# Sex and Race Characteristics in Patients Undergoing Hip and Knee Arthroplasty in an Urban Setting

James D. Slover, MD, MS, Michael G. Walsh, PhD, and Joseph D. Zuckerman, MD

**Abstract:** The purpose of this study was to examine the relationship between sex, race, and preoperative function in a large diverse patient population undergoing hip and knee arthroplasty. An observational study was conducted on 3542 consecutive primary unilateral total hip and knee arthroplasties. Harris Hip and Knee Society Scores were used to quantify preoperative function. The results demonstrate lower function, with average Harris Hip Scores that were 4.9 ($P < .0001$) and 8.77 ($P < .001$) and average Knee Society Scores that were 6.03 ($P < .06$) and 12.8 ($P < .001$) points lower in African American and Hispanic patients than white patients for the population, respectively. This study demonstrates that Hispanic and African American patients have worse preoperative hip and knee function before arthroplasty than white patients. Future efforts to elucidate the reasons for this decreased function as well as efforts to rectify any disparities should target these patient populations. **Keywords:** hip arthroplasty, knee arthroplasty, racial disparities, function.
© 2010 Elsevier Inc. All rights reserved.

Primary hip and knee arthroplasty prevalence rates have been increasing, and this trend is expected to continue in the coming years [1,2]. The cost to the healthcare system for delivering these services is also increasing [3]. The need to optimize patient outcomes with these highly prevalent procedures is self-evident. Studies have demonstrated that the timing of joint arthroplasty is an important determinant of outcome, that is, patients with worse preoperative function achieving lower postoperative function after an arthroplasty procedure. These studies were based upon validated outcome measures such as the Short-Form 36 (SF-36) physical function subscale and the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and function subscales [4,5]. Simultaneously, several studies have demonstrated decreased functional status for women compared with men at the time of primary hip and knee arthroplasty [6,7]. Kennedy et al [6] found that women reported lower scores on self-reported function questionnaires and had poorer performance in functional tests, such as stair climbing and self-paced walking tests. Recent studies have found that female arthroplasty candidates had lower SF-36 and Knee Outcome Survey scores, longer timed up-and-go test and stair-climb test times, shorter 6-minute walk distances, and lower normalized quadriceps strength compared with men awaiting a joint arthroplasty [7]. In addition, a study examining the relationship between race and function before lower extremity joint arthroplasty found that Hispanics and African Americans demonstrated lower SF-36 and higher WOMAC scores when compared with whites before hip and knee arthroplasty, indicating lower preoperative function in those patient groups [8].

The potential for sex and racial disparities in the practice of orthopedic surgery remains an issue of primary concern for our profession [9]. The purpose of this study was to determine whether severity of preoperative clinical condition differs according to race and/or sex among patients who present for total hip and knee arthroplasty surgery in an American urban setting.

## Methods

An observational study was conducted on 3542 consecutive primary unilateral total hip (n = 1596) and knee (n = 1946) arthroplasties performed at the NYU Hospital for Joint Diseases, New York, New York, between January 1997 and July 2006. Physical examinations and standardized questionnaires were administered to patients before their surgery. The data from these comprised the functional components of the Harris Hip Score and the Knee Society Score, which were used to quantify functional ability in hip and knee

*From the NYU Hospital for Joint Diseases, New York, New York.*
Submitted April 7, 2008; accepted March 6, 2009.
Our registry has been supported by educational grants from Smith and Nephew in the past.
Reprint requests: James Slover, MD, MS, Department of Orthopaedic Surgery, NYU Hospital for Joint Diseases, 301 East 17th Street, Suite 1616, New York, NY 10010.
© 2010 Elsevier Inc. All rights reserved.
0883-5403/2504-0014$36.00/0
doi:10.1016/j.arth.2009.03.002

**Table 1.** Mean Difference in Preoperative Harris Hip and Knee Society Scores*

| | Hispanic | White |
|---|---|---|
| Hips (Harris Hip Score) | | |
| African American (men and women) | 3.87 (0.06) | −4.90 (<0.001) |
| Hispanic (men and women) | | −8.77 (<0.001) |
| African American (men) | 5.12 (0.16) | −3.68 (0.16) |
| Hispanic (men) | | −8.80 (<0.001) |
| African American (women) | 3.10 (0.44) | −5.22 (0.003) |
| Hispanic (women) | | −8.32 (<0.001) |
| Knees (Knee Society Score) | | |
| African American (men and women) | 6.04 (0.11) | −6.03 (0.06) |
| Hispanic (men and women) | | −12.08 (<0.001) |
| African American (men) | 18.92 (0.009) | −4.61 (>0.99) |
| Hispanic (men) | | −23.53 (<0.001) |
| African American (women) | 3.86 (0.68) | −2.42 (>0.99) |
| Hispanic (women) | | −6.28 (0.10) |

*Numbers shown are regression coefficients. Regression coefficients show the mean difference (*P* value) in function between ethnic groups for hips (Harris Hip Score 100-point scale) and knees (Knee Society Score 200-point scale). Analyses for hips and knees were conducted separately. The joint specific analyses are pooled across, as well as stratified by, sex and adjusted for age. All comparisons are made with the ethnic categories in the rows relative to the ethnic categories in the columns. Thus, because all coefficients are negative, Hispanics always do worse than African Americans, and both African American and Hispanics always do worse than whites.

arthroplasty patients, respectively. The total score composite was used for both scores, which includes both the self-reported and clinical examination components. In addition, we obtained basic demographic data from the same questionnaires. Race was categorized as black, white, Latino, and other based on each patient's self-reported, self-identified classification in the demographic section of the questionnaire. All patients gave written informed consent before their being included in the study. The study protocol was approved by the NYU Institutional Review Board.

### Statistical Analysis

We used 1-way analysis of variance to assess the bivariate associations between the different ethnic groups and knee and hip function. The 3 ethnic groups were compared using the Bonferroni adjusted multiple comparisons. Both pooled and sex-stratified estimates from the analysis of variance models are presented. Multiple linear regression was used to, first, adjust for the potential confounding of age and sex and, second, assess effect modification of ethnicity by sex. Harris Hip Scores [10] and Knee Society Scores [11] did not demonstrate any substantial departure from normality and were homoscedastic across ethnicity and sex. Ethnicity was included in the regression models as an indicator variable, with "white" as the reference group, whereas sex  ethnicity interaction terms were used to assess effect modification in the models. There was no evidence of sex-ethnicity effect modification, so the reduced models, which control for age and sex, are presented. All results are reported separately for hips and knees. We further conducted the analyses selecting only one joint per bilateral patient to determine if the within-individual correlation affected the results. Doing so did not affect the results in any substantive way, so we report the results for all joints. The level of significance for all statistical tests is assumed to be .05 or lower.

## Results

Harris Hip Scores were 4.9 ($P < .0001$) and 8.77 ($P < .001$) points lower in African American and Hispanic patients than white patients for the population, respectively. Similar findings were found in preoperative total knee arthroplasty patients with 6.03 ($P < .06$) and 12.8 ($P < .001$) lower average Knee Society Scores in African American and Hispanic patients than white patients for the population, respectively. For men, hip and knee scores were worse for Hispanics and African Americans relative to whites before joint arthroplasty, but the differences were only statistically significant for Hispanics with average Harris Hip and Knee Society Scores that were 8.8 ($P < .001$) and 23.53 ($P < .001$) points lower than whites, respectively (Table 1). Among women, Hispanics and African Americans had statistically significantly worse preoperative hip scores than white women, with an average Harris Hip Score that was 5.22 ($P < .003$) and 8.32($P < .001$) points lower for these groups. They demonstrated worse preoperative scores before knee arthroplasty as well, but the differences were not statistically significant (Table 1).

Compared with Hispanics, African Americans had better preoperative hip and knee scores, but the difference was only statistically significant for men before knee arthroplasty, where they demonstrated an average Knee Society Score that was 18.92 ($P < .009$) points better.

Table 2 shows the adjusted effect estimates for ethnicity. When the estimates were adjusted for age and sex, there was little change. Both blacks and Latinos did significantly worse than whites, with the greatest disparity occurring between Latinos and whites in both hips and knees. Furthermore, age was significantly associated with hip

**Table 2.** Multiple Linear Regression for Harris Hip and Knee Society Scores

| | Regression Coefficient (SE) | *P* |
|---|---|---|
| Harris Hip Score (100-point scale) | | |
| Black | −5.2 (1.2) | <.001 |
| Latino | −9.5 (1.4) | <.001 |
| Age | −0.15 (0.03) | <.001 |
| Women | −4.0 (0.9) | <.001 |
| Knee Society Score (200-point scale) | | |
| Black | −3.9 (2.7) | .14 |
| Latino | −10.8 (2.4) | <.001 |
| Age | −0.03 (0.09) | .70 |
| Women | 14.3 (2.3) | <.001 |

Download English Version:

https://daneshyari.com/en/article/4063267

Download Persian Version:

https://daneshyari.com/article/4063267

Daneshyari.com