

# Incidence of oral cancer among South Asians and those of other ethnic groups by sex in West Yorkshire and England, 2001–2006

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## Abstract

In 2008 there were 11 682 cases of oral cancer in the United Kingdom; this is 16.41/100 000 population, and 3.7% of all cancers. Ethnic coding of these data is poor, and so databases were combined to report rates for the incidence of oral cancer in South Asians compared with those among other ethnic groups in West Yorkshire, 2001–2006. A total of 2157 patients with oral cancer were identified in West Yorkshire, 138 of whom were South Asian (6.4%). We analysed them by ethnicity, sex, area in which they lived, and site of cancer. Oral cancer was significantly more common among South Asian women than those from other ethnic groups in England and West Yorkshire, and in England alone it was significantly more common in men of other ethnic groups than those from South Asia. Patients from South Asia were at higher risk of being diagnosed with oral cancer than those of other ethnic groups within West Yorkshire, when data were adjusted for age at diagnosis and sex. In England and in West Yorkshire there was a significantly higher rate of oral cancer among Southern Asian women than among those of other ethnic groups, and men in other ethnic groups had a higher incidence than those from South Asia (England only). The excess of oral cancers gives further weight to the association between smokeless tobacco, smoking, alcohol, and dietary intake by ethnic group. This information is particularly pertinent in areas such as West Yorkshire where there are large groups of Asian people.

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## Introduction

Three quarters of oral and pharyngeal cancers are thought to occur in developing countries. 'Oral' cancer is defined

as a malignant neoplasm that affects the pharynx, tongue, lip, or mouth.<sup>1</sup> Within the UK in 2008 there were 11 682 reported oral cancers (ICD-10: C00–C14, C30–C32, C73), which constituted 16.41/100 000 population and 3.73% of all cancers.<sup>2</sup> Mortality was similar to that for cervical cancer,<sup>3</sup> but early diagnosis can greatly improve survival.<sup>4</sup> Overall, the incidence of oral cancer is higher in men than women and is more likely to present in lower socioeconomic groups.<sup>5</sup>

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The ability to identify patients at risk would greatly improve survival and give patients better outcomes. There is also the impact on the costs of treatment. Speight et al. found that the annual costs of managing patients with oral cancer in the UK increased from £1869 for a patient diagnosed with a precancerous lesion, to £13 513 for a patient with stage IV disease.<sup>6</sup>

The greatest risk factors for the development of oral cancer are tobacco and alcohol.<sup>7</sup> Smokers are 7–10 times more likely to develop it than those who have never smoked.<sup>8</sup> The risk of developing it is estimated to increase by 1.3 in alcoholics, and for long-term regular users of smokeless tobacco the risk is 11.4 times that of a non-user.<sup>9</sup> Data about oral cancer by ethnicity vary across the world, with a higher reported incidence in South Asian countries. Within India, oral cancers account for 20–30% of all cancers where the use of smokeless tobacco is widespread.<sup>10</sup> Warnakulasuriya et al. reported that there was a higher incidence of cancers of the mouth, pharynx, and nasopharynx in South Asian residents of the Thames region of the UK (1986–1991).<sup>11</sup> In south-east England there was also an excess of oral cancers among the South Asian population, particularly Bangladeshi women.<sup>12</sup> In West Yorkshire the largest ethnic minority group after ‘white’ residents (88.6%) are Pakistani (5.9%) followed by Indian (2%) (in England as a whole these are 90.9%, 2.1%, and 1.4%, respectively).<sup>13</sup>

The Health Survey for England in 2004 (which focussed on the health of ethnic minority groups) reported that the highest recorded smokeless tobacco use was among Bangladeshi women (16%) and men (9%), followed by Indian men (4%), Pakistani men (2%), and Indian and Pakistani women (both 1%).<sup>14</sup> An earlier study in West Yorkshire found that 95% of Bangladeshi women over 25 years old who were surveyed reported using ‘paan’, and 60% added tobacco.<sup>15</sup>

The detection of variations in the incidence of oral cancer between ethnic groups has been difficult. Within the UK, cancer statistics are collected by 9 population-based cancer registries, which are responsible for quality assurance and analysis of the information.<sup>16</sup> The data have limitations, particularly when ethnicity is not routinely coded.<sup>17</sup> It is against this background that we report on the incidence of oral cancer within the sexes of South Asian compared with other ethnic groups in West Yorkshire between 2001 and 2006.

## Methods

Cases of oral pharyngeal cancer diagnosed between 2001 and 2006 in West Yorkshire were identified by the Northern and Yorkshire Cancer Registry and Information Service from their database and defined by the International Classification of Disease (ICD) codes, 10th revision.<sup>18</sup>

Of the 2157 cases identified, only 813 (37.7%) had a valid ethnic code. All data were then cross-referenced for ethnicity with the Hospital Episode Statistics database, which matched patients by NHS number, date of birth, sex, and

Table 1  
Numbers according to ICD 10 codes for malignant neoplasms.

Code	Site	No (%)
C00	Lip	78 (4)
C01	Oral cavity	24 (1)
C02	Oral cavity	63 (3)
C03	Oral cavity	55 (3)
C04	Oral cavity	41 (2)
C05	Oral cavity	60 (3)
C06	Oral cavity	11 (1)
C07	Oral cavity	68 (3)
C09	Tonsil	364 (17)
C11	Pharynx	7 (0)
C12	Pharynx	216 (10)
C13	Pharynx	3 (<1)
C14	Other lip, oral cavity, pharynx	196 (9)
C30	Nasal cavity, sinus, larynx	82 (4)
C31	Nasal cavity, sinus, larynx	88 (4)
C32	Nasal cavity, sinus, larynx	381 (18)
C73	Thyroid	420 (19)
Total		2157 (100)

postcode. Nam Pehchan (a name recognition package) was then used to assign ethnicity to the remaining unknown cases. Patients were classified as either South Asian (Indian, Pakistani, Bangladeshi and other South Asian) or other.

To enable us to compare the incidence of oral cancer in West Yorkshire and that in England as a whole, national data were obtained from the National Cancer Intelligence Network. Rates for England were available only for 2002–2006 and were therefore used as the best available national comparator. Local authority population estimates by 5-year age band, sex, and ethnicity were obtained from the 2001 census. The age-standardised incidence for oral cancers with 95% confidence intervals (CI) was calculated using the European standard population. Rates are presented/100 000 population at risk. This has enabled the analysis of variations by ethnicity, sex, area, and site of cancer.

We used negative binomial regression, and incidence ratios (IR) with corresponding 95% CI were calculated. These surveillance data identified the incidence of oral cancer by ethnicity adjusting for factors such as age and sex, for West Yorkshire. STATA version 11.0 was used to assist with the statistical analyses.

## Results

Of the 2157 cases identified in West Yorkshire (Table 1), 138 were South Asian (6.4%); 63 were men (45.7%) and 75 women (54.3%).

Table 2 shows the age-standardised incidence of oral cancers including thyroid (C00–C14, C30–C32, C73). The rates for women were significantly higher among South Asians than among other ethnic groups both in West Yorkshire and in England. Within the analysis, men from other ethnic groups had significantly higher rates than South Asian men, but in England alone, not in West Yorkshire. The incidence of

Table 2

Age:sex ratio (95% CI) for incidence by site of oral cancer and sex in 2001–2006 (West Yorkshire and England).

	Other ethnic groups	South Asian
<b>Oral cancers including thyroid (ICD 10: C00–C14, C30–C32, C73)</b>		
Men:		
England*	18.1 (17.9–18.4)	13.3 (12.3–14.4)
West Yorkshire	20.06 (18.93–21.25)	24.29 (17.82–33.36)
Women		
England*	9.8 (9.7–10.0)	12.5 (11.50–13.50)
West Yorkshire*	11.72 (10.89–12.60)	26.48 (20.15–34.79)
<b>Oral cancers excluding thyroid (ICD 10: C00–C14, C30–C32)</b>		
Men:		
England*	16.8 (16.50–17.00)	11.5 (10.5–12.5)
West Yorkshire	18.72 (17.63–19.87)	18.49 (12.96–26.66)
Women:		
England*	6.0 (5.9–6.2)	7.2 (6.4–8.1)
West Yorkshire*	7.31 (6.67–8.01)	13.16 (8.58–19.91)
<b>Lip and mouth cancers (ICD 10: C00–C08)</b>		
Men		
England*	6.7 (6.6–6.8)	5.8 (5.1–6.5)
West Yorkshire	7.05 (6.39–7.78)	7.97 (4.54–14.25)
Women:		
England*	3.5 (3.40–3.60)	5.8 (5.0–6.5)
West Yorkshire*	4.1 (3.62–4.62)	9.14 (5.45–15.04)

\* Significant difference between South-Asian and other ethnic groups within each sex.

oral cancer (C00–C14, C30–C32, C73) was higher in West Yorkshire than in England.

When thyroid cancer was excluded from the analyses (C00–C14, C30–C32) results were more consistent. Rates among women were significantly higher in South Asians than among other ethnic groups in both England and in West Yorkshire. However, the only significant difference between men was in England as a whole, and not within West Yorkshire alone, when men from other ethnic groups had significantly more oral cancers than South Asian patients.

Cancers of the lip and mouth (C00–C08) were significantly more common among women of South Asian origin than among women of other ethnic groups, both nationally and locally. The comparison between the incidence in West Yorkshire and in England showed that local rates were higher than the national ones for women of other ethnic backgrounds. Men from other ethnic groups again had significantly higher rates of oral cancer in England as a whole compared with men of South Asian origin.

Negative binomial regression using the incidence of oral cancer (including or excluding thyroid) as an outcome was applied to people diagnosed within 2001–2006 in West Yorkshire and presented in Table 3. South Asian patients were at higher risk of being diagnosed with oral cancer by 79% (ratio 1.79 (95% CI: 1.31–2.47)) compared with those from other ethnic groups within West Yorkshire, adjusted for age and sex. When thyroid cancer was excluded from the analysis the risk remained higher (63%) (ratio 1.63 (95% CI: 1.11–2.39)). Women had a lower risk of developing oral cancer (excluding thyroid) than men (ratio 0.50 (95% CI: 0.36–0.71)), when adjusted for age and ethnicity.

Further analysis showed that South Asian men and women had a higher risk of being diagnosed with oral cancer than

men or women from other ethnic groups. When the model was applied to patients diagnosed with oral cancers excluding thyroid, consistent results were obtained but differed significantly only among women.

## Discussion

This paper is one of few to our knowledge to compare the incidence of oral cancers between people of South Asian descent and those of other ethnic groups in the UK,<sup>3,7,12</sup> and it highlights the need for regional work in areas with large numbers of people from Southern Asia. This analysis identified that South Asian women had a significantly higher incidence of oral cancer (C00–C14, C30–C32, C73) than women of other ethnic backgrounds in West Yorkshire and in England. This has already been shown in other regions of the United Kingdom, notably the South East where Moles et al. found higher rates of oral pharyngeal cancers in South Asian women.<sup>12</sup> Our analysis for West Yorkshire used similar methods to assign ethnicity, while it used more recent data from the cancer registry (2001–2006) (Moles et al. used data from 1985 to 1995). The present analysis shows that where many South Asian women live, there may be a higher incidence of oral cancer. This has major implications for localities with large and growing South Asian populations, and as South Asian women also had a higher risk of being diagnosed with oral cancer than women of other ethnic groups, this has implications for treatment, and for health promotion to reduce the factors that cause oral cancer.

Within the male group, oral cancers including thyroid (C00–C14, C30–C32, C73), oral cancers excluding thyroid (C00–C14, C30–C32), and cancers of the lip and mouth

Table 3

Incidence ratios (95% CI) for oral cancer adjusted for ethnicity, age, and sex for patients diagnosed in 2001–2006 in West Yorkshire.

	Oral cancers including thyroid (ICD 10 codes C00–C14, C30–C32, C73)		Oral cancers excluding thyroid (ICD 10 codes C00–C14, C30–C32)	
Ethnic group				
Other (baseline)	1.0	–	1.0	–
South Asian	1.79	(1.31–2.47)	1.63	(1.11–2.39)
Age (years)	1.06	(1.05–1.07)	1.07	(1.06–1.08)
Sex				
Male (baseline)	1.00	–	1.00	–
Female	0.94	(0.69–1.29)	0.50	(0.36–0.71)

(C00–C08) were significantly more common among men from other ethnic groups in England than South Asian men (although no significant difference was found between the men in the 2 groups in West Yorkshire).

The results show that South Asian women had a higher incidence of oral cancer in West Yorkshire and in England as a whole than women from other ethnic groups, and this excess may be linked to the use of smokeless tobacco and to diet. Men from other ethnic groups had the highest incidence of oral cancer nationally, which may reflect risk factors such as smoking and alcohol misuse. These findings correlate with lifestyle factors such as alcohol and smoking, which are highest amongst white men in the UK and increase the risk of oral cancer.<sup>5,12,19</sup> As trials that measure the risk of oral cancer outside India have so far been inconclusive, it is essential that further research is done to establish evidence for the adverse effects of smokeless tobacco and diet and their links to the development of oral cancer.<sup>20</sup>

The differential in the incidence of oral cancer between South Asian women and those of other ethnic groups has been debated for some time, and poor coding of ethnicity has meant that analysis has been limited.<sup>21</sup> The present analysis of surveillance data has confirmed this for the time period 2001–2006, but it is said to be improving.<sup>16</sup> In 2002–2003, 29.4% of episodes had no ethnic code assigned, but this had decreased to 10.4% by 2007–2008.<sup>17</sup> There were other limitations of completeness within the data that could not be overcome, and therefore must be acknowledged. More specific comparisons of squamous cell carcinomas of the oral cavity would have been desirable, particularly because of the documented links with human papillomavirus.<sup>22</sup> We were unable to exclude all relevant tumours using four-digit codes for site (for example, C00.3) because of issues with completeness of data and the number of tumours with ‘unspecified’ four digit codes in our dataset. For the 78 lip cancers (C00), for example, half of these were coded ‘unspecified’ at this level of detail. A reduction in the numbers of tumours classified as ‘non-specific’ for cancers of the head and neck has been highlighted as a key issue by the Oxford Cancer Intelligence Unit.<sup>23</sup> Further work using improved and more complete datasets nationally is a priority.

Analysis of multiple surveillance datasets showed that sections of our populations are at increased risk of developing oral cancers, namely South Asian women at local and national

levels, and men from other ethnic groups nationally. The risk factors for oral cancer (such as smokeless tobacco) are an increased priority for national bodies such as The Department of Health, where the current guidance directs those working in primary care to realise the adverse impact on health and put support services in place.<sup>24</sup> More recently the National Institute for Health and Clinical Excellence (NICE) has begun to consult stakeholders about smokeless tobacco with a view to developing guidance on services to support those who wish to stop using it.<sup>25</sup>

The numbers in this study are small, but this limitation could be overcome by pooling data using Cancer Registry databases nationally; this work is currently being undertaken.<sup>16</sup>

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