Lifecourse influences on maternal smoking before pregnancy and postpartum among women from ethnic minority groups

Summer Sherburne Hawkins¹, Catherine Law¹, Hilary Graham²

Background: Studies using a lifecourse framework to examine women's smoking behaviour have focused on samples of predominantly white women. We examined the contributions of conventional lifecourse factors and women's domestic trajectories to smoking behaviour before pregnancy and postpartum among women from ethnic minority groups. Methods: We analysed data from 2140 mothers from ethnic minority groups in the UK Millennium Cohort Study. Mothers reported their smoking habits (smoking ≥1 cigarette/day) before pregnancy, at 9 months, and 3 years postpartum, along with information used to characterise their social and domestic lifecourse trajectories. Results: In a mutually adjusted model, women were more likely to smoke before pregnancy if, when they were children, their father held a routine/manual occupation [adjusted odds ratio (aOR) 1.67, 95% confidence interval 1.00–2.80] (compared with managerial/professional), they left education at age ≤18 (aOR 2.10, 1.18–3.73) (compared with ≥22), or they were currently in a routine/manual occupation (aOR 1.53, 0.84–2.76) (compared with managerial/professional). Women were also more likely to smoke before pregnancy if they were age 14–19 years at their first birth (aOR 1.92, 1.05–3.50) (compared with age ≥30) or a lone parent (aOR 3.39, 2.18–5.28) (compared with non-lone parents). Similar relationships were apparent for smoking at 9 months and 3 years postpartum. Conclusions: Among women from ethnic minority groups, those on more disadvantaged social and domestic lifecourse trajectories were more likely to smoke before pregnancy and postpartum. These patterns are consistent with studies of predominantly white women, indicating the importance of disadvantage across the lifecourse in all ethnic groups.

Keywords: ethnic group, smoking, lifecourse, women.

Introduction

Studies linking influences across the lifecourse to women’s smoking behaviour have revealed the independent contributions of childhood circumstances and current socio-economic circumstances to smoking habits. While these conventional measures of the lifecourse (childhood circumstances, educational attainment, current socio-economic circumstances) may typify men’s trajectories, parenthood is also a powerful determinant of women's trajectories. Compared with women from advantaged backgrounds, women from disadvantaged backgrounds are more likely to enter parenthood at a young age and be a lone parent; however, early and lone parenthood also influence women’s future circumstances and socio-economic position. Furthermore, women’s domestic trajectories (age of entry into motherhood and cohabitation status) are strongly associated with smoking behaviour, independent of conventional lifecourse factors.

The time during pregnancy and after birth is an important transition for women's smoking behaviour. While pregnancy has a powerful influence on smoking cessation, most women who smoke before pregnancy resume postpartum, increasing the risk of second-hand smoke exposure to infants and young children. Despite policies to encourage smoking cessation, a significant proportion of women continue to smoke in adulthood, including during pregnancy.

Studies using a lifecourse framework to examine women’s smoking behaviour have focused on samples of predominantly white women. Although the prevalence of smoking varies by ethnic group in the UK and USA, little is known about lifecourse influences on smoking behaviour among women from ethnic minority groups. We used data from a contemporary sample of women from ethnic minority groups in England to examine the contributions of conventional lifecourse factors and domestic trajectories to smoking behaviour before pregnancy and postpartum.

Methods

Participants

The Millennium Cohort Study (MCS) is a nationally representative study of UK children born in the new century and their families. Information on the study and sampling design has been reported previously. Briefly, a stratified clustered sampling design (based on electoral wards) was utilised to over-represent families from ethnic minority groups and living in disadvantaged areas. While electoral wards in England were categorised for the purpose of sampling as ‘ethnic’ (based on the 1991 census, if at least 30% of residents were from an ethnic minority group), ‘disadvantaged’ (the upper quarter of the child poverty index) or ‘advantaged’ (all remaining wards), there was no ‘ethnic’ stratum in Wales, Scotland or Northern Ireland. Families eligible for Child Benefit and living in the UK when their child was age 9 months were invited to participate. In the original cohort, there were 18,819 children (18,533 families), born between September 2000 and January 2002 (72% response). At the second contact, between September 2003

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and January 2005, 80% of the singleton children participated (14,630/18,296) at age 3 years. At the first contact, mothers reported their ethnicity, which was classified according to guidelines from the Office for National Statistics. We excluded women who recorded their ethnic group as white who were from the UK or Republic of Ireland. We included women from all other ethnic groups, combined into one group to increase sample size. This included white women from any other country besides the UK or Republic of Ireland (classified as ‘Other white’), 16% (weighted for survey design and non-response), and women who reported their ethnic group as Pakistani or Bangladeshi (31%), Black (21%), Indian (15%), Other (11%), or Mixed (7%). In this analysis we only included mothers from ethnic minority groups living in England because of differences in the sampling strategy between England and Wales, Scotland and Northern Ireland. Data were obtained from the UK Data Archive, University of Essex. The MCS received ethical approval from the South West and London Multi-Centre Research Ethics Committees for the first and second contacts, respectively.

Among the 2259 mothers from ethnic minority groups with singleton children in England who participated in both contacts, 2140 were included in the analyses to examine lifecourse influences on smoking before pregnancy. Women were excluded if the main respondent was not female (71) or a natural parent (17), or the main respondent had missing information on smoking before pregnancy (2), or current socio-economic position (32). Some mothers satisfied more than one exclusion criterion. To examine lifecourse influences on smoking at 9 months postpartum, mothers were also excluded if information was missing on smoking at 9 months postpartum (3) and/or they were currently pregnant (151), leaving 2002 mothers with data available. To examine lifecourse influences on smoking at 3 years postpartum, mothers were also excluded if information was missing on smoking at 3 years postpartum (17) and/or they were currently pregnant (208), leaving 1931 mothers with data available.

**Outcome measures**

At the first contact, main respondents were asked to report about how many cigarettes a day they usually smoked just before they became pregnant. Mothers who smoked roll-ups were asked to provide their best estimate. Women who smoked one cigarette per day or more were considered to have smoked just before they became pregnant. Mothers were also asked whether they currently smoked any tobacco products (9 months postpartum) and, if so, the number of cigarettes they smoked a day. Mothers were asked the latter two questions again at the second contact (3 years postpartum).

**Lifecourse factors**

Conventional measures of the lifecourse included mothers’ childhood circumstances, age of leaving education, current socio-economic position, and household income. Mothers’ childhood circumstances were derived from questions asked at the second contact about their father’s employment at age 14. Mothers reported whether their father worked and if so, the type of job that he did. The free text was coded into types of employment and collapsed into the National Statistics Socio-economic Classification (NS-SEC) categories. Approximately 14% of mothers reported they did not know whether their father worked, so a ‘don’t know’ category was included. Additional lifecourse factors were reported by mothers at the first contact unless otherwise indicated. Mothers reported their age when they left full-time education. Mothers’ socio-economic position at 9 months postpartum was classified according to the NS-SEC categories and collapsed into four groups. Although the coded responses allowed distinction between being long-term unemployed and having never worked, none of the women in this sample reported being long-term unemployed. Mothers also reported their household income (per annum); if missing, values from the second contact were substituted (190). For smoking at 3 years postpartum, household income at the second contact was used; if missing, values from the first contact were substituted (388).

Women’s domestic trajectories were described by age at entering motherhood and cohabitation status. At the first contact, mothers reported their age at their first live birth and whether they were a lone parent. For smoking at 3 years postpartum, cohabitation status at the second contact was used. Whether or not the cohort child was the first or a subsequent live birth (birth order) was also included as an indicator of women’s reproductive history, which has been shown to influence smoking status in pregnancy.

**Statistical analyses**

All analyses were conducted using STATA statistical software, version 10.1 SE (Stata Corporation, Texas), with survey commands to account for the clustered sampling design and obtain robust standard errors. Weighted percentages were derived and regression analyses were conducted using survey and non-response weights to account for the clustered sampling and attrition between contacts. P-values were calculated by an adjusted Wald test.

Analyses were conducted to examine conventional lifecourse factors and women’s domestic trajectories on smoking behaviour before pregnancy and at 9 months and 3 years postpartum. Since women’s smoking behaviour and lifecourse factors varied by ethnic group (Table 1), regression analyses were adjusted for maternal ethnic group. First, regression analyses were conducted between women’s smoking status and each lifecourse factor adjusted only for ethnic group. Second, a mutually adjusted model examined the contributions of conventional lifecourse factors (childhood circumstances, age of leaving education, current NS-SEC, household income), women’s domestic trajectories (age at first live birth, cohabitation status) and birth order to smoking behaviour.

**Results**

Among women from all ethnic minority groups, 15.4% [95% confidence interval (CI), 13.0–18.1%] smoked before they became pregnant, 13.0% (10.7–15.7%) at 9 months postpartum, and 14.1% (11.9–16.7%) at 3 years postpartum; however, smoking prevalence varied by ethnic group (Table 1). Conventional lifecourse factors were significant determinants of smoking before pregnancy (Table 2). Women whose father held a routine or manual occupation, never worked or they did not know their father’s occupation were more likely to smoke before pregnancy compared with women whose father held a managerial or professional occupation (column B). Women’s smoking before pregnancy was also associated with leaving education at age 21 or younger, being in a routine or manual occupation (current NS-SEC), or having a low household income (column B). Most associations remained in the full lifecourse model (column C). The relationships between smoking and childhood circumstances attenuated and only the association between smoking and routine or manual occupations remained. Leaving education at an early age remained a strong predictor of smoking.
After adjustment, being in a routine or manual occupation was no longer associated with smoking before pregnancy; in contrast, women who had never worked were less likely to smoke compared with those in managerial or professional occupations. Household income was no longer associated with smoking before pregnancy in the full lifecourse model.

Women’s domestic trajectories were associated with smoking before pregnancy independent of conventional lifecourse factors. Women were more likely to smoke if they entered motherhood at a young age or were a lone mother (column B). In the full lifecourse model (column C), the relationships between smoking and age at first live birth attenuated slightly while lone parenthood remained a strong predictor of smoking. Birth order was also associated with smoking before pregnancy. Women were more likely to smoke if the cohort child was their first live born (column B) and the relationship remained in the full lifecourse model (column C).

Similar relationships between smoking and both conventional lifecourse factors and domestic trajectories were apparent at 9 months and 3 years postpartum (Tables 3 and 4). The principal difference to note was that the relationship between smoking and age at leaving education was not statistically significant at 9 months postpartum whereas a significant relationship was present before pregnancy and at 3 years postpartum; however, the overall pattern between smoking behaviour and leaving education early remained.
Among women from ethnic minority groups, smoking behaviour before pregnancy and postpartum was associated with social gradients in conventional lifecourse factors (childhood circumstances, educational attainment, current circumstances) and women’s domestic trajectories (age at first live birth, cohabitation status). In general, women on more disadvantaged social and domestic trajectories were more likely to smoke at all time points.

The breadth of information collected in the MCS allowed us to extend current frameworks of lifecourse influences on women’s smoking behaviour in two ways. First, we examined the contributions of conventional lifecourse factors to smoking risk among women from ethnic minority groups, taking lifecourse analyses beyond their predominant focus on socio-economic factors. Second, we explored the influence of women’s domestic trajectories in addition to conventional lifecourse factors on smoking behaviour. We found that both conventional and domestic lifecourse factors influence smoking behaviour similarly in ethnic minority women and white women. Specifically, the lifecourse factors which we found provide only the first step in understanding the influence of conventional and domestic lifecourse factors on smoking behaviour in different ethnic minority groups. Overall, women from ethnic minority groups in England have a lower prevalence of smoking than white women in the UK. However, our results are consistent with those from studies of predominantly white women in early childhood and mid-adulthood and suggest that conventional and domestic trajectories influence smoking behaviour similarly in ethnic minority women and white women. Specifically, the lifecourse factors which we found were associated with smoking behaviour before pregnancy and postpartum among mothers from ethnic minority groups were the same as those seen in comparable analyses of British/Irish white mothers in the MCS (Graham et al., 2015). Lifecourse influences on maternal smoking status before, mid and postpartum among mothers from ethnic minority groups provide only the first step in understanding the influence of conventional and domestic lifecourse factors on maternal smoking behaviour in different ethnic minority groups.
during and after pregnancy, submitted for publication). The effect sizes were also similar, except the relationship between cohabitation status and smoking was stronger for mothers from ethnic minority groups than British/Irish white mothers. While household income was also associated with smoking behaviour for British/Irish white mothers, it was not significant for mothers from ethnic minority groups. In addition, women from ethnic minority groups who had never worked were less likely to smoke before pregnancy and postpartum (compared with women in managerial and professional occupations), while British/Irish white mothers who had never worked or were long-term unemployed were more likely to smoke (Graham et al., Lifecourse influences on maternal smoking (submitted for publication)). These discrepancies may be due to differences in socio-demographic characteristics between ethnic groups as well as differences between women from ethnic minority groups who are immigrants first or second generation.

We did not include an indicator of acculturation (‘adoption of health behaviours from the new dominant culture and loss of health behaviours from the original culture’) in our lifecourse framework because acculturation is likely to influence both conventional lifecourse factors and domestic trajectories. For example, we have found that first- and second-generation women are more likely to hold more skilled occupations and to have higher educational qualifications than immigrants. We examined mothers’ current NS-SEC by their generational status and found that 86% of women who had never worked were immigrants compared with 14% who were first or second generation (data not shown); this may help explain why women who had never worked were less likely to smoke than women in managerial or professional occupations. While beyond the limits of this study, research is needed to explore the associations between generational status, never working and non-smoking in ethnic minority groups, and how the process of acculturation influences women’s smoking behaviour.

Studies of white women from the UK have also found that conventional lifecourse factors and domestic trajectories are associated with a reduced likelihood of smoking cessation. Although quitting during pregnancy could not be examined because of the small proportion of women across ethnic minority groups who quit, this is also an area for future research.

Reducing smoking in adults is an international priority, which will also improve the health of infants and children through a decrease in second-hand smoke exposure. Despite policies in the UK aimed at reducing inequalities in smoking between socio-economic groups for all adults and for women during pregnancy, a recent evaluation of the targets showed no significant improvements in narrowing these gaps. Studies of predominantly white women using a lifecourse perspective have demonstrated that both conventional lifecourse factors and domestic trajectories are important contributors to inequalities in smoking. Our results confirm that socio-economic inequalities in smoking are also evident among women from ethnic minority groups, and that disadvantage across the lifecourse contributes to smoking risk.

### Table 3: Prevalence rates and ORs (95% CIs) for smoking at 9 months postpartum (n = 2002)

<table>
<thead>
<tr>
<th>Childhood circumstances</th>
<th>Percentage</th>
<th>OR (95% CI)</th>
<th>Mutually adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td><strong>Managerial and professional occupations</strong></td>
<td>10 1</td>
<td>1** 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Intermediate occupations</td>
<td>7 0.84 (0.44, 1.63) 0.65 (0.33, 1.31)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Routine and manual occupations</td>
<td>16 2.27 (1.35, 3.82) 1.63 (0.89, 2.99)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Never worked and long-term unemployed</td>
<td>11 2.65 (1.24, 5.65) 1.84 (0.78, 4.35)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>22 2.87 (1.60, 5.14) 1.58 (0.77, 3.24)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td><strong>Age of leaving education (years)</strong></td>
<td>8 1** 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>≥22</td>
<td>17.6 (0.89, 3.46) 1.13 (0.51, 2.47)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>19–21</td>
<td>15 2.34 (1.31, 4.19) 1.37 (0.68, 2.77)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>17–18</td>
<td>16 3.25 (1.86, 5.69) 1.88 (0.93, 3.81)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td><strong>Current NS-SEC</strong></td>
<td>12 1** 1***</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>Managerial and professional occupations</td>
<td>12 1.26 (0.72, 2.19) 0.86 (0.43, 1.73)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Intermediate occupations</td>
<td>22 2.85 (1.68, 4.84) 1.86 (0.98, 3.50)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Never worked</td>
<td>4 0.48 (0.25, 0.92) 0.25 (0.11, 0.60)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td><strong>Household income (9 months postpartum)</strong></td>
<td>11 1** 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>£33 000–53 000</td>
<td>14 1.49 (0.80, 2.78) 1.13 (0.57, 2.23)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>£11 000–22 000</td>
<td>9 1.40 (0.77, 2.57) 0.75 (0.40, 1.40)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>£0–11 000</td>
<td>18 2.60 (1.46, 4.62) 0.77 (0.35, 1.67)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td><strong>Age at first live birth (years)</strong></td>
<td>12 1** 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>≥30</td>
<td>11 1.18 (0.70, 2.00) 1.13 (0.67, 1.93)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>25–29</td>
<td>14 2.01 (1.16, 3.49) 1.46 (0.77, 2.75)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>20–24</td>
<td>22 3.23 (1.75, 5.96) 2.36 (1.21, 4.61)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td><strong>Cohabitation status (9 months postpartum)</strong></td>
<td>9 1** 1***</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>Non-lone mother</td>
<td>1 3.28 (2.21, 4.88) 3.35 (2.01, 5.59)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>Lone mother</td>
<td>31 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td><strong>Birth order</strong></td>
<td>11 1** 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
<tr>
<td>Not first live birth</td>
<td>17 1.45 (1.02, 2.06) 1.43 (0.95, 2.15)</td>
<td>1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
</tr>
<tr>
<td>First live birth</td>
<td>17 1</td>
<td>P = 0.01; P = 0.05; *P = 0.1</td>
<td></td>
</tr>
</tbody>
</table>

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*a: Weighted for survey design and non-response
*b: Adjusted for ethnic group
Significance in models B and C: ***P ≤ 0.001; **P ≤ 0.05; *P ≤ 0.1
Much tobacco control policy addresses individual smoking behaviour through cessation programmes and public education.33 Our study adds to the growing body of research which suggests that policies are also needed to address disadvantage in childhood, across the transition to adulthood and in adulthood, in order to reduce smoking.3,34

Acknowledgements

The authors would like to thank all of the Millennium Cohort Study families for their cooperation, and the Millennium Cohort Study team at the Centre for Longitudinal Studies, Institute of Education, University of London.

Funding

The Millennium Cohort Study is funded by grants to Professor Heather Joshi, Director of the study from the ESRC and a Consortium of Government funders. There was no specific funding source for this study. Research at the Institute of Child Health and Great Ormond Street Hospital for Children NHS Trust benefits from R&D funding received from the NHS Executive.

Conflicts of interest: None declared.

Key points

- Among women from ethnic minority groups, those on more disadvantaged social (childhood circumstances, educational attainment, current circumstances) and domestic (age at first birth, cohabitation status) lifecourse trajectories were more likely to smoke before pregnancy and at 9 months and 3 years postpartum.
- These patterns are consistent with studies of predominantly white women, indicating the importance of disadvantage across the lifecourse in all ethnic groups.

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Life course influences on maternal smoking


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Received 10 June 2009, accepted 19 September 2009