Diversity and Equality in Health and Care 2013;10:31–40

Research paper

Does ethnicity or religion affect and/or explain the relationship between knowledge, attitudes and beliefs, and smoking behaviour?

Denis Anthony PhD
Harris Manchester College, University of Oxford, Oxford, UK

Qasim Chowdary BSc
Stop Smoking, Leicestershire Partnership NHS Trust, Leicester, UK

Pamela Dyson PhD
Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Oxford, UK

KR Thankappan MD
Achutha Menon Centre for Health Science Studies, Thiruvananthapuram, Kerala, India

What is known on this subject
- Tobacco smoking is declining in high-income countries.
- There are differences in tobacco smoking among ethnic groups.
- There are gender differences in tobacco smoking.

What this paper adds
- The differences between genders and among ethnic groups are confirmed.
- Acculturation does not appear to affect tobacco smoking in Leicester.
- Differences among ethnic groups with regard to tobacco smoking do not appear to be related to attitudes or knowledge.

ABSTRACT

Each year about 200 000 young people commence smoking in the UK. Most regular smokers report starting in their teens, and health education designed for smoking cessation among schoolchildren should identify and take into account the contributory factors for tobacco use. We used a cross-sectional anonymous survey of 693 schoolchildren (aged 11–16 years, 47% boys) in Leicester. This survey was delivered in schools in Leicester in March 2011. There are significant differences between different ethnic and religious groups and between the sexes with regard to smoking behaviour, with higher smoking rates in girls, those from white British ethnic groups and those with no stated religion. There are no differences with regard to knowledge, attitudes or beliefs. Smoking behaviour is not explained by attitude or knowledge. Cultural factors are important in determining the risk of smoking; young people who are white British, those who are female and those with no religion have higher smoking rates in Leicester.

Keywords: cessation, prevention, primary healthcare

Introduction

This paper is a report of a study of smoking beliefs, attitudes, knowledge and behaviour in young people. Specifically we assess factors determining tobacco use among schoolchildren in different ethnic groups in Leicester. This was a repeat of a survey conducted for the Community Interventions for Health (CIH) study in 2010. CIH is a study designed to evaluate interventions to reduce the three main risk factors for non-communicable disease, namely tobacco use, unhealthy diet and physical inactivity. The full methodology for CIH, describing sampling and data collection, has been reported previously (O'Connor Duffany *et al*, 2011). Briefly, baseline data collection for CIH has taken place in four country sites, in Hangzhou, China, in Kerala State, India, in Mexico City, Mexico and in Leicester, UK, and includes surveys about lifestyle factors such as tobacco use.

Leicester is a deprived city with five electoral wards where around 50% of the children and young people are living in poverty (Leicester City Children's Trust, 2011, p. 46). About one-third of families in Leicester officially live in relative poverty, but nearly two-thirds are living on a 'low income' (Leicester City Children's Trust, 2011, p. 45). The population is highly diverse, with a very large proportion of Asian ethnic groups. However, unlike some other cities in the UK, the ethnic-minority groups are not necessarily the most deprived. Although Pakistanis are very deprived, some of the wards (e.g. New Parks, which is 88.6% white British) are among the poorest parts of the city.

Background

Most regular smokers begin the habit in their teens. Although less than one-third of adolescents who experiment with tobacco will go on to become regular smokers, over 80% of adult smokers report that they began smoking regularly before the age of 18 years (Amos and Hastings, 2009). The proportion of children and adolescents in England who have ever tried smoking has been declining since 2000 (down to 27% of 11- to 15-year-olds in 2010 from a peak of 53% in 1982 (NHS Information Centre for Health and Social Care, 2011), but nevertheless each year around 340 000 children under the age of 16 years experiment with smoking for the first time (Department of Health, 2009), and 200 000 begin smoking regularly (HM Government, 2010).

Smoking rates vary among ethnic groups and between the sexes. Some South Asian ethnic groups have very high smoking rates (e.g. Bangladeshi populations), especially among men, and others have very low rates (e.g. Indian populations) (Goddard, 2006). There have been few studies exploring the effects of ethnicity on smoking in children, and those that exist are largely US-based studies. For example, African American adolescents are less likely to smoke than white non-hispanics (West *et al*, 2007). The prevalence of smoking among 12- to 17-year-olds has been found to range from 27.9% ($n = 72\,207$) for American Indians and Alaska Natives to 5.2% for Japanese (Caraballo *et al*, 2006). We could find no studies of smoking among young people from different ethnic groups in the UK, although one rather dated study from Australia showed that South Asian young people were less likely to smoke than those from other ethnic groups (Gliksman *et al*, 1989).

Smoking rates tend to be higher among men (Dunstan *et al*, 2011), and this is especially true for Asian populations, where a US study found that women smoked less than men in all six Asian groups, including South Asians, although acculturation increased smoking among women (An *et al*, 2008). However, among young people in the UK, girls have had consistently higher rates of smoking than boys since 1986, and in 2010, 14% of 15-year-old girls reported smoking, compared with 10% of boys (Fuller *et al*, 2011). Acculturation can change smoking behaviour (An *et al*, 2008), and is usually assumed to be associated with increased smoking. However, men who are second-generation or later migrants and with higher education have been associated with reduced rates of smoking (An *et al*, 2008). Clearly it would be of interest to public health authorities if smoking were to increase in the Asian population, especially in Leicester and other cities with a high proportion of South Asian ethnic groups. The UK Government has a tobacco strategy to motivate and assist every smoker to quit, to protect families and communities from tobacco-related harm and, most relevant to this study, to stop the inflow of young people recruited as smokers. Thus data collected in schools can inform the policy, in particular addressing the aspiration in the strategy to reduce the smoking rate among 11- to 15-year-olds to 1% or less, and the rate among 16- to 17-year-olds to 8% by 2020.

The study

Aim

The aim was to measure smoking behaviour (and specifically the differences in prevalence between boys and girls and between different ethnic and religious groups), attitudes and beliefs.

Design and sample

A cross-sectional survey of beliefs, attitudes, knowledge and behaviour in five schools in Leicester was conducted in March 2011. One of the schools has now closed. The other four range in size of school roll from 700 to 1050. The same classes in the schools had taken part in the previous CIH survey. Following a review of previous surveys that addressed knowledge of, attitudes to, and behaviours in relation to tobacco use and two other risk factors (unhealthy diet and physical inactivity), the Oxford Health Alliance designed the youth survey in conjunction with external consultants and pilot site teams. Contributions from reputable surveys included the Global Youth Tobacco Survey (Warren *et al*, 2009) and Health Behavior in School-aged Children (Roberts *et al*, 2009). For this study, the tobacco-related items and demographics were used, along with additional questions on ethnicity and religion. The rationale for employing a survey is that it allows comparison with previous research, it is inexpensive and it may be anonymised, which allows more accurate reporting.

Data collection

All young people in years 9 (aged 13–14) and 11 (aged 15–16) were invited to complete the survey. Students completed the surveys on paper, independently without collusion, in a classroom setting supervised by teachers. The survey collected demographic data, information on whether the children had ever smoked or had smoked within the last 30 days (here defined as current smoker), and information on beliefs, attitudes and knowledge about tobacco smoking and second-hand smoke. Indicative questions included those on beliefs:

- Do you think smoking cigarettes is harmful to your health?
- Do you think the smoke from other people's cigarettes is harmful to you?
- Once someone has started smoking, do you think it would be difficult for them to stop?

We also used some data from our community survey of adults, conducted in 2009 in Leicester, which included the same wards as the child survey in the discussion, to address the issue of betel quid and tobacco.

Ethical considerations

The CIH initiative received approval from De Montfort University Ethics Committee. The British Educational Research Association guidelines (www.bera.ac.uk/publications/ethical-guidelines) were followed. Written or verbal informed consent was obtained from the participants prior to the start of the interview for the adult survey. Parents were notified of the intention to survey the children and were given the option of not including their child. If the parents did not opt out of including their child, completion of the child survey was assumed to represent consent. The child survey was distributed by teachers, who supervised its completion and returned the paper copies. The adult survey was conducted by an independent public health consultancy via an interview in the respondent's home. There was one case in which parents did not give consent although the child was willing to complete the survey, and in this case no data were collected on this child, as ethical approval stipulated that data could only be collected if the parents did not opt out. There were no other cases where parents objected to the survey. The children were informed in writing that completion of the survey was optional and that the data collected were anonymous. Teachers were informed in writing that the survey was optional and anonymous. They were asked to ensure that children did not write their names on the questionnaire, and to collect the questionnaires in a sealed envelope to be returned to the research team. Thus it is unlikely that supervision by teachers influenced the results. We assumed that the children believed (correctly) that all of the data were anonymised; if they did not believe this, they might have answered some questions wrongly (e.g. stating that they did not smoke when they did).

Data analysis

SPSS v20 was used for all statistical tests. Descriptive statistical tests were used and the results were presented in tables and graphs. Inferential statistical methods were used to test for differences between groups (e.g. between boys and girls, between ethnic and religious groups). The data were not normally distributed, and non-parametric tests were therefore used (chi-square (χ^2) test for nominal data, Mann–Whitney test for ordinal data with two groups, and Kruskal–Wallis test for more than two groups with ordinal data). Binary logistic regression was used to determine the effects of demographic variables on beliefs, attitudes, knowledge and behaviour.

Power is dependent on the test employed, the number of degrees of freedom and sample size. We used the definitions of effect sizes by Cohen (1989). However, the main test employed is chi square which, for 5 degrees of freedom (the largest number used here), would be able to detect a small effect ($w = 0.3$) with 1283 and a medium effect with 143, and for the Mann–Whitney test a small effect ($d = 0.3$) with 290 and a medium effect ($d = 0.5$) with 106. Thus, for all of the results presented here, one would be able to detect

at least a medium effect with standard power and alpha level.

Validity and reliability and rigour

CIH has an advisory board, expert panel and intervention committee, membership of which can be seen on the website (www.cih.net). A survey questionnaire was created by an international panel of medical experts, and piloted in 2008 in a Leicester school (not the one described in this paper). The purpose was to evaluate a programme of public health interventions targeting smoking, exercise and diet. A focus group of one class in the school (30 young people) identified one question that was considered unacceptable (postcode), which was then removed. For this study only demographic questions and those related to smoking were used.

Results

In total, 693 young people completed the survey, equivalent to a response rate of around 50%. However, one complete year was missing in two schools due to a combination of staff sickness and exam preparation. Demographic data are shown in Tables 1, 2 and 3. The ethnic composition of the sample shows, as expected, a higher proportion of Asian or Asian British: Indian (9.9%) than the national figure of 2%, but a lower proportion than the figure for Leicester of 25.7% (Leicester City Council, 2011). A more detailed breakdown is available from a previous publication (Anthony, 2011a). Although interventions were evaluated in three other sites of the programme, in Leicester, due to problems with recruitment of some parts of the programme, the interventions were not delivered.

Smoking behaviour

Gender

There were significant differences between boys and girls in both those reporting having *ever smoked* and *current smokers* (i.e. defined for this study as those who had smoked in the last 30 days) (χ^2 = 26.5 and 12.5, respectively; df = 1, $P < 0.001$ in both cases). Girls were more likely to report smoking at least once (45% of girls vs. 26% of boys), and twice as many girls as boys reported that they were *current smokers* (20% vs. 10%).

Mothers' education

Children with more highly educated mothers reported lower rates of having *ever smoked* ($\chi^2 = 13.1$ df = 5, $P = 0.023$) and of *currently smoking* ($\chi^2 = 15.6$, $P = 0.008$), although the children of mothers who had not completed secondary school education had very low current smoking rates.

Ethnic group

In total, 667 individuals gave a response about ethnic group. Children from white and mixed backgrounds reported significantly higher rates than black or Asian or Asian British: Indian for both *ever smoked* and *current smoker* ($\chi^2 = 32.3$ and 24.1, respectively; df = 7; $P < 0.001$ and $P = 0.001$, respectively).

It is important to note that only ethnic groups with 10 or more young people were included in this analysis, namely white British (n = 433), any other white background (n = 30), white and black Caribbean (n = 18), white and Asian (n = 12), any other mixed background (n = 12), black or black British Caribbean

Table 1 Smoking status of students by age

Age (years)	Boys	Girls	Total	%	Number who ever smoked (% of age group)	Number of current smokers (% of age group)
≤ 11	0	1	1	0.1	1 (100)	1 (100)
12	0	3	3	0.4	2 (67)	2 (67)
13	69	69	138	20.5	31 (22)	10 (7.1)
14	87	86	173	25.7	42 (24)	10 (5.7)
15	71	90	161	23.9	61 (38)	28 (17)
16	92	106	198	29.4	101 (51)	52 (26)
Total	319	355	674	100.0	238 (35)	103 (15.1)

Table 2 Smoking status by ethnic group

Ethnic group	*n*	%	Number who ever smoked (% of ethnic group)	Number of current smokers (% of ethnic group)
White British	433	64.9	177 (41.3)	87 (20.1)
Asian or Asian British: Indian	66	9.9	6 (9.1)	2 (3.0)
Black or black British: African	36	5.4	7 (20.0)	0 (0.0)
Any other white background	30	4.5	11 (36.7)	2 (6.7)
White and black Caribbean	18	2.7	8 (44.4)	3 (16.7)
White and Asian	12	1.8	3 (25.0)	1 (8.3)
Any other mixed background	12	1.8	5 (41.7)	1 (8.3)
Any other Asian background	12	1.8	2 (16.7)	1 (8.3)
Black or black British: Caribbean	10	1.5	2 (20.0)	1 (10.0)
White and black African	8	1.2		
Other	8	1.2		
White Irish	7	1.0		
Any other black background	5	0.7		
Chinese	4	0.6		
Prefer not to say	3	0.4		
Asian or Asian British: Pakistani	2	0.3		
Asian or Asian British Bangladeshi	1	0.1		
Total	667	100	235 (35.5)	103 (15.4)

Table 3 Smoking status by religion

Religion	*n*	%	Number who ever smoked (% of religious group)	Number of current smokers (% of religious group)
No religion	296	44.2	138 (47.1)	65 (22.0)
Christian	269	40.1	77 (28.7)	28 (10.4)
Hindu	39	5.8	4 (10.3)	1 (2.6)
Muslim	28	4.2	4 (14.3)	2 (7.1)
Any other religion	20	3.0	6 (31.6)	3 (15.0)
Sikh	18	2.7	5 (27.8)	5 (27.8)
Total	670	100	234 (35.2)	104 (15.5)

($n = 10$), black or black British African ($n = 36$), and Asian or Asian British: Indian ($n = 66$). The rationale for this is that the chi-square test assumes expected values of more than 5 for each cell, and groups of less than 10 will always have much lower expected values than 5 for current smokers, as most children are not *current smokers*. The chi-square test is not reliable for analyses where more than 20% of cells have expected values of less than 5, or any cell has an expected value of less than 1 (Anthony, 2011b). Additional checks were made for expected values to ensure that these conditions were not breached in each analysis.

Religion

There were significant differences for the categories of having *ever smoked* and *current smoker* ($\chi^2 = 39.7$ and 23.3, respectively; df = 5; $P < 0.001$ for both). Hindu and Muslim children reported low rates of having *ever smoked*, and those of no religion reported high rates. With regard to children who currently smoked, there were very high rates for those of no religion or of Sikh religion, and very low rates for Hindu children, with Christian and Muslim children reporting intermediate rates.

Beliefs

Overwhelmingly, young people were aware of the health implications of smoking (see Table 4) and did not believe that smoking made one more attractive (see Table 5).

Although there was a difference between religious groups and ethnic groups with regard to whether they had *ever smoked* or were *current smokers*, there were no significant differences in beliefs. Young people from all of the ethnic groups and religions generally considered that smoking did not make boys or girls more attractive, with only 3.8% and 2.3%, respectively, believing that smoking made boys or girls more attractive. There were also no differences between religions in the beliefs that smoking is harmful, passive smoking is harmful or smoking is difficult to stop (Kruskal–Wallis test: $P = 0.18$, 0.1 and 0.2, respectively). There was a small and significant difference with regard to ethnic group, with white children less likely to believe that passive smoking is harmful (Kruskal–Wallis test: $P = 0.03$). Asian or Asian British: Indian children were more likely to believe that smoking is difficult to stop (Kruskal–Wallis test: $P = 0.04$), though neither group reached the Bonferroni-

Table 4 Beliefs about smoking and health

	Do you think smoking cigarettes is harmful to your health? *n* (%)	Do you think the smoke from other people's cigarettes is harmful to you? *n* (%)	Once someone has started smoking, do you think it would be difficult for them to stop? *n* (%)
Definitely yes	555 (84.1)	433 (65.6)	203 (31.2)
Probably yes	88 (13.3)	196 (29.7)	337 (51.8)
Probably not	4 (0.6)	22 (3.3)	77 (11.8)
Definitely not	13 (2.0)	9 (1.4)	34 (5.2)
Total	660 (100.0)	660 (100.0)	651 (100.0)

Table 5 Beliefs about smoking and attractiveness

	Do you think smoking cigarettes makes boys look more attractive? *n* (%)	Do you think smoking cigarettes makes girls look more attractive? *n* (%)
No	349 (60.1)	433 (70.2)
No difference from non-smokers	210 (36.1)	170 (27.5)
Yes	22 (3.8)	14 (2.3)
Total	581 (100.0)	617 (100.0)

adjusted alpha level. Girls did not differ significantly from boys on any of these variables (Mann–Whitney test: *P* values ranging from 0.3 to 0.99).

Binary logistic regression was performed, with *current smoker* as the dependent variable, and *age, gender, mother's highest education, religion* and *ethnicity* as the independent variables. Although the forward, backward and stepwise methods are commonly employed, there are problems with their use, and there is a trend away from deterministic methods and towards a purposeful selection of variables (Hosmer and Lemeshow, 2000). The method and setting values advocated by Hosmer and Lemeshow (2000) were used. Those authors advocate using the Enter method and then removing in turn the least significant variables until only significant ones remain. However, at each removal the beta values are examined and if any are changed by more than 20% the variable is re-entered, as it is assumed to be a confounder.

Thus *religion* was removed first, and this had a large effect on *mother's highest educational level* and was therefore retained. Next *ethnicity* was removed, which had a large effect on both *mother's highest educational level* and *religion*. Finally (as age and gender were always significant), *mother's highest educational level* was removed, which had a large effect on *religion*. Thus interaction between *religion, ethnicity* and *mother's highest educational level* seems to play a part in determining smoking behaviour, although interpreting the output was difficult, as there was so much correlation among religion, ethnic group and mother's educational level. However, Table 6 shows that, when other variables are kept constant, girls are more than twice as likely (odds ratio 2.4) to be current smokers ($P = 0.001$), Asian or Asian British: Indian children are more than eight times less likely than white British children (approaching significance, $P = 0.08$) to be current smokers, and those with no religion are about 80% more likely than Christian children ($P = 0.042$) to be current smokers.

Table 6 Binary logistic regression results with current smoker as dependent variable

	Reference category (categorical variables)	*P*-value	Odds ratio
Age (year)		< 0.001	1.917
Gender	Male	0.001	2.373
Mother's highest educational level		0.263	1.004
Ethnic group	White British	0.557	
Any other white background		0.102	0.275
White and black Caribbean		0.458	1.676
White and Asian		0.416	0.406
Any other mixed background		0.487	0.370
Black or black British: Caribbean		0.761	1.407
Black or black British: African		0.997	Not defined
Asian or Asian British: Indian		0.080	0.117
Any other Asian background		0.300	0.152
Religion	Christian	0.304	
Hindu		0.998	Not defined
Muslim		0.373	3.850
Sikh		0.167	5.684
Any other religion		0.265	2.257
No religion		0.042	1.796
Constant		0.004	

Discussion

The surveys of smoking in young people in the Leicester schools showed that 73% had never smoked, which is broadly in line with national data. The Tellus survey gave a figure of 77%, but as it included year 6 (aged 10–11) in addition to year 8 (aged 12–13) and year 10 (aged 14–15), it is likely to report a lower smoking prevalence (Chamberlain *et al*, 2010).

Since young people are less likely to start smoking if their parents do not smoke, it is likely that parental influence is more important than knowledge about smoking (Thomas *et al*, 2007). Young people are also more likely to smoke if their friends smoke (Thomas and Perera, 2008), so a young person in a group with a low prevalence of smoking, such as Indians, will be less likely to start smoking. Thus a consideration of adult smoking rates in Leicester may inform this study. Data on smoking among adults in Leicester showed large differences between different ethnic groups. White people had a smoking prevalence of 35%, compared with 15% among other ethnic groups (n = 2377) (Glendinning *et al*, 2010). In the UK, Indian men smoke the least (20%) compared with the UK average (24%); there is a more pronounced difference among women (5% of Indian women compared with 23% of white women). Some South Asian ethnic groups show even larger differences, with Bangladeshi men having the highest smoking rate (40%) but Bangladeshi women the lowest (2%) (Cancer Research UK, 2011). The figures quoted by Cancer Research UK are based on the Health Survey for England 2004 (Sproston and Mindell, 2006), and the General Lifestyle Survey of 2008 gave a rate of 21% for smoking in the UK (Robinson and Bugler, 2010), which is likely to be even lower for 2011. Given that men and women in the Bangladeshi community will normally share the same religion, religion in itself is not likely to be a protective factor. A combination of gender and ethnic group seems to be more plausible, as in some cultures it is more acceptable for women to smoke (e.g. smoking rates are similar for white British men and women) and in others it is not (e.g. smoking is disapproved of by Sikh Indians for religious reasons). It would appear that the reduced risk of smoking among Indians is due in part to the fact that the parents of young people in this ethnic group are less likely to smoke.

The picture for smokeless tobacco is very different. High rates of smokeless tobacco and betel quid chewing were found in Bangladeshi women, and the addition of tobacco to paan was more common among Bangladeshi women than men. Adolescents commonly used betel quid, including its use with tobacco, in London in the late 1990s and early 2000s (Messina *et al,* 2012). However, in our adult community sample (n = 1382) in Leicester, in the same wards as were used in our school survey, the population was predominantly white British (60.3%) and then Asian or Asian British: Indian (19.2%), with only small numbers of Pakistani (1.2%) and Bangladeshi (0.3%) individuals. Furthermore, in the overall community sample, only seven men and two women reported any use of smokeless tobacco (snuff, chewing tobacco or betel), and only 0.5% (n = 4) of the Asians or Asian British: Indians and only one of 40 Bangladeshi individuals reported any use of smokeless tobacco. The specific question of whether the subjects used betel quid with tobacco identified just one Indian man who used this combination.

In the schools survey reported here, there were significant differences in smoking between ethnic and religious groups, and between boys and girls, and these were not explained by beliefs about smoking. Similar results have been seen in adults in the same geographical areas (Anthony *et al*, 2012). The dangers of smoking are well known. A recent Cochrane review states that lack of knowledge about smoking among adolescents is not a problem, and that focusing on the dangers of smoking in order to persuade young people to make a rational decision not to start smoking does not work. This suggests that programmes based on social learning theory, providing positive images for non-smokers, are likely to be a better approach (Brinn *et al*, 2010).

Smoking was not seen as attractive. For example, only 2.3% of our sample thought that smoking made girls more attractive. Although acculturation has been suggested to increase smoking among Asians, in this sample we see no evidence for this, and indeed they have very low smoking rates for boys and girls. Quite how unrelated beliefs and smoking behaviour can be is illustrated by a comparison with data collected with the same instrument in 2010 in the CIH site in Kerala State, India. In Leicester, 16% of the young people were *current smokers*, compared with only 1.9% of those in Kerala. Beliefs differed in Kerala, where 43% (n = 4459) thought that smoking made boys more attractive and 8% thought that it made girls more attractive, compared with 3.8% and 2.3%, respectively, in Leicester. Knowledge was similar in the two countries, with 80% of children in Leicester and 81% of those in India reporting that smoking was harmful. Smoking rates in children may be related to those in adults: smoking is less prevalent in Kerala (12.8%) compared with Leicester (25%). However, in Kerala there is a large gender difference (27.6% of boys and 0.3% of girls report *current smoking*).

The results of our study may be generalisable to other cities in the UK and other countries where there is a high proportion of either of the two main ethnic groups reported (white British and Asian or Asian British: Indian). The Indian diaspora is the largest proportionally and the second largest by number in

the UK, and there are large populations in the USA, Canada, Malaysia and many other countries (Non Resident Indians and Persons of Indian Origin Division, 2001). The results will not be generalisable to other South Asian ethnic groups since, as noted above, their tobacco use is very different.

Finally, given the target of the UK Government to reduce smoking in 11- to 15-year-olds to less than 1% by 2020, we can report that, in the wards of Leicester, we are a very long way from achieving this. Among the 11- to 15-year-olds in the schools that we surveyed, 28.3% have tried cigarette smoking and 11.2% are current smokers. For white British children with no religion (n = 177), the corresponding figures are 37.3% and 16.9%, respectively.

Limitations of this study

The survey is a self-completion tool and may therefore suffer from inaccurate data. One complete year was missing from two schools. Some ethnic groups are small in number, so a larger survey would be needed in order to obtain meaningful results for these groups. The number of Asian or Asian British: Indian children is lower than the comparable figure for adults in the same wards. It is possible that children from this group did not wish to complete the survey, although discussion with the teachers suggested that very few children did not complete it, and this result is probably an artefact due to the missing data from some schools where there is a high proportion of children from this ethnic group. Poverty has an influence on smoking, and indices of deprivation would have been useful in this study. Postcodes which can be linked to deprivation scores were found to be unacceptable to children in the pilot study, and we employed *mothers' highest educational level* as a proxy measure. However, this information is not always known by children, and other measures such as *uptake of free school meals* could be considered. This is a measure commonly employed in the UK by Government, although its use is associated with problems such as variability in uptake between schools, and a very low baseline such that children from relatively poor families may not be recipients of free school meals.

Conclusions

There are differences in smoking behaviour among the various demographic groups, but these are not explained by knowledge, attitudes or beliefs. There is no evidence of acculturation in this sample with regard to smoking.

Young girls, white British children and those with no religion were more at risk of smoking. This is probably not related to ethnic group or religion per se, but to the function of role models in a particular social group. Smoking rates for males in older age groups are similar to those for females. It could be that, for males, smoking initiation is delayed, or that young men are now less likely to smoke compared with young women than in previous years. There seems to be little evidence of increased smoking due to acculturation in black or Indian ethnic groups. As 80% of young people recognise that smoking is harmful, we could view this as a public health success, but it is apparent that knowledge alone is not sufficient to prevent children from taking up smoking.

In the future, health education should be more innovative and should target high-risk groups. The girl smokers in our survey could be considered a vulnerable/high-risk group, and targeted smoking prevention programmes might reduce the number of individuals who require smoking cessation programmes in pregnancy.

A qualitative component in future studies could explore with the young people their motivations, and this could establish the potential value of programmes using social learning theory, and possibly illuminate the correlations between *religion, ethnicity* and *mother's educational level.*

ACKNOWLEDGEMENTS

Community Interventions for Health (CIH) is supported by a registered UK charity, the Oxford Health Alliance (OxHA), and is facilitated by MATRIX Public Health Solutions Inc. A full list of donors supporting OxHA can be found on the OxHA website (www.oxha.org). NHS Leicester City funded the survey, with matched funding provided by the Oxford Health Alliance. The schools of Leicester supported the programme and the young people in the schools completed questionnaires voluntarily.

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CONFLICTS OF INTEREST

None.

ADDRESS FOR CORRESPONDENCE

Dr Denis Anthony, Harris Manchester College, University of Oxford, Oxford OX1 3TD, UK. Tel: 01865 281464; email: danthony@oxha.org

Received 6 July 2012
Accepted 9 December 2012