Editorial

The Quest for Explanations for Race/Ethnic Disparity in Rates of Use of Total Joint Arthroplasty

Osteoarthritis (OA) is a common, disabling, and costly disease. For individuals with advanced knee or hip OA in whom medical treatment has failed, total joint arthroplasty (TJA) has become the accepted treatment. About 95% of TJA recipients have OA. Studies have shown substantial, sustained longterm improvement in joint pain, physical function, and quality of life after TJA[1]. Thus, despite the high surgical costs, TJA ranks at or near the top among medical and surgical interventions in its cost-effectiveness and capacity to improve individuals' quality of life[2]. Despite this, research suggests that TJA is under-utilized, particularly in certain population subgroups. In the US, rates of joint replacement are lower in individuals with low income and in African-Americans and Hispanics, relative to those with higher income or Whites, respectively[3–5].

Given the effectiveness of TJA, whether these disparities are unwarranted is a matter of considerable concern. Unfortunately, if we examine rates of use of a procedure such as TJA, we learn only about who is getting care, not about who is not, and even more importantly, about why not. Further, the interpretation of these studies is difficult due to the potential for inadequate adjustment, inherent in analyses of administrative data, for racial/ethnic or socioeconomic differences in the underlying population prevalence of severe hip or knee arthritis (i.e., for "need" for TJA), for the presence of major comorbidities that might contraindicate surgery, and for individuals' preferences for having the surgery. The study by Byrne, *et al* in this issue of *The Journal,* discussed below, is one of a growing number of studies that are seeking explanations for these observed differences in TJA rates[6].

A number of potential explanations must be considered. That the need for TJA is lower among individuals with low socioeconomic status (SES), African-Americans, and Hispanics, relative to their wealthier or White counterparts, is highly unlikely. Studies consistently indicate that persons with low SES have worse self-reported arthritis symptoms and disability, even after adjustment for lifestyle risk factors for OA, such as obesity[3,7]. Whether prevalence of OA varies by race or ethnicity is less clear. Some studies suggest a higher prevalence in African-Americans than Whites[8], while others do not[9]. Even so, it seems reasonable to conclude that the population prevalence of individuals who might benefit from TJA is at least as great, if not greater, among these subgroups.

A second possibility is that the prevalence of comorbidities that might preclude TJA as a treatment option is higher among people with low SES, African-Americans, and Hispanics. It's well accepted that individuals with low SES have worse general health — thus it is plausible that this might partly explain the disparate rates for TJA. This has not been explicitly studied in the US with respect to TJA. However, in Canada, research has shown that even adjusting for comorbidity, there is greater unmet need for TJA among individuals with low education and/or income[3]. Race/ethnicity was not examined.

Thus, it is most likely that factors other than differences in demonstrable need for TJA are responsible for the observed disparity in TJA rates. These include the effects of sociodemographics (individuals' characteristics, literacy, knowledge, and cultural traditions), and health beliefs (different perceptions of risk, self-efficacy, and trust), lack of both community (e.g., proximity to care) and personal/family resources (e.g., health insurance, ability to pay for out-of-pocket costs, living circumstances and social support), and the characteristics of the clinicians providing care (e.g., clinician and system racial, SES, or sex-based discriminatory practices that are either overt[10] or subtle[11]), and finally preferences for treatment[11-13].

From research performed in individuals with other conditions, we see the choices people make about treatment are influenced by a number of factors[13], including individuals' tolerances and the importance attached to their symptoms, the manner in which risks/benefits of the treatment are presented[14], and the individual's attitude towards risk[15]. Prior knowledge of someone who has had the procedure in question has

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also been shown to influence individuals' healthcare decisions[16], as does the patient-provider relationship. Geography (i.e., proximity to care[17]), sex[17], self-efficacy, and the individual's preferred role in clinical decision-making[18] have also been shown to influence individuals' healthcare decision-making.

However, these studies have largely examined clinical decision-making in the healthcare setting without extensive consideration of the key contextual factors that influence individuals' real-world healthcare decisions. Specifically, the process of decision-making for seniors considering elective surgery, such as TJA, has received relatively minimal study. Hip and knee arthritis, although severely debilitating, is not a life-threatening condition. While the risks associated with TJA are small, they are not insignificant considering that the intent of the surgery is not to prevent death, but rather to improve quality of life. As a result, systematic differences between various racial or ethnic groups, or between those with lower versus higher SES, with respect to arthritis health beliefs, or perceived or actual risks and benefits associated with TJA, may result in different preferences for care.

Among the participants of a community-based cohort of Canadians with hip/knee arthritis, individuals with lower SES perceived the risks associated with TJA as less acceptable, and the benefits less good, compared to those with higher SES. In adjusted analyses, willingness to consider TJA as a treatment option was associated with individuals' perceived arthritis severity and candidacy for TJA, acceptability of TJA risks, and the opinions of friends regarding TJA[19]. Taking these factors into consideration, none of education, income, or racial background was a significant correlate of willingness. In the US, studies have similarly found that African-Americans, compared with Whites, perceive the risks of TJA to be higher[20] and the outcomes poorer[21]. These differences in perceptions may reflect general medical mistrust, higher risks and lower benefits for certain patient subgroups, and/or lack of knowledge, or different information needs, about the procedure. A recent study of Manhattan Medicare beneficiaries found that African-Americans, compared with Whites, were less likely to report knowing someone who had surgery for knee or hip pain, and less likely to report that such surgery is beneficial[16].

To date, however, no study had examined whether systematic differences exist by race/ethnicity in how individuals value improvement of hip or knee OA symptoms. The study by Byrne, *et al*[6] addresses this knowledge gap. The authors used "willingness to pay" (WTP) methodology to examine for differences by race/ethnicity (White, African-American, Hispanic) in preferences for knee OA. WTP methodology is used to assess the amount of money individuals would be willing to pay to receive a certain health status change or benefit; WTP assumes that the larger the stated amount, the higher the preference for a particular outcome. Participants' WTP to be rid of each of 2 arthritis states — one scenario described a typical patient with severe knee OA while the other described a person with mild–moderate knee OA — and what they would pay to move from "severe" to "mild–moderate," was assessed for Whites, African-Americans, and Hispanics over age 20 years recruited from the general population, and compared with their WTP for 5 non-health items (a new car, a nice dinner, a week's vacation, a couch, and painting their house). Since WTP may vary depending on the level of the respondent's income, participants were asked to indicate their WTP as a percentage of their reported household income.

Interestingly, the authors found that African-American participants were willing to pay a significantly lower proportion of their income to get relief of joint pain or disability than were White participants. In comparison, Hispanic participants did not differ significantly in their WTP from either the White or African-American participants. In multivariable analyses, adjusting for other factors that may influence WTP (age, level of education, insurance status, and whether or not the individual had been told by a physician that she/he has arthritis), race/ethnicity explained up to 30% of the variability in reported WTP. In contrast, once individual characteristics and income were accounted for, no such racial/ethnic differences in WTP were observed for any of the 5 non-health items.

Together, these studies indicate that ethnic/racial and socioeconomic differences in health valuation and preferences for care exist, are strongly related to social network factors (in particular, the opinions and experiences of friends and family), and are potential modifiable barriers to receipt of timely and appropriate arthritis care, including TJA. Clarifying the extent to which these differences explain the observed disparities in TJA rates is important, and warrants ongoing research.

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