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Variation in mortality by country of birth in Northern Ireland: A record linkage study

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ABSTRACT

The study of health differences between those residing in the same country but originating in different countries is a potential source of insight into the causes of ill-health. Within Northern Ireland, those born in England, Wales, the Republic of Ireland and outside of the British Isles have a lower mortality risk than the Northern Ireland born; however, these differentials are largely explained by the demographic and socio-economic characteristics of these migrants. Conversely, the Scottish born residing in Northern Ireland have higher mortality than the Northern Ireland born, especially from ischemic heart disease, suggesting that the Scottish immigrants maintain the health disadvantage of their country of birth.

1. Background

The study of health differences between migrant groups and their host country is a source of insight into the causes of ill-health and can contribute to debates on the relative contribution of genetic or environmental factors in the aetiology of particular diseases (Marmot et al., 1975; Hammar et al., 2002). Often the most significant migrant groups to a country are those from neighbouring countries, yet these groups are often infrequently studied, perhaps because of an assumption that close proximity is equivalent to similarity, thereby rendering them somewhat invisible to the research agenda (Pearson et al., 1991). One localised migration receiving some attention is that of the Irish in the UK, with research showing that the Irish-born resident in England and Wales having higher mortality than either non-migrating Irish or the host population (Adelstein et al., 1986; Wild and Mckeigue, 1997). In addition, Scottish-born migrants to England and Wales experience excess mortality similar to the Irish (Wild and Mckeigue, 1997), while Irish-born living in Scotland have mortality rates that are 20–30% higher than the native Scots (Abbotts et al., 2001).

The reasons for the higher mortality of these migrant groups are not clear. In relation to the Irish, it has been argued that selection effects cannot be the major explanation for the excess mortality and would not explain its persistence in later generations (Raftery et al., 1990). While both Scottish and Irish migrants tend to be more disadvantaged than the general population of England and Wales (Chance, 1996), socio-economic status does not fully explain the excess mortality. The importance of lifestyle factors are frequently cited (Cruickshank, 1996) though there is little evidence supporting this (Harrison et al., 1993). Another explanation looks to competing ideas of context and content, since migrants tend to gravitate towards certain geographical areas (Macintyre and Ellaway, 2000). Alternatively immigrant mortality differences could simply reflect the established health patterns of the areas they live in.

There has been practically no research looking at the health of migrants to Northern Ireland – probably because high unemployment rates and local civil unrest acted as a deterrent to inward population flows. However, there has been a recent increase in immigration, with the 2001 Census recording that just under 9% of the resident population were born outside Northern Ireland, with the majority born in the British Isles. In addition, anecdotal evidence suggests that there has been a significant increase in the number of migrants from Eastern European countries over the past number of years. Examining the health status of migrants provides useful insights about the influence of country of origin, country of destination and possibly the process of migration on health status. This is particularly interesting for those coming to Northern Ireland from other parts of the UK where, despite shared health and welfare systems, significant differences in health status exist. The aims of this analysis are to determine firstly, if migrants to Northern Ireland are more or less healthy than the Northern Ireland born, and secondly to determine if the health status of migrants most closely resembles that of their country of origin or destination.

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2. Methods

The Northern Ireland Mortality Study (NIMS) is a prospective record linkage study, based on the 2001 Census returns for the whole enumerated population, to which subsequent registered deaths have been linked. This forms a longitudinal study, with 94% of all deaths occurring in the six year post-census period linked to a census return. Details of the linkage process are described elsewhere (O'Reilly et al., 2008). These data were anonymised, held in a safe setting by NISRA and made available to the research team for this study.

All attributes of the cohort members were as described on the census record. The census included a question on country of birth, allowing the following responses: Northern Ireland, England, Wales, Scotland, Republic of Ireland and elsewhere – with those born 'elsewhere' asked to include their country of birth. Demographic characteristics included age-group, sex and marital status. Socio-economic status was assessed using housing tenure, car availability, educational attainment and national statistics socio-economic classification (NSSEC). In addition, the income domain of the Northern Ireland Index of Multiple Deprivation (Northern Ireland Statistics and Research Agency, 2005) indicated relative area affluence, with census super output areas (average population=1894) ranked from low to high and divided into quintiles, each containing approximately 20% of the population. Health status was assessed using the two self-reported health questions in the census: limiting long-term illness (LLTI), which elicited a yes or no response and general health in the year prior to census, which included the responses good, fairly good or poor. Both health measures have been included in the analysis as earlier analysis has shown that both independently contribute to mortality risk.

The cohort was restricted to those aged 25–74 to ensure that socio-economic factors could be applied to the whole of the analysis population: many of those aged less than 25 will not yet have finished their full time education, while neither education nor social class were coded for those aged 75 and over in the 2001 Census. Members of the Armed Forces stationed in Northern Ireland because of the civil unrest were excluded. These groups were predominantly from Great Britain, and formed an exceptional group of young disproportionately healthy adults.

Cox Proportional Hazards modelling was used to detect differences in the mortality (all cause and cause specific) experience of the country of birth groups over the six year period. No adjustment for was made for multiple hypothesis testing. Cause specific mortality included ischemic heart disease (IHD) (International Classification of Disease (ICD) 10 I20-I25); stroke (ICD 10 I60-I69); respiratory disease (ICD 10 J00-J99); cancer (ICD 10 C00-C97) and external causes (ICD 10 V01-Y98).

3. Results

Just over 90% of the cohort was born in Northern Ireland. Of the remainder, 4.2% were born in England, 1.2% in Scotland, 0.2% in Wales, 2.7% in the Republic of Ireland and 1.7% were born outside of the British Isles. The English born and those born outside of the British Isles tended to be younger than those born in Northern Ireland, Scotland, Wales and the Republic of Ireland (Table 1). Those born in the Republic of Ireland tended to be older (42% were aged 55–74 compared to only 30% of those born in Northern Ireland), and had a correspondingly higher proportion of females. The indicators of socio-economic status showed a mixed picture of the relative affluence of those born in different countries: for example, almost 78% of those born in Northern Ireland lived in an owner-occupier property, compared to 66% of those born in Scotland and 67% born outside of the British Isles; conversely, 39% of the English born and 42% of the Welsh-born were classed as professionals, compared to 28% of those born in Northern Ireland. Just over 16% of those born in Northern Ireland had a degree, compared to 23% of those born in England, Wales and the Republic of Ireland, and 39% of those born outside of the British Isles. The almost equal distribution of the Northern Ireland born across the quintiles of area deprivation is to be expected, given the method used to create the indicator; with the exception of those born in the Republic of Ireland, those born outside of Northern Ireland tended to live in more affluent areas.

During the six years of follow-up, the cohort recorded a total of 39,511 deaths. Table 2 shows the demographic, socio-economic and health factors associated with mortality: the expected relationships were observed. In the fully adjusted model (Model 3) females were approximately 40% less likely to die than males (Hazard ratio (HR)=0.58; 95% confidence interval (CI) 0.57, 0.59), while married people had a lower risk than the never or previously married. Marked social gradients are evident with car availability, housing tenure and educational attainment each making an independent contribution to mortality risk. The relationship between NSSEC and mortality was more tenuous, with only those not currently working having an excess mortality risk, once adjustment was made for all other demographic and socio-economic characteristics. A graded relationship between mortality risk and relative deprivation of area of residence was observed even after adjustment for demographic and socio-economic factors; however, it was attenuated with further adjustment for health status.

There were relatively few deaths (57) among those born in Wales, making it more difficult to detect statistically and clinically significant associations. Adjusting for age and sex (Table 2), the Scottish born had higher mortality rates than those born in Northern Ireland, while other migrant groups had lower mortality than the Northern Ireland born. For example, those born in Scotland were 8% more likely (HR=1.08; 95% CI=0.98–1.18) to have died in the follow-up period than the Northern Ireland born. Conversely, those born in England were 14% less likely to have died in the follow-up period than the Northern Ireland born (HR=0.86; 95% CI=0.81–0.91); those from the Republic of Ireland were 17% less likely to have died (HR=0.83; 95% CI=0.78–0.88), while those born outside the British Isles were 22% less likely to have died (HR=0.78; 95% CI=0.71–0.87).

With the exception of the Scottish born, adjusting for the demographic and socio-economic characteristics (Model 2) and health status (Model 3) of the cohort attenuated the differences between the groupings, though in the fully adjusted model, those born in the Republic of Ireland continued to be significantly less likely to die in the follow-up period than the Northern Ireland born. After adjusting for the demographic, socio-economic and baseline health status of the cohort, the excess mortality among the Scottish born increased (HR=1.15; 95% CI=1.05–1.27).

The five major causes of death included in the analysis – IHD, stroke, respiratory, cancer and external causes, accounted for 75% of all deaths to the cohort in the follow-up period. Cancer accounted for 49.1% of these deaths, while IHD accounted for almost 25%. Mortality risk by country of birth differed depending on the cause of death examined (Table 3). Compared to the Northern Ireland-born residents, risk of IHD was lower for the Republic of Ireland (HR=0.74; 95% CI=0.64–0.86) and English (HR=0.85; 95% CI=0.73–0.99) born, even after adjusting for a wide range of demographic and socio-economic characteristics. Migrants from outside the British Isles recorded lower levels of both IHD (HR=0.74; 95% CI=0.57–0.97) and stroke (HR=0.58; 95% CI=0.35–0.96). Conversely, the Scottish born had significantly higher rates of IHD (HR=1.42; 95% CI=1.17–1.72), and an elevated risk of a respiratory death, though that did not reach conventional levels of significance. The small numbers of deaths among the Welsh-born migrants renders the estimates for cause-specific mortality unreliable.