union Council guidelines²¹ recommend time limits on working with visual display units of 50% of the working day, as well as regular breaks and the right to transfer away from the machines for workers planning to start a family. Just under a quarter of the women we interviewed, of both ethnic groups, used visual display units at work, for an average time of 18 hours a week. Recent epidemiological studies, such as those reviewed by Blackwell and Chang,²² have not shown any statistically significant associations between failure of pregnancy and use of visual display units.

O'Grady and Wakefield²³ believe that the answer to health and safety questions may be "to design jobs and work environments to be safe for all workers including pregnant women, rather than transfer women off the job or make special provision."

Most of the women we interviewed who had experienced problems at work during pregnancy had been able to discuss the difficulty with their managers. The Asians were significantly more likely to report having received a sympathetic response, a finding which challenges the hypothesis that the nature of conditions at work would be poorer for this group. Only 27% of the women we interviewed were members of a trade union. Traditionally, union membership for women has been lower than that for men. For example, in 1983, the Equal Opportunities Commission²⁴ conducted a survey of women and trade unions, which showed that women's membership represented only 39% of their potential recruitment in the United Kingdom, compared with 63% for men. Possible explanations for this underrepresentation of women within trade unions may relate to the nature of much of their work; employment that is predominantly of a casual or temporary nature or both, may of itself present barriers to successful and comprehensive unionisation. Furthermore, working while planning a pregnancy, then a substantial period of time out of the labour market, may discourage women from ongoing commitment to union membership.

No statistically significant differences were found between the two ethnic groups within our sample in terms of their union membership, but membership for the non-Asian women appeared to be lower than expected as the women and employment survey found a union membership of 41%.

Working hours for the Asian women were significantly longer than for the non-Asian sample, with Asian women being more likely to be working in excess of 35 hours a week during pregnancy. Financial reasons may be an important factor here, as we found that the Asian sample were significantly more likely to be working because of financial necessity.

DO ASIAN WOMEN CONTINUE WORKING LONGER DURING THEIR PREGNANCIES THAN NON-ASIAN WOMEN?

In 1984 Chamberlain²⁵ reported that 75% of women working during pregnancy continued to work beyond the 30th week. The women we interviewed, however, finished work on average at 29 weeks, and only 40% continued after the 30th week. This result was consistent for both the Asian and non-Asian sample. One major difference between the two ethnic groups was that Asian subjects seemed less sure of their maternity rights; 14% did not know whether they qualified for statutory maternity pay (SMP) at the time of interview compared with only 3% of the non-Asian subjects.

Choosing to finish work at 29 weeks relates closely to SMP legislation. As SMP cannot be paid for any weeks worked, a pregnant woman intending to claim must finish work by the 34th week of her pregnancy. Just over 64% of the sample believed that they qualified for SMP and may have chosen to finish work at the earliest opportunity.

The uncertainty concerning qualification for SMP expressed by 14% of the Asian sample reflects an unfamiliarity with employment and maternity legislation, both on the part of the woman and also possibly her employer. This may have been compounded by the changes introduced to regulations for maternity pay in June 1987, and the fact that written information concerning SMP was only available in English locally during the study period; yet for 70% of the Asian sample English was not the first language.

ARE ASIAN WOMEN WORKING DURING PREGNANCY OUT OF FINANCIAL NECESSITY?

As previously shown (table 2), a statistically significant difference was found between the two ethnic groups when we explored the importance women attributed to their own earnings. The results for the non-Asian sample were similar to those of the women and employment survey, where 14% of women questioned reported that they could not manage without the contribution made to the family income by their wages. The conclusion drawn from this finding was that "it is clearly fallacious to assume that, because a wife is working part time and contributing less than a quarter of the total income of the couple, this is necessarily pin money."

The results for the Asian women suggest that they experience a stronger motive for working during pregnancy than their non-Asian colleagues, (41% said that they would not be able to manage), and therefore may indeed be working out of financial necessity.

There may be many complex and interrelated reasons for this apparent dependence for so many Asian households upon womens' earnings. In order to explore these further, we must consider the position of women, and of ethnic minority workers within the British labour market.

It is not surprising to find that 85% of those subjects we interviewed whose partners were working were earning less than their partners, as employment statistics consistently confirm that women are concentrated in low paid industries and low grade jobs or in what Hunt²⁶ describes as "so-called female ghettos."

Results from the Office of Population Censuses and Surveys women and employment survey showed that among both full and part time workers, women working in "women only" jobs earned less an hour on average than those working with men as well as women. The jobs targeted in the pregnant women at work study are members of this model of occupational segregation. In the local hosiery industry female machinists and packers (classified a social class IV) work in the same factories as male pressers and knitters (social class IIIM) in less skilled jobs with lower rates of pay. Nationally the clothing and textile industry is a major employer of women, with 300 000 female employees, and average earnings fall below those of the manufacturing industry as a whole.²⁷

Almost 75% of the women who had partners believed that they could not manage without his earnings, which would appear to be related to the fact that partners' earnings were described as greater than those of the subjects in most cases. The position of women within the labour market, therefore, is a subordinate one in terms of status and pay to that of men. For Asian women, however, especially immigrants as in 89% of our sample, their ethnicity may serve as a further disadvantage in the labour market. This could result from an overrepresentation in industries such as clothing and textiles where pay is low and, as we found, Asian women are predominantly working in semiskilled jobs such as packing and machining.

Asian women, and immigrant workers in general, tend to suffer more severely than other colleagues in times of recession according to studies by Brown²⁸ and by Castles and Kosack.²⁹ Clearly if unemployment is high, redundancy commonplace, and wages low for Asian workers of both sexes, Asian women may continue to work during pregnancy because of sheer financial necessity.

DO ASIAN WOMEN HAVE MORE RESPONSIBILITIES AT HOME DURING PREGNANCY THAN NON-ASIAN WOMEN? We found no evidence to suggest that Asian women have more domestic responsibilities during pregnancy than non-Asian women. Indeed, two of the more physically demanding tasks, ironing and cleaning, were significantly reduced during pregnancy for the Asian sample. This appears to confirm the belief that the domestic work usually undertaken by Asian women is taken over by other women of the household during pregnancy.³⁰

The pattern and division of labour within the home changed during pregnancy for just over half the sample, and 91% expressed satisfaction with these domestic arrangements. This result is broadly similar to that found by Martin and Wallace³¹ where 11% reported difficulties in combining work and household responsibilities. Martin and Wallace also noted that 87% of their sample preferred to work, which, they suggested, was the result of choice related both to economic need, and also to "an assessment of the alternative rewards available to them in their domestic role." Thus it is possible that the women we interviewed were satisfied with their domestic arrangements because household responsibilities did not prohibit them from the rewards of paid work, which in turn enabled them to make a significant financial contribution to family income.

The findings suggest that Asian and non-Asian women working during pregnancy in occupations within social classes IINM, IIIM, and IV, experience broadly similar conditions at work. These similarities include practical aspects such as noise, time spent sitting, standing, and walking, the concentration required, and provision of breaks through to the nature of problems and requests made at work during pregnancy.

There were few differences between the two ethnic groups. Those we found, however, suggest that Asian women are more likely to experience economic disadvantages, work longer hours on average than their non-Asian colleagues, are more likely to report working during pregnancy out of financial necessity, and have less knowledge of entitlements to welfare rights. The nature and extent of financial dependence or pressures upon pregnant women, including for example, attitudes and practises concerning work and management of money and employment opportunities and experiences, are factors which we believe merit further investigation.

In conclusion, the extent of the similarity between the two ethnic groups does not appear to explain the significantly increased risk of perinatal mortality for Asian women, especially those with manual occupations, found by the Leicestershire perinatal mortality survey between 1976 and 1984. Our findings do appear, however, to parallel more recent statistics (1985 to 1987) from the same survey (table 3), which

Table 3 Relative risk of perinatal death in working Asian and other women by their social class in Leicestershire 1976-87

	Relative risk (95% CI)	
	1985-7	Whole time period 1976-87
Asian:non-Asian		
Non-manual work:		
Social classes I, II, and IIINM	2.4 (1.0-6.1)	1.6 (1.0-2.5)
Manual work:		
Social classes IIIM, IV, and V	0.9 (0.4-2.0)	1.6 (1.1-2.2)

show that the risk of perinatal mortality for women of social classes IIIM, IV, and V was similar for both ethnic groups. Strategies such as the Asian mother and baby campaign that have been introduced locally since 1985 to reduce difficulties identified as high risk factors for perinatal mortality in the Asian population, may have contributed to the closing health divide within the social classes we targeted but has not altered the overall higher risk to Asian women. Investigation of movement within the local labour market since 1985 and of changes within the workplace are necessary to explore the risk of perinatal mortality for Asian manual workers further.

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- 1 Marbury M, Linn S, Monson R, et al. Work and pregnancy. *J Occup Med* 1984;26:415-21.
- 2 Gofin J. The effect on birthweight of employment during pregnancy. *J Biosoc Sci* 1979;11:259-67.
- 3 Terris M, Gold EM. An epidemiologic study of pregnancy. *Am J Obstet Gynaecol* 1969;103:358-70.
- 4 Mamelie N, Laumon B, Lazar P. Prematurity and occupational activity during pregnancy. *Am J Epidemiol* 1984;119:309-22.
- 5 Saurel-Cubizolles MJ, Kaminski M. Healthy worker effect and pregnancy: role of adverse obstetric history and social characteristics. *J Epidemiol Community Health* 1987;41:312-20.
- 6 Naeye RL, Peters EC. Working during pregnancy: effects on the fetus. *Pediatrics* 1984;69:724-7.
- 7 Alegre A, Rodriguez-Escudero FJ, Cruz E, Prada M. Influence of work during pregnancy on fetal weight. *J Reprod Med* 1984;29:334-6.

- 8 Murphy JF, Dauncey M, Newcombe R, Garcia J, Elbourne D. Employment in pregnancy: prevalence, maternal characteristics, perinatal outcome. *Lancet* 1984;i:1163-6.
- 9 Vaughan TL, Daling JR, Starzyk PM. Fetal Death and Maternal Occupation. An analysis of birth records in the State of Washington. *Occup Med* 1984;26:676-8.
- 10 Hemminki K, Kyyronen P, Niemi ML, Kroskinen K, Sallmen M, Vainio. Spontaneous abortions in an industrialised community in Finland. *Am J Public Health* 1983;73:32-7.
- 11 McDonald AD, McDonald JC, Armstrong B, et al. Occupation and pregnancy outcome. *Br J Ind Med* 1987;44:521-6.
- 12 McDonald AD, McDonald JC. Outcome of pregnancy in leatherworkers. *Br Med J* 1986;292:979-81.
- 13 Clarke M, Mason ES. Leatherwork: a possible hazard to reproduction. *Br Med J* 1985;290:1235-7.
- 14 Lumb KM, Congdon PJ, Lealman GT. A comparative review of Asian and British born maternity patients in Bradford 1974-1978. *J Epidemiol Community Health* 1981;35:106-9.
- 15 Terry PB, Condie RG, Settatre RS. Analysis of ethnic differences in perinatal statistics. *Br Med J* 1980;261:1307-8.
- 16 Grundy MFB, Hood J, Newman GB. Birthweight standards in a community of mixed racial origin. *Br J Obstet Gynaecol* 1978;85:481-6.
- 17 Clarke M, Clayton D. Quality of obstetric care for Asian immigrants in Leicestershire. *Br Med J* 1983;286:621-3.
- 18 Clarke M, Clayton D, Mason E, MacVicar J. Asian mothers' risk factors for perinatal death—the same or different? A 10 year review of Leicestershire perinatal deaths. *Br Med J* 1988;297:384-7.
- 19 Leicester City and County Councils. *Survey of Leicester 1983. Initial report of survey*. Leicester: LCCC, 1984.
- 20 Martin J, Roberts C. Women and employment: a lifetime perspective. *Report of the 1980 Department of Employment Office of Population Censuses and Surveys women and employment survey*. HMSO, 1984.
- 21 Trades Union Congress. *Health and safety guidelines to working with VDUs*. London: TUC, 1986.
- 22 Blackwell R, Chang A. Video display terminals and pregnancy. A review. *Br J Obstet Gynaecol* 1988;95:446-53.
- 23 O'Grady F, Wakefield H. *Women, work and maternity, the inside story*. London: Maternity Alliance 1989.
- 24 Equal Opportunities Commission. *Women and trade unions—A Survey*. Manchester: EOC, 1983.
- 25 Chamberlain G, ed. *Pregnant women at work*. London: Royal Society of Medicine and Macmillan Press, 1984.
- 26 Hunt A. Women and government statistics. *Equal Opportunities Commission research bulletin No 4*. Autumn 1980.
- 27 National Union of Hosiery and Knitwear. *Workers report*. Leicester: NUHK, 1987.
- 28 Brown C. *Black and white Britain: the third Policy Studies Institute Survey*. London: Heinemann, 1984.
- 29 Castles S, Kosack G. *Immigrant workers and class structure in Western Europe*. 2nd ed. Oxford: Oxford University Press, 1985.
- 30 McFadyen I, MacVicar J. Obstetric problems of the Asian community in Britain. London: Royal College of Obstetricians and Gynaecologists, 1982.
- 31 Martin R, Wallace J. *Working women in recession. Employment, redundancy and unemployment*. Oxford: Oxford University Press, 1984.

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