

- 5 Vutuc C, Kunze M. Lung cancer risk in women in relation to tar yields of cigarettes. *Prev Med* 1982;11:713-6.
 - 6 Vutuc C, Kunze M. Tar yields of cigarettes and male lung cancer risk. *J Natl Cancer Inst* 1983;71:435-7.
 - 7 Wilcox HB, Schoenberg JB, Mason TJ, Bill JS, Stenhagen A. Smoking and lung cancer: risk as a function of cigarette tar content. *Prev Med* 1988;17:263-72.
 - 8 US Federal Trade Commission. *Domestic market share of cigarettes by tar yield. Federal Trade Commission cigarette report for 2000*. Washington, DC: US Federal Trade Commission, 2002.
 - 9 Stellman SD, Garfinkel L. Smoking habits and tar levels in a new American Cancer Society prospective study of 1.2 million men and women. *J Natl Cancer Inst* 1986;76:1057-63.
 - 10 Thun MJ, Calle EE, Rodriguez C, Wingo PA. Epidemiological research at the American Cancer Society. *Cancer Epidemiol Biomarkers Prev* 2000;9:861-8.
 - 11 Garfinkel L. *Selection, follow-up, and analysis in the American Cancer Society prospective studies*. Washington, DC: Government Printing Office, 1985:49-52. (NIH Publication 85-2713, National Cancer Institute monograph 67.)
 - 12 Calle EE, Terrell DD. Utility of the national death index for ascertainment of mortality among cancer prevention study II participants. *Am J Epidemiol* 1993;137:235-41.
 - 13 US Federal Trade Commission. *Report of tar, nicotine, and carbon monoxide of the smoke of 200 varieties of cigarettes*. Washington, DC: US Federal Trade Commission, 1981.
 - 14 Rothman KJ, Greenland S. *Modern epidemiology*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 1998.
 - 15 Zang EA, Wynder EL. Cumulative tar exposure. A new index for estimating lung cancer risk among cigarette smokers. *Cancer* 1992;70:69-76.
 - 16 Kunze M, Vutuc C. Threshold of tar exposure: analysis of smoking history of male lung cancer cases and controls. In: Gori GB, Bock FG, eds. *A safe cigarette? Banbury report 3*. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory, 1980:29-36.
 - 17 Benowitz N. Compensatory smoking of low-yield cigarettes. In: Shopland DR, Burns DM, Benowitz NI, Amacher RH, eds. *Risks associated with smoking cigarettes with low machine-measured yields of tar and nicotine*. Bethesda, MD: US National Institutes of Health, National Cancer Institute, 2001:39-64. (NCI smoking and tobacco control monograph No 13.)
 - 18 Burns DR, Major JM, Shanks TG, Thun MJ, Samet JM. Smoking lower yield cigarettes and disease risks. In: Shopland DR, Burns DM, Benowitz NI, Amacher RH, eds. *Risks associated with smoking cigarettes with low machine-measured yields of tar and nicotine*. Bethesda, MD: US National Institutes of Health, National Cancer Institute, 2001:65-158. (NCI smoking and tobacco control monograph No 13.)
 - 19 Thun MJ, Lally CA, Flannery JT, Calle EE, Flanders WD, Heath CW Jr. Cigarette smoking and changes in the histopathology of lung cancer. *J Natl Cancer Inst* 1997;89:1580-6.
 - 20 Hoffmann D, Hoffmann I. Tobacco consumption and lung cancer. In: Hansen HH, ed. *Lung cancer*. Boston: Kluwer Academic Publications, 1994:1-42.
 - 21 Harris JE. Smoke yields of tobacco-specific nitrosamines in relation to FTC tar level and cigarette manufacturer: analysis of the Massachusetts benchmark study. *Public Health Rep* 2001;116:336-43.
 - 22 Forey B, Hamling J, Lee P, Wald N, eds. *International smoking statistics*. 2nd ed. London: Oxford University Press, 2002.
 - 23 US Department of Agriculture, Economic Research Service. *Tobacco outlook*. Washington, DC: USDA, April 2002. (TBS-252.)
 - 24 Yang G, Fan L, Tan J, Qi G, Zhang Y, Samet JM, et al. Smoking in China: findings of the 1996 national prevalence survey. *JAMA* 1999;282:1247-53.
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Review of prevalence data in, and evaluation of methods for cross cultural adaptation of, UK surveys on tobacco and alcohol in ethnic minority groups

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Abstract

Objective To assess the adequacy of cross cultural adaptations of survey questions on self reported tobacco and alcohol consumption in the United Kingdom.

Design Assessment of consistency of data between studies identified through literature review. Studies evaluated with 12 guidelines developed from the research literature on achieving cross cultural comparability.

Results The literature review identified 18 key studies, five of them on national samples. Survey instruments were obtained for 15 of these. The comparison of prevalence data in national surveys showed some important discrepancies, greater for tobacco than for alcohol. For example, prevalence of cigarette smoking in Bangladeshi women was 6% in a national survey in 1994 and 1% in a national survey in 1999; in Chinese men it was 31% in a survey in 1993-4 and 17% in one in 1999; in African-Caribbean men it was 29% in a 1992 survey and 42% in one in 1993-4. The most guidelines met by any study was three, although one study partly met a fourth. Two studies met no guidelines. Only four studies consulted with ethnic minority communities in developing the questionnaire, none checked each language version with all others, and two stated the questionnaire had not been validated.

Conclusions Surveys have not followed best practice in relation to measurement of risk factors in cross cultural settings. There is inconsistency in the prevalence data on smoking provided by different major national UK studies. Users of such data should be aware of their limitations. Research is needed to help achieve linguistic equivalence of survey questions in cross cultural research.

Introduction

Cancers and cardiovascular disease are dominant causes of death in Britain's ethnic minority groups.¹ The prevention of such disorders requires accurate information about health related behaviour such as the amount and pattern of consumption of tobacco and alcohol. Such information is usually acquired by self completed questionnaires or schedules administered by interviewers, sometimes validated by biochemical and other tests.

Most survey instruments on tobacco and alcohol consumption by ethnic minorities were developed for English speaking people and translated into other languages. To compare data across language groups the items on the questionnaire, the instructions given, and the responses obtained should be conceptually and



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Summary of 12 guidelines for maximising cross cultural validity of questionnaire

Original instrument

- Questionnaire source—whether professional or lay, or both
- Piloting of questionnaire
- Validity testing of original questionnaire
- Reliability testing of original questionnaire
- Responsiveness testing of original questionnaire

Translation process

- Discussion of translations of questionnaire by bilingual people
- Discussions of translations with community members who speak only one language
- Comparison of original questionnaire with each translation
- Comparison of each translation with every other
- Validity testing of translated questionnaire(s)
- Reliability testing of translated questionnaire(s)
- Responsiveness testing of translated questionnaire(s)

functionally equivalent in each language.²⁻⁵ If reliability and validity for each language varies, comparisons across groups may be invalid. Translation is a vital step in the process.

The quality of data obtained from surveys of non-English speakers may be compromised by inadequacies in the translation procedures, failure to compare questionnaire content across languages, failure to consider the cultural appropriateness of items for use with English speakers (for example, it is socially unacceptable for women from several ethnic minority groups to smoke or to drink), and lack of standardisation in terminology, sampling, and the grouping of samples.

We established whether previous studies that measured prevalence of tobacco and alcohol use in ethnic minority groups in the United Kingdom applied

well established guidelines for cross cultural research (see box),^{3 4 6-11} and we looked for evidence of inconsistency in the findings that might indicate methodological problems.

Methods

We identified publications of investigations on prevalence of tobacco or alcohol consumption, or both, in minority ethnic groups in the United Kingdom. Although our focus was on national studies because of their influence on policy, we also included local studies that measured the prevalence of consumption of tobacco, alcohol, or smokeless tobacco. We did not include studies in which tobacco or alcohol consumption was a small component of a health or lifestyle questionnaire. Our search strategy included key word searches of five major science databases, searches of cited references, and hand searching of relevant academic journals.

We identified 43 publications. We analysed 18 key studies (those providing detailed national or local prevalence data) and for 15 of these obtained the questionnaires from the authors, who were informed about our work. Three questionnaires were unobtainable. The investigators' translations were sought. Five questionnaires were from national surveys. Fourteen of the 15 studies included data on tobacco, 11 on alcohol, and six on smokeless tobacco products. The studies on smokeless tobacco products are not tabulated here but are included in the evaluation methods (table available from authors).

We summarised tobacco and alcohol consumption by ethnic group and sex. Consistency across the studies should increase confidence in the translations and methods used to collect the data while large differences would suggest methodological problems.

We analysed the survey instrument(s) for each key study and publication according to well established guidelines governing cross cultural research (box). Our analysis was sent to the authors for checking and for

Table 1 Questions asked to obtain prevalence data and prevalence (percentage) of self reported current tobacco consumption in national studies according to ethnic origin

Study(fieldwork dates)	Question asked	African-Caribbean		Indian		Pakistani		Bangladeshi		Chinese		Predominantly European	
		M	F	M	F	M	F	M	F	M	F	M	F
BMEG 1992 ¹⁶ (1991-2)*	Do you smoke cigarettes at all nowadays?	29	17	20	1	30	2	42	5	NA	NA	29	27
FNS ¹⁵ (1993-4)	Do you smoke cigarettes (or Bidis, if Asian) at all nowadays?	42	31	19	5	33	4	49	<1	31	3	34	37
BMEG 1994 ¹⁴ (1994)	Do you smoke cigarettes at all nowadays?	34	21	18	3	28	2	49	6	NA	NA	29	27
H&LC ¹³ (1997-8)	Do you smoke cigarettes at all nowadays?	NA	NA	NA	NA	NA	NA	NA	NA	21	8	NA	NA
HSE 1999 ¹² (1999)†	Do you smoke cigarettes at all nowadays?	35	25	23	6	26	5	44	1	17	9	27	27
	Self reported smoking (any tobacco products)	38	25	28	8	8	7	53	27	20	9	32	27
	Cotinine adjusted prevalence	43	28	34	12	38	12	59	38	23	11	36	29
	Difference	5	3	6	4	9	5	6	12	3	2	3	2

NA—not applicable.

BMEG=black and minority ethnic groups in England: health and lifestyles survey.

FNS= fourth national survey of ethnic minorities.

H&LC=health and lifestyles of the Chinese population in England.

HSE=health survey for England: the health of ethnic minority groups.

*Standardised figures as reported in Rudat, 1994. For African-Caribbeans.

†Figures under European are for general population, which includes all people living in England including ethnic minority groups.

Table 2 Questions asked to obtain prevalence data and prevalence (percentage) of self reported current alcohol consumption in national studies according to ethnic origin

Study* (fieldwork dates)	Question asked†	African-Caribbean		Indian		Pakistani		Bangladeshi		Chinese		Predominantly European	
		M	F	M	F	M	F	M	F	M	F	M	F
FNS ¹⁵ (1993-4)	How often, if ever, do you drink alcohol?	87	74	66	18	8	<1	3	2	69	51	92	83
H&LC ¹³ (1997-8)	Do you ever drink alcohol nowadays?	—	—	—	—	—	—	—	—	73	56	—	—
HSE 1999 ¹² (1999)	Do you ever drink alcohol nowadays, including drinks you brew or make at home?	87	81	66	35	9	3	4	1	68	56	95	89

FNS=fourth national survey of ethnic minorities.
 H&LC=health and lifestyles of the Chinese population in England.
 HSE=health survey for England: the health of ethnic minority groups.
 *Includes only studies that asked questions about alcohol consumption.

additional information. Mostly, we have preserved the terminology relating to ethnic groups used by the authors—for example, use of the term “white” or “European.” However, we use the term South Asian to refer to mainly Indian, Pakistan, and Bangladeshi populations, and European to mean predominantly white populations. General populations in the United Kingdom are usually more than 90% white. Other terms are as in general use.

Results

Tobacco

Table 1 shows the reported prevalence of tobacco consumption by ethnic group in five national studies.¹²⁻¹⁶

We were able to compare the five national studies because they had similar aims, but the local studies were too different to permit comparisons.¹⁷⁻²⁵ (See bmj.com for a table of results.) The results from the national studies showed important discrepancies. For example, in Bangladeshi women in the health survey for England 1999 the prevalence of cigarette smoking was 1% compared with 6% in the survey of black and minority ethnic groups in 1994.¹⁴ The prevalence of smoking in men of Chinese origin in the health survey for England 1999 was 17% compared with 31% in the fourth national survey of ethnic minorities and health (1993-4). The prevalence for African-Caribbean men was 29% in the 1992 survey of black and ethnic minority groups in England⁶ and 42% in the fourth national survey of ethnic minorities.¹⁵

Cotinine, a derivative of nicotine, can indicate whether a person smokes (at levels on or above 15 mg/ml) or has had recent exposure to tobacco smoke through passive smoking.¹² In the health survey for England 1999 when the prevalence of smoking was adjusted for cotinine it was substantially higher for men from most ethnic minorities except for the Chinese (table 1). This level of discrepancy was not seen in the general population, suggesting that self reported data are less accurate in ethnic minority groups.

Alcohol consumption

Table 2 shows considerable consistency between ethnic groups in the national studies for reported drinking among men. For women, however, the results were mixed. There was consistency between studies for Pakistani, Bangladeshi, African-Caribbean, Chinese, and European women. However, in Indian women differences existed—for example, in the fourth national survey of ethnic minorities 18% of Indian women reported drinking alcohol compared with 35% in the health survey for England 1999.

Survey methods

Using the 12 guidelines in the box we appraised publications and information obtained from nine of the 15 authors, including a study reporting only on smokeless tobacco.²⁶ The health survey for England 1999 met three of the 12 guidelines and partially met one other.¹² Three studies met three guidelines: two of these studies were national,^{15 16} and one was a local study in Newcastle.²² Most studies complied with one or two of the guidelines.

Ideally, survey questions should be based on consultation with lay people.²⁷ Four studies explicitly

Table 3 Assessment of studies according to recommended criteria—original questionnaire

Study	Source of questionnaire	Original validation	Original reliability	Original responsiveness	Piloted
National					
BMEG1 ¹⁶	Community consultation, focus groups	NS	NS	NS	Yes
FNS ^{15*}	Professional (HSE)	Yes	NS	NS	Yes
BMEG2 ¹⁴	Not stated but based on BMEG1	NS	NS	NS	Yes
H&LC ¹³	Focus groups and other surveys	NS	NS	NS	Yes
HSE 1999 ^{12*}	Previous HSE surveys	No	No	No	Yes
Local					
Kohli ¹⁷	Not stated	No	No	No	Yes
Cochrane ^{26*}	Professional: WHO survey	NS	NS	NS	NS
Denscombe ^{19 20}	WHO survey	Yes, face validity	NS	NS	Yes
Bhopal ^{22*}	Newcastle health and lifestyle survey	No	No	No	Yes
White ²¹	Newcastle health and lifestyle questionnaire	No	No	No	Yes
Williams ^{18*}	Professional; various sources	NS	No	No	Yes
Summers ^{22*}	Community discussion	NS	NS	NS	Yes
Pearson ^{26*}	Other studies and community discussion	No	No	No	Yes
Shetty ^{24*}	Literature review and other studies	No	No	No	Yes
Ahmed ^{25*}	Lay family opinion and author	No	No	No	Yes

NS=not stated.
 BMEG=black and ethnic minority groups in England: health and lifestyles survey.
 FNS=fourth national survey of ethnic minorities.
 H&LC=health and lifestyles of the Chinese population in England.
 HSE=health survey for England: the health of ethnic minority groups.
 *Studies for which authors provided comments on our systematic analysis.

Table 4 Assessment of studies according to recommended criteria—translated questionnaire

Study	Group translation	Monolingual consultation	Comparison with		Translation		
			English original	Each language version	Validation	Reliability	Responsiveness
National							
BMEG1 ¹⁶	NS	Yes	Yes	NS	NS	NS	No
FNS ^{15*}	No	No	Yes	No	No	No	No
BMEG2 ¹⁴	NS	NS	NS	NS	NS	NS	No
H&LC ¹³	NS	Possibly during pilot	Yes	NA	NS	NS	No
HSE 1999 ^{13*}	No	Partly during pilot	Yes	No	No	No	No
Local							
Kohli ¹⁷	NA	NA	NA	NA	NA	NA	NA
Cochrane ^{28*}	NS	NS	Yes	NS	NS	NS	No
Denscombe ^{19,20}	NA	NA	NA	NA	NA	NA	No
Bhopal ^{22*}	Yes	No	Yes	No	No	No	No
White ²¹	No	No	Yes	NA	No	No	No
Williams ^{18*}	No	No	Yes	No	No	No	No
Summers ^{23*}	NS	NA	NA	NA	NA	NA	No
Pearson ²⁶	NA	No	NA	NA	NA	NA	No
Shetty ^{24*}	NA	NA	NA	NA	NA	NA	No
Ahmed ^{25*}	Yes	No	Yes	NA	NS	No	No

NS=not stated; NA=not applicable.

*Studies for which authors provided comments on our systematic analysis.

consulted with the community to design the English questionnaire (table 3). Two studies reported that the questionnaire had been validated (table 3), but they gave no details of the validation process and these could not be obtained from the authors. Information on reliability and responsiveness of the English questionnaires was not provided. Fourteen of the 15 studies carried out some piloting of research instruments (table 3). This varied from piloting the questionnaire in English only, to piloting it in different language versions in particular geographical areas to test appropriateness of wording and acceptability.^{13–15}

Two of the studies explicitly used a group translation process.^{22–25} All of the others used a single translator (table 4). The 1992 survey of black and ethnic minority groups in England involved consultations with the community to investigate sensitivity of questions and cultural taboos but did not seek their opinion on the accuracy, simplicity, and conceptual equivalence of the translation.¹⁶ During piloting the health survey for England 1999 sought the views of monolingual people on how understandable the questions were. Interviewees were asked to express any concerns to the interviewer that they may have had with the translated question.¹²

None of the studies compared each language version of the questionnaire with every other language to check for linguistic and conceptual equivalence. Most studies compared translations to the original English version only. Some, but not all, studies used the written back translation method, whereby the original instrument is translated, a second translator translates it back into English, and the two English versions are compared.^{16, 22–25, 28} None of the studies retested the translated questions for validity, reliability, or responsiveness.

Discussion

Principal findings

We assessed studies by comparing reported prevalence figures, analysing the process of development of the survey instruments (both reported here), and by asking for comments from Bengali speakers on the versions

translated into Bengali (reported elsewhere²⁹). All three methods suggest problems in the translation of questionnaires and their cultural appropriateness.

The five national surveys had important discrepancies between self reported prevalence of tobacco use. This may be because the fieldwork for the studies was done some years apart, the earliest in 1991 and the most recent in 1999; the sampling methods were different; the questions were not standard across studies; and the mode of administration of the questionnaires was not the same. However, most of these factors apply equally to comparisons between predominantly white populations, in which consistency was much greater. One potential source of discrepancy is that for non-English questionnaires the items had been variably translated. This does not, however, explain the discrepancy in data on African-Caribbean men, where the questionnaires were in English. Inadequate cross cultural adaptation is an important potential explanation for these discrepancies.

Limitations of the study and strengths

Our study has several limitations. Tables 3 and 4 may be incomplete as not all of the authors provided the required detail. The correspondence we had with nine authors, however, suggests that publications report reasonably accurately the methods that were used for designing and translating questionnaires. Further, although our study was limited to tobacco and alcohol, it gives direction to future more general research.

Implications of the study

We have questioned the quality of data obtained from surveys of non-English speaking ethnic minorities. New questionnaires should be developed and guided, as far as possible, by established guidelines for cross cultural research. We found only one other study on this issue. Bowden and Fox-Rushby recently reported a review of the translation and adaptation of health related quality of life measures internationally.³⁰ Their review used guidelines to assess whether authors of original articles had followed recommended processes.

What is already known on this topic

Key risk factors, including consumption of tobacco and alcohol, vary among ethnic groups

Collecting data on risk factors by ethnic group in multi-ethnic settings is necessary but difficult

Translation into appropriate languages and back translation are necessary but insufficient steps to safeguard cross cultural validity

What this study adds

Discrepancies in prevalence data between even the national surveys are substantial and call for greater attention to the validity of study methods

The scientific literature offers guidelines on how to conduct surveys in cross cultural settings, but most of these have not been implemented in UK surveys on tobacco and alcohol

The cross cultural validity of survey methods needs to be improved, particularly in multilingual, multi-ethnic societies

Their conclusions were similar to ours—researchers using and developing health related measures had paid insufficient heed to cross cultural equivalence, particularly conceptual.

Our findings have implications for the design of future epidemiological research that depends on self report from ethnic minority groups, especially in older people, new immigrants, and refugees living in the United Kingdom. The health survey for England in 2004 will once again focus on ethnic minority groups and will present an opportunity to maximise the cross cultural validity of the methods. Policy makers, health planners, health promoters, and health carers should use existing data to underpin their efforts to reduce the prevalence of risk factors in UK ethnic minority groups.^{1 31} It is vital, however, that they do so with awareness of the data's limitations, some of which are considered in this paper. The principles and issues raised here are likely to be relevant to all multi-ethnic societies.

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1 Gill PS, Kai J, Bhopal RS, Wild S. Health care needs assessment: black and minority ethnic groups. In: Raftery J, ed. *The epidemiologically based needs assessment reviews*. 3rd series. (In press.) <http://hcna.radcliffe-oxford.com/bemframe.htm> (accessed Oct 2003).

- 2 Deutscher I. Asking questions cross-culturally: some problems of linguistic comparability. In: Warwick D, Osherson S, eds. *Comparative research methods*. New Jersey: Prentice Hall, 1973:163-88.
- 3 Herdman M, Fox-Rushby J, Badia X. A model of equivalence in the cultural adaptation of HRQoL instruments: the universalist approach. *Qual Life Res* 1998;7:323-35.
- 4 Hunt SM. Cross-cultural comparability of quality of life measures. In: Gugenmoos-Holzman I, Bloomfield K, Brenner H, Flick U, eds. *Quality of life and health: concepts methods and applications*. Berlin: Blackwell Wissenschaft-Verlag, 1995:15-26.
- 5 Hunt SM. Cross-cultural issues in the use of quality of life measures in randomized controlled trials. In: Staquet M, Hays R, Fayers P, eds. *Quality of life assessment in clinical trials*. Oxford: Oxford University Press, 1998:51-64.
- 6 Aaronson N, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organisation for Research and Treatment of Cancer (EORTC). A quality of life instrument for use in international clinical trials in oncology. *J Nat Cancer Inst* 1993;85:365-76.
- 7 Bullinger M. Ensuring international equivalence of quality of life measures. In: Orley J, Kuyk W, eds. *Quality of life assessment: international perspectives*. Berlin: Springer, 1994:33-40.
- 8 Hunt SM, Alonso J, Bucquet D, Niero M, Wiklund I, McKenna S. Cross-cultural adaptation of health measures. *Health Policy* 1991;19:33-44.
- 9 Guillemin F, Bombardier C, Beaton D. The cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines. *J Clin Epidemiol* 1993;46:1417-32
- 10 European Group for Quality of Life Assessment and Health Measurement. *European guide to the Nottingham health profile*. Montpellier: Verret, 1992.
- 11 Herdman M, Fox-Rushby J, Badia X. 'Equivalence' and the translation and adaptation of health-related quality of life questionnaires. *Qual Life Res* 1997;6:237-47.
- 12 Erens B, Primatesta P, Prior G, eds. *Health survey for England: the health of minority ethnic groups 1999*. Vols 1 and 2. London: Stationery Office, 2001.
- 13 Sproston K, Pitson L, Whitfield G, Walker E. *Health and lifestyles of the Chinese population in England*. London: Health Education Authority, 2001.
- 14 Johnson M, Owen D, Blackburn C. *Black and ethnic minority groups in England: the second health and lifestyles survey*. London: Health Education Authority, 2000.
- 15 Nazroo J. *The health of Britain's ethnic minorities—findings from a national survey*. London: Policy Studies Institute, 1997.
- 16 Rudat K. *Black and minority ethnic groups in England*. London: Health Education Authority, 1994.
- 17 Kohli HS. A comparison of smoking and drinking among Asian and white schoolchildren in Glasgow. *Public Health* 1989;103:433-9.
- 18 Williams R, Bhopal R, Hunt K. Health of a Punjabi ethnic minority in Glasgow: a comparison with the general population. *J Epidemiol Community Health* 1993;47:96-102.
- 19 Denscombe M. Ethnic group and alcohol consumption: the case of 15-16 year olds in Leicestershire. *Public Health* 1995;109:133-42.
- 20 Denscombe M, Druquier N. Diversity within ethnic groups: alcohol and tobacco consumption by young people in the East Midlands. *Health Educ J* 2000;59:340-50.
- 21 White M, Harland J, Bhopal R, Unwin N. Smoking and alcohol consumption in a UK Chinese population. *Public Health* 2001;115:462-9.
- 22 Bhopal R, Unwin N, White M, Yallop J, Walker L, Alberti K, et al. Heterogeneity of coronary heart disease risk factors in Indian, Pakistani, Bangladeshi, and European origin populations: cross sectional study. *BMJ* 1999;319:215-20.
- 23 Summers RM, Williams SA, Curzon ME. The use of tobacco and betel quid ('paan') among Bangladeshi women in West Yorkshire. *Community Dent Health* 1994;11:12-6.
- 24 Shetty K, Johnson N. Knowledge, attitudes and beliefs of adult South Asians living in London regarding risk factors and signs for oral cancer. *Community Dent Health* 1999;16:227-31.
- 25 Ahmed S, Rahman A, Hull S. Use of betel quid and cigarettes among Bangladeshi patients in an inner-city practice: prevalence and knowledge of health effects. *Br J Gen Pract* 1997;47:431-4.
- 26 Pearson N, Croucher R, Marcens W, O'Farrell M. Dental service use and implications for oral cancer screening in a sample of bangladeshi adult medical care users living in tower Hamlets, UK. *Br Dent J* 2001;186:517-21.
- 27 Hunt SM, McEwan J, McKenna SP. *Measuring health status*. Cheltenham: Croom Helm, 1986.
- 28 Cochrane R, Bal S. The drinking habits of Sikh, Hindu, Muslim and white men in the West Midlands. *Br J Addict* 1990;85:759-69.
- 29 Vettini A, Bhopal R, Hunt S, Wiebe S, Hanna L, Amos A. *Measurement of risk factors for cancer in ethnicity and health research: a case study of tobacco and alcohol*. Edinburgh: University of Edinburgh, 2001:1-132.
- 30 Bowden A, Fox-Rushby JA. A systematic and critical review of the process of translation and adaptation of generic health-related quality of life measures in Africa, Asia, Eastern Europe, the Middle East, South America. *Soc Sci Med* 2003;57:1289-306.
- 31 Hunt S, Bhopal R. Self report in research with non-English speakers. *BMJ* 2003;327:352-3.

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