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Low hepatitis B testing coverage among migrants in UK: a cross-sectional study

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Abstract

**Background** In 2012, hepatitis B virus (HBV) testing of people born in a country with prevalence of 2% or more was recommended in UK. Implementation of this recommendation requires an understanding of prior HBV testing practice and coverage, of which there are limited data.

**Aim** To estimate the proportion of migrants tested for HBV and explore General Practitioner (GP) testing practices and barriers to testing.

**Design and Setting** Cross-sectional study. Participants were a) migrants for whom testing was recommended under English national guidance, living in Bristol and registered with a GP in 2006-13 and b) GPs practicing in Bristol.

**Methods** We linked NHS patient demographic data and HBV laboratory surveillance data. We defined a person as ‘HBV-tested’ if a laboratory result was available. We undertook an on-line GP survey using a structured questionnaire.

**Results** Among 82,561 migrants for whom HBV testing was recommended, 9,627 (12%) were 'HBV-tested'. The HBV testing coverage was: Eastern Asia: 11%; Western Africa: 7%; South-Eastern Asia: 6%; Eastern Africa: 3%. Of 19 GPs, the majority did not use guidelines to inform HBV testing in migrants and did not believe routine testing of migrants was indicated. 12/17 GPs stated that time, human and financial resources were the most significant barriers to increased testing.

**Conclusions** The majority of migrants to a multicultural UK city from medium/high prevalence regions have no evidence of HBV testing. Much greater support for primary care in UK and increased GP awareness of national guidance is required to achieve adherence to current testing guidance.

**Keywords:** Cross-Sectional Studies, Hepatitis B, Transients and Migrants, Diagnosis, General Practice, United Kingdom
How this fits in English national guidance recommends HBV testing for migrants born in medium and high prevalence countries. General Practitioner testing practice and coverage in UK is not known. The present study determines the proportion of migrants tested and explores General Practitioner testing practices, facilitators and barriers to this. Only a small proportion of migrants were tested for HBV. Most GPs did not test routinely for HBV; the main barriers were lack of resources, time constrains and guidance awareness.
Introduction

Worldwide 240 million people have chronic hepatitis B (HBV) infection and 780,000 people die of the disease annually (1). Treatment is available and can slow disease progression and improve survival (2). The World Health Organization (WHO) classifies countries according to the hepatitis B surface antigen (HBsAg) into low (<2%), intermediate (2-8%) and high (>8%) prevalence. Chronic HBV infection disease burden in low prevalence countries is mainly attributed to migrants from higher prevalence countries (3).

In United Kingdom (UK), a low prevalence country, the majority of chronic HBV infection occurs among migrant populations who acquired their infection outside UK (4). The number of people with chronic HBV infection living in the UK is unknown – with estimates ranging from 86,000 to 326,000 (5-7). UK testing strategies include antenatal screening (8), and testing blood donors and at risk populations including people who inject drugs, prisoners, haemodialysis patients and healthcare workers(9). A 2013 UK study demonstrated that 1.1% of tested individuals were positive for HBsAg (10); in 2009, the prevalence of HBV among migrants in the UK was estimated to be 4% (11), ranging from 0.1% to 17.4% depending on ethnic group and study method (12-17).

In 2012, the English National Institute for Health and Care Excellence (NICE) recommended that all people born in a country with HBV prevalence of 2% or more should be offered an HBV test and that testing is offered in primary care (18). In 2011, approximately 7.5 (13%) million individuals living in England and Wales were born outside UK (19). The implementation of this guidance has major implications in terms of costs and resources needed and requires understanding of current testing coverage and General Practitioner (GP) testing practice in migrants. Such data is not routinely available in the UK as country of birth information is not captured in HBV testing surveillance (20), and there have been no previous studies of HBV testing coverage and GP testing practices in migrants in the UK.
The aim of this service evaluation was to estimate the number of migrants for whom HBV testing is recommended under UK National guidance in a large multicultural UK city and the proportion tested. Furthermore, this study aimed to explore testing practices and barriers to implementation of the national guidance among GPs in Bristol.

Methods

Hepatitis B testing and prevalence study

Study population
This study was undertaken in Bristol, a UK city with an estimated population of 428,234 in 2011, of whom 60,226 (15%) were born outside of the UK (21). The study population was defined as all individuals residing in Bristol, registered with a GP at any time between April 2006 and September 2013 and whose country or United Nations sub-region of birth had an HBV prevalence of 2% or more as stated in the NICE guidance.

Data sources
The study population was identified using the English National Health Authority Information System (NHAIS) – a database that includes socio-demographic characteristics of all patients registered at any time with a GP in England; a country of birth was assigned to each individual based on the `place of birth' field. Where the place of birth was ambiguous – for example the place recorded existed in more than one country or was unrecognisable – or missing, it was recorded as unknown. Duplicates and those not part of the defined study population were removed (Figure 1). Hepatitis B test results were provided by Bristol Public Health Laboratory (PHLB) for all patients tested during the study period. The dataset included patient's name or code, date of birth, NHS number, date of request, requestor and location of requestor, HBV serology (HBsAg, hepatitis B core antibody, hepatitis B e antigen, hepatitis B e antibody) and HBV DNA.
We defined migrants as ‘HBV tested’ if any HBV serology or HBV DNA test was performed during the study period; and as ‘HBV infected’ if HBsAg was positive or HBV DNA was detected. We defined the requestor of the chronologically first HBV test in the study period as ‘GP’ if the requestor was a GP practice, and ‘Antenatal’ (ANC) if either the ‘requestor’ or the ‘location’ field included any of the terms ‘midwives’, ‘antenatal’, ‘early pregnancy’ or ‘maternity’. We linked the patient demographic database with the laboratory dataset using the name, date of birth and NHS number (if available).

**GP survey**

We undertook a survey of Bristol GPs to assess HBV testing practice in primary care and explore barriers and facilitators to testing. We classified the Bristol electoral wards (administrative small areas) into high (>30%), medium (10-30%) and low (<10%) population density of Black and Ethnic Minority (BME) groups using 2011 census data (22) and, considering that GPs in higher BME density wards may be more aware of hepatitis B and test more. We invited one GP from 8/8 GP practices located in high BME density wards and a stratified simple random sample of 6/21 in medium and 10/27 in low BME density wards to participate; additionally we asked them to encourage other GPs in their practice to participate. Data were collected from December 2013 to July 2014 using an online structured questionnaire that collected information on views and practices regarding HBV testing, barriers and facilitators to testing, awareness of NICE guidance, satisfaction with available resources and resources needed to implement the guidance.

**Data analysis**

We performed descriptive analysis of the study population demographics and estimated the proportion of HBV tested and infected. The association between BME density categories and HBV testing was explored using Poisson regression to produce estimates of crude prevalence ratios (PR). To explore bias from missing data, we calculated the proportion of tested and infected individuals for whom the country of birth was unknown. Statistical
analysis was performed in Excel Microsoft Office 2010 and STATA 12 software (StataCorp, Texas, USA).

**Results**

**Participants**
Of 687,483 individuals identified, country of birth was unknown for 194,025 (28%); 82,561 of the remainder (17%) were identified as migrants born in a country with 2% or more HBV prevalence, comprising the study population.

The median age of the study population was 33 (interquartile range: 25-41) years; 50% were female (Table 1). Thirty-nine per cent were born in Asia, 18% in Eastern Europe, 18% in Southern Asia and 14% in Eastern Africa. Poland (12%), Somalia (8%) and India (8%) were the commonest countries of birth.

**Hepatitis B testing**
Of 82,561 individuals in our study population 9,627 (12%) had evidence of an HBV test (Table 2); of whom 7,201 (75%) were female. The proportion tested was greater for females (7,201/41,255; 18%) than males (2,426/41,306; 6%), and by age, greatest for the 35-44 age group in both sexes (30% for females, 8% for males) and least for children and adolescents (0.5%-2%). The regions, sub-regions and countries of birth with the highest proportion tested were: Africa (20%), middle Africa (19%), western Africa (15%), and Somalia (23%), Gambia (19%), Sudan (18%) and Pakistan (18%) (Table 3). Among the tested study population, the requestor of their first chronological test in the study period was ‘GP’ for 4,078 (42%) and ‘ANC’ for 3,857 (40%).

The proportion of the study population tested varied from 2% to 23% at practice level (excluding practices with less than 100 patients from medium/high prevalence countries). Practices in high BME density wards were more likely to test their migrant population for HBV than practices in low/medium density BME wards (17% vs. 10% uPR: 1.74; 95%CI
The lowest proportion tested was observed in a student health practice (2%, 168/7,645) in which only 0.9% of 4,418 Chinese students were tested.

**Hepatitis B infection**

Overall, among the HBV tested subset of the study population, 5% (457/9,627) were infected with hepatitis B including 262/2,426 (11%) of tested males, and 195/7,201 (3%) of tested females. Among the individuals tested in GP practices 249/4,078 (6%) were positive for HBV, including 158/1,626 (10%) males and 91/2,452 (4%) females.

Among 194,025 individuals with unknown country of birth, 14,971 (8%) were tested for HBV and, among those tested 0.5% were infected.

**GP survey – views, practices and barriers to HBV testing**

Of 24 GP practices invited, 13 participated in the survey with 19 GPs responding. The response was highest among practices in high BME density wards (7/8) compared to medium (3/6) and low density wards (3/10). GPs were predominantly male (10/17) of white ethnicity (16/17) with a mean age of 46 (standard deviation (SD): 14) years; they were practicing medicine for a mean of 18 (SD: 10) years.

Regarding guideline awareness, of 15 GPs who answered this question, 14 were not aware of the NICE guidance recommending routine HBV testing of migrants. Regarding their views on testing, a minority of 19 GPs stated that routine HBV testing was indicated for migrants born in China (5/19), Somalia (4/19), Poland (2/19) or India (1/19) (Table 4). Most GPs indicated that testing should only be offered if the person presented with signs or symptoms of hepatitis B or after an active assessment for likelihood of infection. Regarding their practice, only 3 of 18 GPs indicated that it was their routine practice to offer opportunistic testing of patients born in high prevalence countries.

When asked to state significant barriers to implementation of the NICE guidance, 12/17 GPs cited workload and lack of human and financial resources, with 9 ranking workload as the most important barrier. Other barriers cited were patient-related issues (10/17) such as
awareness of HBV and acceptance of testing; lack of HBV awareness of healthcare staff (7/17); language barrier (5/17). Overall, GPs indicated dissatisfaction with the resources and available guidance regarding HBV testing of migrant patients; the median satisfaction score among 19 GPs was 2 (range: 0-5) on a 0 to 10 scale. Almost all GPs reported that additional resources and support, such as support for contact tracing, translated sample letters, country of birth information and automated flags for eligible patients would be useful.

Discussion

Summary

Testing for HBV among migrants born in countries with moderate/high prevalence was low; for 88% there was no evidence of testing. Proportionately more women than men were tested, notably among the 25-44 year old age group due to antenatal screening (23). Testing in children and adolescents was very low and may be partially attributed to higher vaccination coverage among this population. Practices serving high BME density wards had the highest proportion of tested individuals. GPs showed limited awareness of national guidance on migrant testing, did not routinely test migrants born in medium/high prevalence countries and expressed dissatisfaction with resources and support available to them.

Strengths and Limitations

The study population used to determine HBV testing coverage was drawn from a regularly updated national population database (NHAIS database) expected to include the vast majority of migrant residents. Individuals missed will have included those not registered with a GP. Overall GP registration rates in the UK population are very high (24) but irregular migrants make up approximately 7% of the UK migrant population (25) and are under-represented in the present study. Country of birth was unavailable for one third of the NHAIS population, but the HBV prevalence in this subset was 0.5%, suggesting that most were not from medium/high prevalence countries.
The laboratory that supplied the HBV testing dataset provides all non-private HBV testing for the study area. Testing of the study population not captured will have included testing prior to the study period or prior to moving to the study area, testing through private practice, and anonymous testing at sexual health clinics. Data linkage between the population and the laboratory database may have been incomplete due to errors in identifiers used, thereby underestimating the proportion tested.

The GP survey had high response rate among practices in high BME density wards and medium to low response rate among practices in medium and low BME density wards; thus the findings may not be generalizable to all GPs in these areas. However, one of the major findings from the survey, that HBV testing in primary care is done on the basis of clinical indicators and not as a routine, is corroborated by the much higher infection prevalence in tested men, where testing is elective, compared to the prevalence in women, where a proportion of tests are performed as antenatal screening, and by the high prevalence in the tested population in primary care (6%) when compared to the prevalence for the whole Bristol migrant population, estimated as 1.7% (26).

Comparison with existing literature

To our knowledge this is the first estimate of HBV testing coverage to be published in a UK migrant population. The finding of low coverage in UK is in line with previous reports indicating that key stakeholders do not identify immigrant populations as a priority for HBV testing (27) and that most GPs do not routinely screen migrants from endemic countries (28). However, individual GP practices in UK may have HBV screening programs targeting specific migrant populations, resulting in higher testing coverage (29). Testing coverage of migrant population outside the UK demonstrated mixed results but was generally low (30, 31).

General Practitioners’ guideline awareness and professional development were associated with increased screening in the United States and Australia (32-34); language difficulties
have been identified as barriers to testing and treatment (33, 35). In the UK, new entrant migrants identified non-migrant friendly services and disease-related stigma as barriers to testing (36).

The overall prevalence of HBV infection in our study is similar to previous estimates of 4% (11); 3.3% (4); and 6.4% (37) in selected UK migrant populations but may reflect selective testing as it is significantly higher than the 1.7% estimated antenatal prevalence in the Bristol migrant population (26). The higher HBV prevalence in males is consistent with previous UK studies (38, 39) and again reflects greater selective testing in the male population.

**Implications for research and/or practice**

It is important to determine if other UK regions have similar low HBV testing coverage in migrant populations because the application of the NICE guidance in large untested populations in primary care will require significant resources, with major cost implications that need to be carefully budgeted. The low testing coverage in migrants has clear consequences for patient access to treatment and for public health interventions in case-finding and disease prevention. The low awareness of the NICE guidance and the testing views of GPs suggest that the guidance needs to be promoted and healthcare professionals educated on HBV. The dissatisfaction of the GPs regarding the available resources (e.g. patient information material) and their concerns regarding lack of time and manpower reflected a true lack of supporting resources. Public health authorities could support the implementation of NICE guidance by providing easily accessible online resources, building the human resource capacity and developing testing strategies, such as opportunistic, active and new registrants’ testing. Targeted testing of children should be considered because of the very low levels of testing coverage and given evidence of child to child intrafamilial spread (1, 40). GP electronic systems could be adapted to allow easy identification of at risk patients (i.e. easy access to country of birth information, use of automated messages).
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Ethical approval
Approval from an Ethics Committee for the study was not required, as this was a service evaluation. This decision was accepted by the Regional Ethics Committee Centre (Bristol).

Management of data with personal identifiers complied with Caldicott guidelines (41).

Competing Interests
Alexandra Cochrane has received research funding from Gilead UK and Ireland Fellowship Programme. Gilead UK and Ireland Fellowship Programme had no role in design of the study, data collection, analysis, interpretation, abstract preparation, or decision to submit.

The other authors have no conflicts of interest to declare.

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