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Original Research

Differences in all-cause hospitalisation by ethnic group: a data linkage cohort study of 4.62 million people in Scotland, 2001–2013

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ABSTRACT

Objectives: Immigration into Europe has raised contrasting concerns about increased pressure on health services and equitable provision of health care to immigrants or ethnic minorities. Our objective was to find out if there were important differences in hospital use between the main ethnic groups in Scotland.

Study design: A census-based data linkage cohort study.

Methods: We anonymously linked Scotland's Census 2001 records for 4.62 million people, including their ethnic group, to National Health Service general hospitalisation records for 2001–2013. We used Poisson regression to calculate hospitalisation rate ratios (RRs) in 14 ethnic groups, presented as percentages of the White Scottish reference group (RR = 100), for males and females separately. We adjusted for age and socio-economic status and compared those born in the United Kingdom or the Republic of Ireland (UK/RoI) with elsewhere. We calculated mean lengths of hospital stay.

Results: 9.79 million hospital admissions were analysed. Compared with the White Scottish, unadjusted RRs for both males and females in most groups were about 50–90, e.g. Chinese males 49 (95% confidence interval [CI] = 45–53) and Indian females 76 (95% CI 71–81). The exceptions were White Irish, males 120 (95% CI 117–124) and females 115 (95% CI 112–119) and Caribbean females, 103 (95% CI 85–126). Adjusting for age increased the RRs for most groups towards or above the reference. Socio-economic status had little effect. In many groups, those born outside the UK/RoI had lower admission rates. Unadjusted mean lengths of stay were substantially lower in most ethnic minorities.

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Conclusions: Use of hospital beds in Scotland by most ethnic minorities was lower than by the White Scottish majority, largely explained by their younger average age. Other countries should use similar methods to assess their own experience.

Introduction

Most European countries are becoming ethnically more diverse because of an increase in arrivals of migrants. There is concern on the one hand about the consequent pressure on health services[1,2] and, on the other, about whether healthcare services are being equitably provided to migrants and ethnic minorities.[3] However, information about health service use by migrants or ethnic minority groups in Europe is patchy and typically limited to specific services.[4] To the best of our knowledge, only Spain and Norway have published recent analyses of actual health service use by migrants or ethnic minority groups across a regional or national health service.[5,6]

As part of the United Kingdom (UK), Scotland carries out a census every 10 years. It should be completed by everyone who, on the day of the census, has lived or intends to live in the country for at least 3 months. Since 1991, self-defined ethnic group has been requested. The National Health Service in Scotland (NHS Scotland) generally offers free healthcare services to everyone, 'ordinarily resident', in the country. Thus, almost everyone completing the census should be eligible for free NHS health care.

The Scottish Health and Ethnicity Linkage Study (SHELS) has created a retrospective cohort of about 4.62 million people by linking Scotland's Census 2001 to NHS hospitalisation and other health records, thus enabling the relationship between ethnic group and health service use to be studied in detail.[7] SHELS has found complex differences between ethnic groups in a wide range of specific conditions as measured by age-adjusted rates for hospitalisations and deaths combined.[8–10] In this analysis, we aimed to find out if there are important differences between ethnic groups by overall general hospital admission rates and lengths of stay in Scotland. We judged that differences of more than 10% would be potentially important from a policy perspective.

Methods

Approvals and safeguards

Full ethical and other approvals for the data linkage, security and analyses in this study were granted by the Scottish Multicentre Ethics Committee and the Privacy Advisory Committee of NHS National Services Scotland. The anonymised data sets were only made available to named researchers with appropriate clearance and training in a secure environment at National Records of Scotland (NRS). All analyses and outputs followed the NRS Disclosure Control Guidance for SHELS and were cleared for release by its Disclosure Committee.

Study population

Methods used to develop the SHELS cohort have previously been described in detail.[7] Individuals completing Scotland's Census 2001 form were asked to choose their ethnic group and those of household members from a list of 14 predefined categories. This was a legally required field and had a high completion rate (95.7%), with 100% availability following imputation carried out by NRS. Names, addresses, sex and dates of birth from Scotland's Census 2001 were confidentially linked to the Community Health Index (CHI), a register of people using the Scottish NHS with a unique number for each individual. The resulting look-up table had encrypted CHI and census numbers that could be used as a key to anonymously link the census to other health-related databases that included CHI numbers. About 4.62 million people whose census record included their ethnic group were linked, representing 91.3% of the estimated population of Scotland at the time and 95.1% of those completing the census. Supplementary Table 1 provides more detail.

Data selection and analysis

We selected all Scottish NHS general hospital admission records from 1 May 2001 to 30 April 2013 that could be linked to the census cohort. The denominators were person-years (PY), censored for death or transfer of registration from the NHS in Scotland to elsewhere in the UK and stratified by sex. We used Poisson regression with robust variance to calculate admission rates per 100,000 PY and unadjusted rate ratios (RRs) for each ethnic group with the White Scottish majority as the reference group. We multiplied RRs by 100 to be interpretable as percentages. The 'All other ethnic group' category in the census was not used because of its heterogeneity.

Using our standard method, we examined whether the associations between indicators of socio-economic position and outcome were similar across ethnic groups before entering them as confounding variables.[11] The two indicators consistently associated in the same direction with the likelihood of admission across ethnic groups were highest educational qualification (individual level for people aged 16–74 years and household level for children and elderly) and housing tenure (owning or renting). We therefore adjusted rates for age, then, in addition, for education and housing tenure combined. We also calculated age-adjusted rates for each ethnic group and whether born in the United Kingdom