Ethnic differences in multimorbidity in Scotland – Is the Pakistani morbidity-mortality paradox real?

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Extended abstract

Introduction

The literature researching ethnic inequalities in health tends to be divided between a strand focusing on a mortality advantage in particular migrant and ethnic groups and a strand worried by a morbidity disadvantage in these minority groups. Separate research on the health of minority ethnic groups in Scotland showed a discrepancy between the ethnic patterns of self-reported health (1, 2) and the ethnic patterns of mortality (3). In particular, the Pakistani population reported poorer health than the majority White Scottish population while showing a mortality advantage.

These findings could represent a real morbidity-mortality paradox whereby certain groups live longer but in poorer health. However, self-reported health is a self-declared measure of morbidity and is, consequently, deemed subjective. There could be cultural differences in the meaning and reporting of health which do not reflect objective health similarly across ethnic groups. Hence, the patterns of reported morbidity in the Pakistani population might not reflect their actual morbidity status. To provide further evidence on the morbidity disadvantage faced by the Pakistani population in Scotland, we explore ethnic differences in health using a more objective measure of morbidity.

Research in health inequalities should use objective measures of health to complement findings using subjective measures of health and in order to better understand health inequalities. In addition, a strand of health research pushes toward assessing health more globally and beyond the focus on a single disease (4-6). Therefore multimorbidity based on clinical diagnosis was chosen for this investigation. Indeed, the health of individuals tends to be determined by more than one disease, especially as we age (4, 7). A measure of multimorbidity (two or more comorbidities) was created from the main clinical diagnosis of 12 years of hospitalisation data, reflecting a certain severity of objective morbidity.

Methods

We used the Scottish Health and Ethnicity Linkage Study (SHELS) which links the 2001 Scottish census data for 4.6 million people to 12 years of their hospitalisation records (2001-2013). The census data provide socio-demographic information such as age, sex, self-declared ethnicity, country of birth and socio-economic status (SES).

The hospitalisation data came from NHS National Services Scotland. For sensitivity considerations, the main diagnosis only was provided for linkage to the 2001 Scottish census within the SHELS project. As there is no standard way to operationalise multimorbidity, we created a multimorbidity indicator based on the 17 comorbidities of the Charlson index, indicator that have been widely used and validated worldwide (7-9). Comorbidities were identified from the main diagnosis of hospitalisation records using the 10th revision of the International Classification of Diseases (ICD-10 codes) and Quan et al. coding algorithms (10).

Ethnicity was categorised in 14 ethnic groups in the census. However, due to small numbers, aggregation was necessary to analyse ethnic inequalities in multimorbidity and avoid disclosure issues (N<6). Hence, the Bangladeshi group was combined with the Other South Asian group and the Caribbean, Black African and Black Scottish and Other Black groups were combined into the 'African Origin' group. The results for the 'All other ethnic group' were not reported due to their heterogeneity.

Country of birth was used as a binary variable on whether individuals were born in the UK or outside the UK. UK-birth combined with ethnicity served as a proxy for migrant generations. Minority ethnic groups born in the UK were considered as descendants while those born outside the UK were considered as migrants. Three measures of SES (education, house ownership, and Scottish index for multiple deprivation) were combined and used as a proxy for SES.

Ethnic differences in multimorbidity were assessed using relative risks (RR) and their 95% confidence intervals calculated using Poisson regression with robust variance. The White Scottish majority population was taken as the reference (RR=1). The baseline model was adjusted for age and further models additionally and separately adjusted for SES and UK-birth. A combined measure of ethnicity and UK-birth was used in a separate set of models to evaluate the risk of multimorbidity in ethnic groups who were born in the UK and born outside the UK. A last set of models presented age-adjusted RRs by ethnicity for each of the 17 comorbidities of the Charlson index in order to understand which type of diseases contributed to the overall multimorbidity patterns observed.

Results

Figure 1 shows ethnic differences in multimorbidity adjusted for age (in red) and for age and SES (in blue). We found lower risks of hospitalisation-based multimorbidity in Other White British, Other White and Chinese populations and higher risks in the Pakistani population compared to the White Scottish population.

Adjustment for SES attenuated the differences in the White groups but lower risk of multimorbidity overall persisted in these groups. Higher risk of multimorbidity in the Pakistani population remained after SES adjustment.

Figure 2 shows the risk of multimorbidity by a combined measure of ethnicity and UK-birth. Other White British males and females, Other White males, and Chinese males had a multimorbidity advantage regardless of being born in the UK or not in comparison the White Scottish population born in the UK. In Chinese females who were born in the UK, events were too small and not released to researchers as deemed disclosive. Nevertheless, the multimorbidity advantage was apparent in Chinese females who were born outside the UK. Despite being significant and stronger in those who were born in the UK, both Pakistani individuals who were born in or outside the UK appeared to have a multimorbidity disadvantage.

Finally, ethnic differences in the 17 comorbidities of the Charlson index were explored. We focused on understanding the conditions underlying the disadvantage observed in the Pakistani population in order to gain a global view of the disease profile in this population based on hospitalisation data. Results showed that the Pakistani population was particularly more likely than the White Scottish population to be hospitalised for myocardial infarction, congestive heart failure and cerebrovascular disease (stroke), diabetes, renal disease, and chronic pulmonary disease while showing 30% to 60% lower risk of cancer and virtually no hospitalisation for dementia.

Figure 1. RRs (95% CI) of ethnic differences in multimorbidity by sex, adjusted for age (red) and adjusted for age and SES (blue)

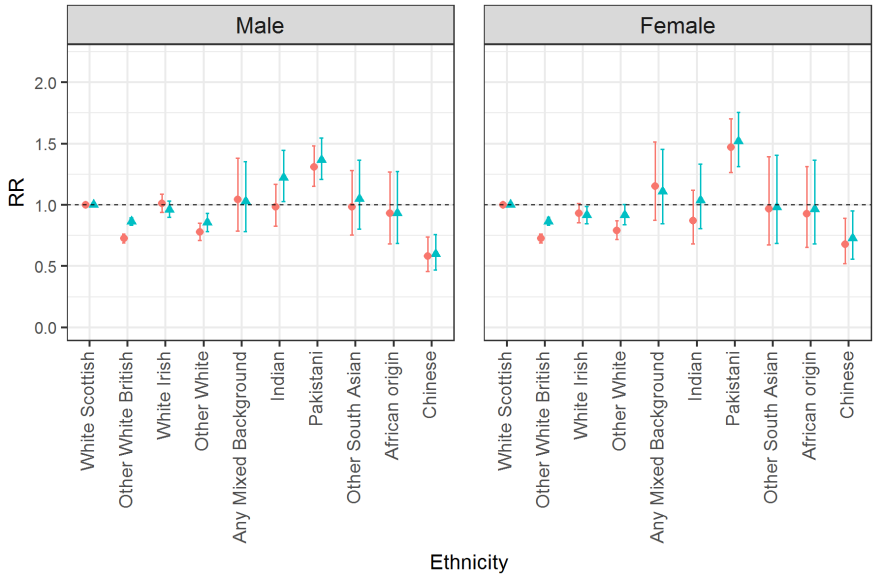
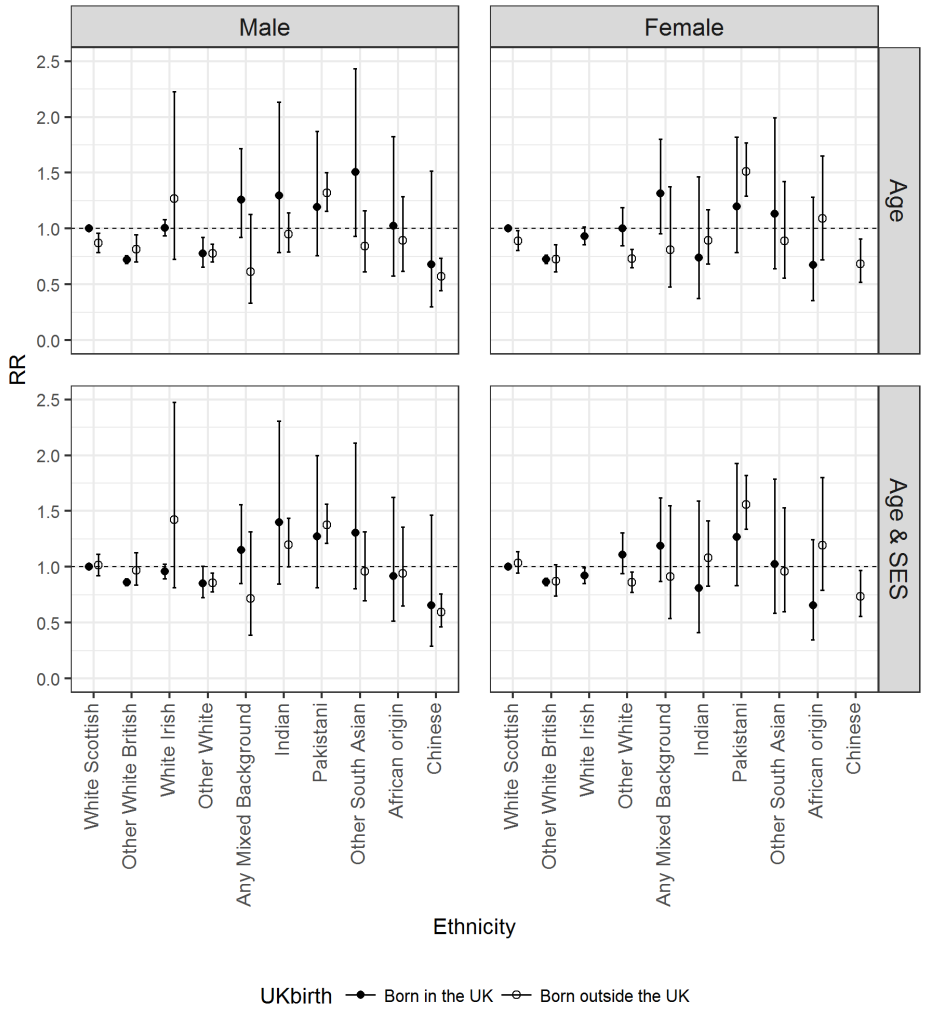


Figure 2. RRs (95% CI) of multimorbidity by ethnicity and UK-birth, stratified by sex, adjusted for age (top) and adjusted for age and SES (bottom)



Discussion and conclusion

Despite a few recent US studies, little is known about ethnic differences in multimorbidity and their underlying mechanisms. Based on hospitalisation data, our findings showed ethnic differences in multimorbidity in Scotland. In line with self-reported health findings, an advantage in multimorbidity was observed in the Other White British, Other White and Chinese groups while the Pakistani population appeared to have a disadvantage compared to the White Scottish population.

With some variability, socio-economic status and UK-birth overall failed to explain the multimorbidity patterns by ethnicity. Adjustment for SES showed a convergence towards the multimorbidity level of the White Scottish population in the white groups (Other White British and Other White). Stratifying ethnicity by UK-birth had little effect on the patterns observed. However, Pakistani males and females who were born outside the UK were at the highest risks of multimorbidity.

The multimorbidity disadvantage seen in the Pakistani population of Scotland was characterised by higher hospitalisation due to cardiovascular disease, diabetes, renal disease and respiratory disease which is in line with the disease-specific literature. Lower risks of cancer in this population was also expected. Hence, Pakistani population are particularly more likely to be hospitalised from the disease linked to the metabolic syndrome. This specific disease profile can explain their higher morbidity levels in line with reported health findings in Scotland. However, these particular diseases for which the Pakistani population is at higher risk, are not necessarily those you would expect to be related to a lower risk of mortality. The question of why Pakistani population seems to survive longer while being more likely to experience metabolic diseases requires further research.

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