Cancer Epidemiology 37 (2013) 34–38

Contents lists available at SciVerse ScienceDirect

Cancer Epidemiology

The International Journal of Cancer Epidemiology, Detection, and Prevention

journal homepage: www.cancerepidemiology.net

Primary liver cancer incidence and survival in ethnic groups in England, 2001–2007

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ARTICLE INFO

Article history:
Received 20 April 2012
Received in revised form 24 August 2012
Accepted 18 October 2012
Available online 21 November 2012

Keywords:
Ethnic groups
Liver cancer
Incidence
Survival

ABSTRACT

Background: The patterns of primary liver cancer incidence and survival are not known for detailed ethnic groups within the UK. *Methods*: Data on patients resident in England diagnosed with primary liver cancer (ICD-10 C22) between 2001 and 2007 were extracted from the National Cancer Data Repository. Age-standardised incidence rate ratios (IRRs) were calculated for different ethnic groups separately for males and females, using the White ethnic groups as baselines. Overall survival was analysed using Cox regression, adjusting sequentially for age, socioeconomic deprivation and co-morbidity. *Results*: Ethnicity data were available for 75% (13,139/17,458) of primary liver cancer patients. Compared with the White male baseline, Chinese males had the highest IRR. Black African, Bangladeshi, Pakistani and Indian men also had statistically significant high IRRs. Black Caribbean men had a marginally elevated incidence rate compared with White men. In comparison with White women, Pakistani women had the highest IRR. Bangladeshi, Chinese, Black African and Indian women also had high IRRs. As observed in men, Black Caribbean women had an incidence rate closer to that of White women. Pakistani men and women, Black African women and Chinese men had statistically significantly better survival compared with their White counterparts. *Conclusion*: The variation found in the incidence of primary liver cancer, could be due to established risk factors such as hepatitis B and C infection being more prevalent among certain ethnic groups. Country of birth, age at migration and length of stay in England are likely to be important factors in this disease, and future research should examine these where possible.

1. Introduction

Primary liver cancer occurs worldwide but incidence rates vary between countries. In 2008, around 85% of cases diagnosed were in less developed regions and the highest age-standardised incidence rates were in Eastern and South-Eastern areas of Asia, and Middle and Western areas of Africa [1]. The incidence of primary liver cancer is relatively low in the UK, although it has been increasing over time [2]. Survival rates are low for patients with liver cancer [3,4] and it is the third most common cause of cancer death worldwide [1].

The most common subtypes of liver cancer are hepatocellular carcinoma and cholangiocarcinoma. The main risk factors for hepatocellular carcinoma are well established, and the importance of hepatitis B and C viruses, alcohol, tobacco and aflatoxin exposure vary in different parts of the world [5]. Hepatitis B infection is a major risk factor and is very common in China, South East Asia and Sub-Saharan Africa [5–7]. Hepatitis C virus has a low prevalence in the UK [8], however higher rates have been estimated in Pakistan and China [9]. In developed countries hepatitis C virus infection acquired via contaminated needles, and alcohol induced cirrhosis are important causes of this cancer [7]. Other factors, such as fatty liver disease, obesity and diabetes mellitus, have also been associated with primary liver cancer, although the relationship between these still require investigation [10,11]. Liver fluke infection is a particular problem in some areas of the world, most notably East Asia and Eastern Europe, and has been linked with cholangiocarcinoma [11,12].

Variations in incidence [7,13–16] and survival [17–21] have previously been shown between different ethnic groups in the US and the UK, although often examining only broader ethnic groups. This study examines primary liver cancer incidence and survival in England for more specific ethnic groups diagnosed between 2001 and 2007.

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http://dx.doi.org/10.1016/j.canep.2012.10.008

Table 1
Characteristics table of patients diagnosed with primary liver cancer (ICD-10 C22), England, 2001–2007.

	Males		Females		Persons	
	N	%	*N*	%	*N*	%
Ethnicity						
White	7267	67.2	4606	69.3	11,873	68.0
Indian	149	1.4	74	1.1	223	1.3
Pakistani	136	1.3	74	1.1	210	1.2
Bangladeshi	54	0.5	20	0.3	74	0.4
Black Caribbean	90	0.8	51	0.8	141	0.8
Black African	104	1.0	29	0.4	133	0.8
Chinese	83	0.8	23	0.3	106	0.6
Other	275	2.5	104	1.6	379	2.2
Not known	2649	24.5	1670	25.1	4319	24.7
Age group						
<60	2403	22.2	1035	15.6	3438	19.7
60–69	2676	24.8	1216	18.3	3892	22.3
70–79	3580	33.1	2065	31.0	5645	32.3
80+	2148	19.9	2335	35.1	4483	25.7
Deprivation quintile						
1 (least deprived)	1883	17.4	1132	17.0	3015	17.3
2	1996	18.5	1253	18.8	3249	18.6
3	2114	19.6	1356	20.4	3470	19.9
4	2234	20.7	1371	20.6	3605	20.6
5 (most deprived)	2580	23.9	1539	23.1	4119	23.6
Total	10,807	100.0	6651	100.0	17,458	100.0

2. Methods

The National Cancer Data Repository contains combined data from each of the regional cancer registries on people resident in England who have been diagnosed with cancer. Information on residents of England who were diagnosed with primary liver cancer (ICD-10 code C22) between 2001 and 2007 was extracted from the National Cancer Data Repository. Records are linked to the Hospital Episode Statistics (HES) dataset, which contains self-assigned ethnicity information. Ethnicity was grouped into the following categories: White, Indian, Pakistani, Bangladeshi, Black Caribbean, Black African, Chinese, Other, and Not known.

Population data for each ethnic and age group for each year examined were from the Office for National Statistics. Data for 2001 were taken from that year's census, and population estimates were used for 2002–2007 [22]. Socioeconomic deprivation was measured using the income domain of the Indices of Deprivation 2004 [23]. The co-morbidity score used is based on episodes mentioning non-cancer diagnoses from HES occurring one year before the primary liver cancer diagnosis date [24]. The conditions are weighted according to their severity [25] and scores are generated and grouped as 0 (where no co-morbid conditions were recorded), 1, 2 or more, and Not known.

As not all patients had an ethnic group recorded, any age-standardised incidence rates calculated would be too low, as there is no corresponding population data for these patients. Therefore male and female age-standardised incidence rate ratios (IRRs) were calculated for each ethnic group, using the White groups as the baselines. Confidence intervals were calculated using the method described in Boyle and Parkin [26]. Patients diagnosed using information from death certificates only were excluded from the survival analysis as they had no additional information, such as histological verification or co-morbidity score, and their date of diagnosis was assumed to be their date of death. Overall survival was assessed using Cox regression, adjusting for age, socioeconomic deprivation and co-morbidity. Patients were followed up until 31 December 2007.

3. Results

There were 17,458 patients diagnosed with primary liver cancer in England between 2001 and 2007: 10,807 men and 6651 women. The characteristics of these patients are shown in Table 1. Female patients were older, with 35% aged 80 years or over, compared with 20% of male patients. Ethnicity information was available for 13,139 (75%) patients. The White, Indian, Pakistani, Bangladeshi, Black Caribbean, Black African and Chinese ethnic groups made up 7883 male and 4877 female patients (97% of those with a recorded ethnicity), and incidence results are presented for these groups.

Age-standardised incidence rate ratios for men are shown in Fig. 1. White men had the lowest incidence of primary liver cancer compared with men in other ethnic groups. Pakistani (IRR = 2.8, 95% confidence interval (CI) 2.1–3.7), Bangladeshi (IRR = 3.1, 95% CI 1.9–5.2), Black African (IRR = 3.3, 95% CI 2.1–5.1) and Chinese

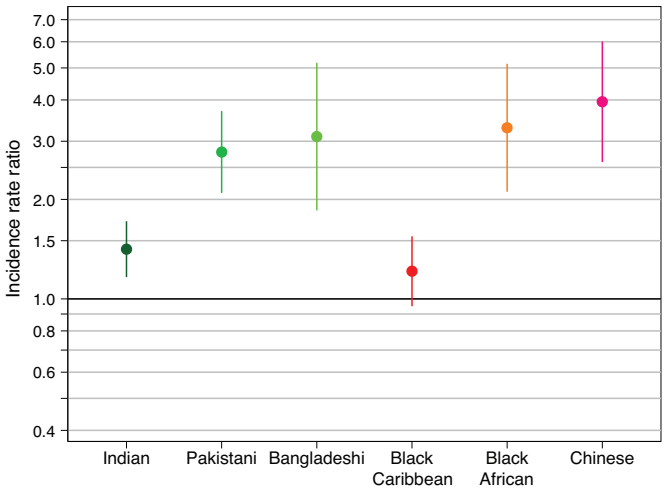

Fig. 1. Age-standardised incidence rate ratios for males diagnosed with primary liver cancer, England, 2001–2007. White men used as baseline.