

## Rates of hip and knee joint replacement amongst different ethnic groups in England: an analysis of National Joint Registry data



M.C. Smith †, Y. Ben-Shlomo ‡, P. Dieppe §, A.D. Beswick †, A.O. Adebajo ||, J.M. Wilkinson || \*\*, A.W. Blom † \*, on behalf of the National Joint Registry for England, Wales and Northern Ireland

† Musculoskeletal Research Unit, School of Clinical Sciences, University of Bristol, Bristol, UK

‡ School of Social and Community Medicine, University of Bristol, Bristol, UK

§ University of Exeter Medical School, Exeter, UK

|| Department of Oncology and Metabolism, University of Sheffield, Sheffield, UK

### ARTICLE INFO

#### Article history:

Received 20 June 2016

Accepted 14 December 2016

#### Keywords:

Ethnicity

Hip replacement

Knee replacement

England

### SUMMARY

**Objective:** Despite a health care system that is free at the point of delivery, ethnic minorities may not always get care equitable to that of White patients in England. We examined whether ethnic differences exist in joint replacement rates and surgical practice in England.

**Design:** 373,613 hip and 428,936 knee National Joint Registry (NJR) primary replacement patients had coded ethnicity in Hospital Episode Statistics (HES). Age and gender adjusted observed/expected ratios of hip and knee replacements amongst ethnic groups were compared using indirect standardisation. Associations between ethnic group and type of procedure were explored and effects of demographic, clinical and hospital-related factors examined using multivariable logistic regression.

**Results:** Adjusted standardised observed/expected ratios were substantially lower in Blacks and Asians than Whites for hip replacement (Blacks 0.33 [95% CI, 0.31–0.35], Asians 0.20 [CI, 0.19–0.21]) and knee replacement (Blacks 0.64 [CI, 0.61–0.67], Asians 0.86 % [CI, 0.84–0.88]). Blacks were more likely to receive uncemented hip replacements (Blacks 52%, Whites 37%, Asians 44%;  $P < 0.001$ ). Black men and women aged  $<70$  years were less likely to receive unicompartmental or patellofemoral knee replacements than Whites (men 10% vs 15%,  $P = 0.001$ ; women 6% vs 14%,  $P < 0.001$ ). After adjustment for demographic, clinical and hospital-related factors, Blacks were more likely to receive uncemented hip replacement (OR 1.43 [CI, 1.11–1.84]).

**Conclusions:** In England, hip and knee replacement rates and prosthesis type given differ amongst ethnic groups. Whether these reflect differences in clinical need or differential access to treatment requires urgent investigation.

© 2017 Published by Elsevier Ltd on behalf of Osteoarthritis Research Society International.

### Introduction

Variations in the provision of health care interventions in different groups within society are commonplace<sup>1</sup>. In the USA particular concern has been raised about ethnicity, and the relative

under-provision of certain procedures amongst African Americans. In the UK the major issue investigated has been reduced service utilisation amongst socio-economically deprived groups<sup>2,3</sup>, although ethnic minority groups are often located in the most deprived areas of a community<sup>4</sup>.

Hip and knee joint replacement operations are amongst the highest volume health care interventions worldwide. In England and Wales in 2013, 79,088 hip and 85,128 knee primary replacements were recorded on the National Joint Registry (NJR)<sup>5</sup>. Osteoarthritis is the most common indication for joint replacement, with about 91% of total hip joint replacements and 98% of total knee joint replacements being done for this reason. In the USA recent studies have shown that, despite broadly similar

\* Address correspondence and reprint requests to: A.W. Blom, Musculoskeletal Research Unit, University of Bristol, Learning and Research Building, Southmead Hospital, Bristol BS10 5NB, UK.

\*\* Address correspondence and reprint requests to: J.M. Wilkinson, C/o: National Joint Registry, 6th Floor, Tenter House, 45 Moorfields, London EC2Y 9AE, UK.

E-mail addresses: [j.m.Wilkinson@Sheffield.ac.uk](mailto:j.m.Wilkinson@Sheffield.ac.uk) (J.M. Wilkinson), [ashley.blom@bristol.ac.uk](mailto:ashley.blom@bristol.ac.uk) (A.W. Blom).

osteoarthritis prevalence (age adjusted prevalence rates for Whites was 22.3% and Blacks 21.8%)<sup>6</sup>, African Americans are less likely to get joint replacements than White Americans<sup>7–9</sup>. Various reasons have been postulated to explain this, including late presentation and relative unwillingness to undergo surgery amongst Black Americans<sup>10–14</sup>. In the UK and USA it has been shown that people in the most deprived groups are less likely to receive joint replacements than those of higher socio-economic status<sup>2,15</sup>, and at least one US study has suggested that there may also be racial disparities<sup>16</sup>. However, there has been no large-scale investigation of ethnicity and joint replacement in the UK.

We have used data from the NJR<sup>5</sup>, linked to the Hospital Episode Statistics (HES) database, to address whether the rate of primary hip and knee joint replacement is the same amongst different ethnic groups in England, whether there are differences in the clinical indications for primary joint replacement amongst ethnic groups and if types of prosthesis and fixation methods used differ between ethnic groups.

## Methods

We linked all records of primary knee and hip joint replacements in the NJR database for England and Wales and which took place between April 2003 and December 2012 to HES records of patient admissions for NHS funded care in England. In so doing, we obtained additional HES recorded patient demographic information on ethnic group and the geographical area in which the person lived – Lower Super Output Area Level (LSOAL). We only used the first primary procedure recorded for a patient and excluded any revisions or subsequent primary procedure on the contra-lateral side for these patients.

### *Ethnicity exposure*

Each NJR record was linked to all existing HES episodes of admission for that individual since 2001 to minimise missing data on ethnicity (HES changed the way ethnicity was categorised from 2001). To ensure consistency in ethnic groupings, we limited eligible HES records for linkage to the NJR to those from 2001 onwards). If the coding of ethnicity differed across episodes we used the most frequently indicated ethnic category. The numbers of patients in some ethnic groups was small, therefore for this data analysis, the ethnic groups were categorised into three main groupings: White (including British, Irish, Gypsy, and Other White), Black (including Caribbean, African, Mixed White & Black African/Caribbean, and Other Black origin), and other ethnicities (including Indian, British Indian, Pakistani, British Pakistani, Bangladeshi, British Bangladeshi, Mixed White & Asian, and Other Asian, Chinese, and “other mixed race”). We have labelled the last category “Asian” for simplicity and as this is the largest ethnic group amongst the races included here, even though it is clearly heterogeneous.

### *Other covariates*

The residential postcode for the patient at the time of the primary operation was used to determine the English Index of Multiple Deprivation (IMD) 2010 area score by LSOAL as an ecological measure of deprivation<sup>17</sup>. We created a five-category indicator going from the 20% most deprived (quintile 1) to 20% least deprived areas of England (quintile 5) by ranking the IMD scores and categorising the distribution into quintiles. Other covariates included age group (<40, 40–49, 50–59, 60–69, 70–79, ≥80 years), gender, the American Society of Anaesthesiologists (ASA) six point scale of surgical fitness, and pre-operative functional severity as captured by the EQ-5D-3L<sup>18</sup> mobility item (whether they have ‘no’ or ‘some’

problems in walking about or are ‘confined to bed’) coded as a three-level ordinal variable. We created a four level variable for body mass index (BMI) although this was only used in a sensitivity analysis due to a high proportion of missing data; underweight ( $10 \leq \text{BMI} < 20 \text{ kg/m}^2$ ), normal ( $20 \leq \text{BMI} < 25 \text{ kg/m}^2$ ), overweight ( $25 \leq \text{BMI} < 30 \text{ kg/m}^2$ ), and obese ( $30 \leq \text{BMI} < 60 \text{ kg/m}^2$ ). We also looked at type of prosthesis and method of fixation as clinical outcomes.

### *Statistical methods*

We used indirect standardisation to compare the observed number of primary joint replacements, for any indication, to the expected numbers in each ethnic group, using the total age and gender specific risks of a procedure applied to the same ethnic specific population strata as reported in the 2011 Census data<sup>19</sup>. We explored possible differences in the clinical indications for having a primary joint replacement amongst ethnic groups using  $\chi^2$  tests of association.

Subsequent analyses were restricted to the sub-set of patients with osteoarthritis as the indication for the primary procedure. We used  $\chi^2$  tests to compare differences in categorical variables by ethnicity and in some cases stratified by gender. Where the data suggested possible interactions, we used log-linear models assuming a Poisson distribution to test for this by comparing any improvement in goodness of fit of the models from likelihood ratio tests with and without these terms.

We ran both univariable and multivariable logistic regression models to mutually adjust for covariates. Model A simply examined ethnicity alone; model B adjusted for age-group, gender, ASA grade and area deprivation quintile as patient related confounders; model C adjusted for routine surgical behaviour unrelated to patient factors, by adjusting for what proportion of all hip replacements are done using uncemented prostheses at that trust. We took into account the clustering of procedures within a trust by using robust standard errors. We used Wald tests to determine the overall significance of additional terms added to a proposed model compared to the model without them. We undertook two further sensitivity analyses by comparing the results for model C with and without adjustment for pre-operative functional limitations using EQ-5D-3L mobility item (data available on about 30% of patients) and BMI (data available on about 45% of patients).

## Results

The total number of eligible NJR records available for all primary diagnoses for the period 2003–2012 before matching to HES and after excluding Welsh and non-NHS England funded operations for hips and knees were 425,726 and 481,528 primary replacements respectively. Of these, 12% hip and 11% knee replacements had missing ethnicity information either because a match to a valid HES record could not be made or because their HES ethnic group classification was ‘unknown’. This left 373,613 hip and 428,936 knee primary replacement records for any primary diagnosis with available ethnicity data. This was reduced to 330,384 hip and 362,505 knee patients after restricting to the first replaced side of a joint for those with bilateral operations. The total number of patients in the osteoarthritis only analysis sample, after restricting to patients’ first primary replaced side and to those with a sole diagnosis of osteoarthritis, with valid ethnicity data was 640,355 (293,325 hip and 347,030 knee patients).

Table I shows the observed vs expected numbers of patients having a primary hip or knee joint replacement by ethnicity and stratified by gender. For both hip and knee replacements, there were fewer than expected procedures amongst the Black and Asian

Download English Version:

<https://daneshyari.com/en/article/5669205>

Download Persian Version:

<https://daneshyari.com/article/5669205>

[Daneshyari.com](https://daneshyari.com)