Published in final edited form as:
Arthritis Care Res (Hoboken). 2013 June ; 65(6): 969–976. doi:10.1002/acr.21926.

RACE, GENDER AND TOTAL KNEE REPLACEMENT CONSIDERATION: THE ROLE OF SOCIAL SUPPORT

Ernest R. Vina, MD, MS, **Yona K. Cloonan, PhD**, **Said A. Ibrahim, MD, MPH**, **Michael J. Hannon, MA**, **Robert M. Boudreau, PhD**, and **C. Kent Kwoh, MD**

Abstract

Objective—To determine whether there are racial differences in social support among patients with knee osteoarthritis (OA) and whether the impact of social support on patient preferences for total knee replacement (TKR) varies by race and gender.

Methods—514 white & 285 African-American (AA) patients with knee OA were surveyed. Logistic regression models were performed to determine if the relationship between willingness to undergo TKR and the interaction of patient race and sex were mediated by social support.

Results—Compared to whites with knee OA, AA patients were less likely to be married ($p<0.001$), reported less close friends/relatives ($p<0.001$) and had lower Medical Outcomes Study-Social Support Scale (MOS-SSS) scores ($p<0.001$). AA patients were also less willing to undergo TKR (62% vs. 80%, $p<0.001$) than whites.

The odds of willingness to undergo TKR was less in white females compared to white males when adjusted for recruitment site, age, income and WOMAC (OR 0.57, 95% CI 0.34–0.96). This difference was no longer significant when further adjusted for marital status, number of close friends/relatives and MOS-SSS score, but the effect size remained unchanged (OR 0.60, 95% CI 0.35–1.02). The odds of willingness to undergo TKR remained much less in AA females (OR 0.35, 95% CI 0.19–0.64) and AA males (OR 0.28, 95% CI 0.14–0.54) compared to white males when controlled for sociodemographic, clinical and social support measures.

Conclusions—AA patients reported less structural and functional social support than whites. Social support is an important determinant of preference for TKR surgery only among whites.

According to an Institute of Medicine (IOM) report on racial/ethnic inequities in US health care, variations in the utilization of medical procedures by race exist, even after controlling for insurance status, income, age and clinical factors (1). The report also acknowledges that disparities in utilization of medical procedures may be largely due to differences in patient preferences for care. Multiple studies have documented that total knee replacement (TKR), an effective and cost-effective intervention, is less utilized by African-Americans as compared to whites (2–4), while others have reported that African-American (AA) patients with osteoarthritis (OA) are less willing to have the procedure done than their white counterparts (5–7).

Similarly, reports have shown a significant underutilization of TKR surgery for severe OA in women as compared to men (8), and others have suggested that gender-specific patient preferences may influence decisions regarding utilization of the procedure (9). Studies have

Corresponding Author: Ernest R. Vina, MD, Arthritis Research Center, 3347 Forbes Ave., Ste. 220, Pittsburgh, PA 15213, USA. Tel: 412-383-4014. Fax: 412-383-4010. evina1@pitt.edu.

Disclosure statement: Dr. Ibrahim is a recipient of the NIH/NIAMS K24 grant (#AR055259). All other authors have declared no conflicts of interest.

demonstrated that factors, including patient psychosocial features, perceptions of procedure effectiveness and risk, and trust in physicians, influence these racial and gender differences in willingness to have TKR (6, 7). Minimal attention, though, has been paid to the extent in which the quantity and quality of social support may affect these racial and gender differences in patients' preferences for TKR.

Social support has been conceptualized in different ways and can have both positive and negative effects on an individual's well-being (10). Most commonly, it refers to a social network's provision of psychological and material resources intended to benefit an individual's ability to cope with stress (11). It has both structural and functional dimensions (12, 13). Structural support refers to the existence and quantity of social relationships and the interconnectedness of a person's social network (12). Functional support, in contrast, refers to the degree to which interpersonal relationships serve particular functions (12).

In general, African-Americans are less likely to receive structural and functional social support than whites (14–18). In addition, women are more likely to have limited social support than men (19–21). Studies have also shown that higher social support is associated with better patient decision-making in regards to medication adherence and other health-related behaviors (e.g. diet control) for a variety of conditions (13, 22). None of these studies in decision-making, though, has stratified their results by race or gender. Moreover, no study has ever examined the importance of social support as a determinant of willingness to consider an elective surgical procedure.

The purpose of this study is to determine whether there are racial differences in social support among patients with knee OA, and whether social support contributes to AA and white patients' treatment preferences for TKR. We will also examine whether the impact of social support on preference for TKR varies by race and gender. We hypothesize that compared to white patients, AA patients with knee OA will have a weaker structural and functional social support system and that social support will be strongly associated with TKR preferences, and especially in women.

METHODS

Study Sample

Participants were recruited from multiple sources. Direct mailing was implemented to recruit potential participants from research and clinic registries. Patients were also recruited from the University of Pittsburgh Medical Center (UPMC) Primary Care and Rheumatology Clinics, and the Veterans Affairs (VA) Pittsburgh Healthcare System Primary Care Clinics. Additional participants were recruited via advertisements (e.g. local newspaper ads). The study was approved by both University of Pittsburgh and VA Institutional Review Boards.

Individuals ≥50 years of age interested in participating in the study were asked to call a phone number to undergo a brief screening procedure. To assess the presence of chronic knee pain and the identification of individuals likely to have knee OA, we used two items from the Arthritis Supplement National Health and Nutrition Examination Survey I (NHANES I) (23). Questions focused on the presence of pain in the knee on at least half of the days over the past month, and pain in either knee for more than six months. Candidate subjects that answered "yes" to both questions were categorized as having chronic, frequent knee pain. At this stage, patients were also asked to self-identify their race.

Individuals who screened positive for knee OA using the above questions proceeded to the next phase of screening using the Western Ontario McMaster (WOMAC) Index to assess disease severity (24). Potential participants were also asked if they had a knee x-ray of the

relevant joint within the past two years. Those without a recent radiograph were asked to have a knee radiograph performed. All knee radiographs were evaluated using the Kellgren-Lawrence scoring system (25). Determination of the presence or absence of knee OA was based on the classification criteria developed by the American College of Rheumatology (ACR) (26).

Inclusion to the study was based on the following features: AA or white, age ≥50, presence of chronic frequent knee pain based on NHANES, moderate-severe knee OA based on WOMAC ≥39, radiographic evidence of OA (i.e. Kellgren-Lawrence grade ≥2) and presence of knee OA by ACR criteria. Exclusion criteria were as follows: prior history of any major joint replacement; terminal illness (e.g. end-stage cancer); inflammatory arthritis (i.e. rheumatoid arthritis, connective tissue disease, seronegative spondyloarthropathy or crystal-induced arthropathy); or dementia.

Study Measures

Patients meeting study criteria were invited to complete a face-to-face interview administered by trained research staff.

Sociodemographic Data—Demographic characteristics included age; sex; educational attainment (≤ high school/GED, certificate program/vocational training/associates or bachelors degree, graduate degree, other); employment status (full-time, part-time, unemployed, disabled, retired); household income (<$4999, $5000–9999, $10000–14999, $15000–19999, $20000–29999, $30000–39999, $40000–49999, ≥$50000) and type(s) of health insurance (Medicare, Medicaid, Medi-Gap, private, HMO, self/free care).

Social Support—Three measures of structural social support were obtained: (1) current marital status (married/living with partner or not); (2) current household composition (alone, spouse/significant other, child/other relative/non-relative); and (3) number of close friends and relatives. Note that from this point forward, “married” will be defined as those who are legally married or living with a domestic partner. Functional social support was assessed using a 5-item modified version of the Medical Outcomes Study-Social Support Scale (MOS-SSS) that represents four dimensions of functional social support: emotional/ informational, tangible, affectionate and positive social interaction.(12) The mean of responses to all items constituted the overall functional social support score. Range is from 0–20, with a higher score indicating more social support. This shortened MOS-SSS has a Cronbach’s α of 0.90 and has been used in other behavioral studies, including those with chronic illness (27, 28).

Willingness to Consider Joint Replacement—A single question, developed by Hawker et al. for use in a population-based study (8), was used to determine willingness to consider joint replacement. The following question was asked: “If your knee pain were ever to get severe, would you be willing to have surgery to replace your knee if your doctor recommended it?” This question has a five-category ordinal response scale. For the current analysis, responses were dichotomized as willing (“definitely willing“ and “probably willing”) or unwilling (“unsure,” “probably not willing” and “definitely not willing”) as in previous studies (7).

Clinical Covariates

Disease Severity—Severity of disease was assessed both radiologically and clinically. Knee radiographs using the Kellgren-Lawrence grade system was used to assess radiologic severity (29). The WOMAC index was utilized to assess clinical severity. This reliable and validated scale was designed specifically to assess lower extremity pain and function in OA

(24). Summary scores range from 0 to 100; a higher scores indicates increased pain, stiffness and functional limitations.

Comorbidity—Medical comorbidity was assessed using an interviewer-based modification of the Charlson Comorbidity Index (30). This measure is a weighted index designed to evaluate the longitudinal risk of mortality attributable to comorbid disease.

Quality of life—Overall quality of life was assessed using the Short Form Health Survey (SF-12v2), from which the physical and mental component summary scores were calculated (31). This 3–4 minute survey has been well-validated with large and heterogenous samples of adults in the US. It has excellent reliability with a Cronbach's α ranging from 0.81–0.88 for each subscale (32). Higher scores indicate better health.

Mental Health—Presence of major depression was assessed using the Patient Health Questionnaire-9 (PHQ-9). The PHQ-9 consists of 9 items based on the DSM-IV depressive disorders criteria. The PHQ-9 total score is a sum of all items, where higher scores indicate increased severity of depressive symptoms. It is a reliable (Cronbach's α ranging from 0.86–0.89) and valid (overall accuracy, 85%; sensitivity, 75%; specificity, 90%) measure of depression severity (33).

Statistical Analysis

Demographic, psychosocial, and clinical characteristics were compared by race using t-tests or Wilcoxon rank-sum tests for continuous variables, and Pearson χ^2 tests for categorical variables. In the same manner, these characteristics were then contrasted by willingness to undergo TKR surgery.

Separate logistic regression models were used to assess the association between willingness to undergo TKR surgery and each measure of social support (marital status, # of close friends or family, and MOS-SSS). The number of close friends/family was transformed into quartiles, and was entered into the logistic models as a linear categorical variable. Both unadjusted and adjusted logistic regression models were performed. The following covariates were selected *a priori* for inclusion in the adjusted models: site (VA or non-VA), age, sex, household income, and WOMAC total score. Statistical significance for the association of each social support measure on willingness was calculated using likelihood ratio tests. The above analyses were repeated after stratifying by race to investigate possible effect modification.

Logistic regression models were also performed to determine if the relationship between willingness to undergo TKR surgery and the interaction of patient race and sex are mediated by social support. The initial model in these analyses included race by sex categories only (White male, White female, AA female, AA male), entered as dummy variables, as the independent variable. Sociodemographic and clinical variables were then added to the initial model. For Models 3 and 4, structural (marital status, # of close friends or family) and functional (MOS-SSS) measures of social support were then serially added to determine whether these covariates may explain the association among the individual race and sex categories with willingness to undergo TKR. Statistical significance of the association of the combined race by sex variable with willingness in each model was determined using likelihood ratio tests for heterogeneity. A significant change in odds ratio (>20%) after the addition of the potential mediating variable/s suggests mediation.

In all regression models, 95% confidence intervals were calculated using robust variance estimates. Statistical significance was also set with an α of 0.05. All analyses were performed using STATA 12.0 (StataCorp LP, College Station, TX).

RESULTS

Demographic Characteristics

A total of 514 white and 285 AA patients participated in the study. AA patients, compared to white patients, were younger ($p<0.001$) and more likely to be female ($p<0.001$). They were also less likely to have a graduate degree, less likely to be employed and more likely to have lower income (Table 1).

Clinical and Psychosocial Characteristics

AA knee OA patients, compared to white knee OA patients, had worse OA severity ($p<0.001$), depressive symptoms ($p<0.001$), physical health ($p=0.005$) and mental health ($p<0.001$) than white patients. In addition, AA patients, compared to White patients, had worse social support, being less likely to be married ($p<0.001$), having fewer numbers of close friends/relatives ($p<0.001$), and being more likely to live alone ($p<0.001$). Finally, mean MOS-SSS scores were also lower in AA as compared with white participants ($p<0.001$).

Association of Social Support with Willingness to Undergo TKR—Most patients were willing to consider undergoing TKR (n=585 of 793, Table 2). In the full sample, 83% of OA patients who were married were willing to undergo TKR, compared with 67% among those who were not married (crude OR 2.30, 95% CI 1.63–3.24). After adjusting for recruitment site, sex, age, income and WOMAC score, this odds ratio was attenuated but remained statistically significant (adjusted OR 1.72, 95% CI 1.14–2.60). Our regression analysis did not show a statistically significant association with willingness and number of close friends or family (adjusted OR 1.05, 95% CI, 0.91–1.21). Although the mean MOS-SSS of those who were willing and those who were unwilling to have TKR were 15.0 ± 4.8 and 13.5 ± 5.5, respectively ($p<0.001$), the association between willingness to have the procedure done and MOS-SSS score did not persist after controlling for sociodemographic and clinical variables (adjusted OR 1.03, 95% CI, 1.00–1.07).

Among white patients with knee OA, 87% who were married were willing to undergo TKR, compared with 66% of patients who were not married. After adjusting for sociodemographic and clinical variables, the odds of willingness to undergo TKR was nearly twice as high among those who were married compared to those who were not (adjusted OR 1.87, 95% CI 1.11–3.15). In this group of patients, the mean MOS-SSS was also higher among those who were willing to have TKR, compared to those unwilling to have the procedure (15.5 ± 4.5 and 13.7 ± 5.5, respectively, $p<0.001$). The association between willingness and MOS-SSS score remained significant even after controlling for sociodemographic and clinical variables (adjusted OR 1.06, 95% CI 1.00–1.12). Among AA patients with knee OA, willingness to undergo TKR was not statistically significantly associated with marital status, number of close friends/relatives or MOS-SSS.

Association of Race/Sex with Willingness to Undergo TKR

Associations between the individual race by sex categories with willingness to undergo TKR are presented in Table 3. The odds of willingness to undergo TKR was less in white females compared to white males when adjusted for recruitment site, age, income and WOMAC score (Model 2, adjusted OR 0.6, 95% CI 0.3–1.0). This difference was no longer statistically significant when further adjusted for marital status, number of close friends/ relatives and MOS-SSS score (Model 4, adjusted OR 0.6, 95% CI 0.4–1.0) but the OR did not change appreciably.

The odds of willingness to undergo TKR was also less in AA females (adjusted OR 0.3, 95% CI 0.2–0.6) and AA males (adjusted OR 0.3, 95% CI 0.1–0.5) compared to white males when adjusted for recruitment site, age, income and WOMAC score (Model 2). These differences in odds remained significant when further adjusted for marital status, number of close friends/relatives and MOS-SSS score (Model 4; adjusted OR 0.4, 95% CI 0.2–0.6, in AA females; adjusted OR 0.3, 95% CI 0.1–0.5, in AA males).

Association of Race by Depression Level & Physical Health with Willingness to Undergo TKR—Relationships between race by level of depression and by physical health level with willingness to undergo TKR surgery are presented in Supplements 1 and 2, respectively. The results are similar to each other. In sum, among whites, the odds of willingness to undergo TKR were no different regardless of depression or physical health level. In addition, the odds of willingness to undergo TKR remained lower among AA patients with low and high levels of depression (or physical health), compared to whites with low depression (or high physical health).

DISCUSSION

In this diverse group of patients with moderate to severe knee OA, we demonstrated that AA patients were less likely to have structural and functional social support than white patients. We have also shown that in this sample, like in prior studies, AA patients were less likely than white patients to consider TKR as a treatment option. Our study is also the first to show that structural social support, measured by marital status, and functional support appear to be important determinants of preference for TKR in white patients, but not African-American patients. Finally, our study demonstrates a significant race and gender interaction in willingness to undergo TKR.

Race and Social Support in OA

Besides confirming a previous report that AA male veterans with OA tend to have less structural and functional support than white male veterans (15), our study extends the generalizability of this finding to female and non-veteran patients with OA. This racial/ethnic disparity in measures of structural and functional support has also been observed in other study populations (14, 16–18). Among younger adults in the general population, African-Americans were found to be less likely to receive social support, more likely to have smaller social networks and more likely to have support come from family members than whites (14, 18).

Indeed, finding that AA patients with OA have weaker support systems than white OA patients has important implications. Low social support has been related to greater symptoms from depression in patients with OA (34). Conversely, greater support has been related to lower depressive symptoms, greater life satisfaction and more enhanced health-related quality of life measures in OA (35, 36). Social support also moderates the effects of pain and functional limitation due to OA (36). Clinical trials have, indeed, shown that support groups for OA patients improve health and limit health care costs (37, 38). In addition, spousal support has been found to predict better improvement in knee limitations following TKR (39). The perceived adequacy of assistance from others has also been significantly associated with WOMAC function months after joint replacement (40).

Other studies, though, have observed similar levels of structural and functional support in AA and white adults in the general population (41, 42). In a study of patients with hypertension, AA patients were less likely to be married than whites, while there was a similar distribution of emotional and financial support across groups (43). One study of patients with diabetes mellitus demonstrated no differences in social support index (assessed

by the number of sources of support in one's life) by race/ethnicity, whereas another study showed that, compared with white patients, AA patients with diabetes mellitus had higher frequencies of contacts with relatives, friends and neighbors (44, 45). However, comparison of studies in social support is often difficult due to the focus on select populations such as the elderly or pregnant women (16, 17, 44), failure to adjust for confounding variables such as social class (18), and variations in the measures of social support used.

Social Support and Decision-Making

Different pathways may explain the relationship between social support and health decision-making (13). Structural support may provide individuals with a sense of belonging that can lead them to feel greater self-worth, motivating them to care for themselves (46). This motivation can then lead them to make more appropriate health decisions. Having a large number of structural support may also mean greater access to sources of information which increases the likelihood of having access to accurate and relevant information sources (10). Peer pressure can also influence health decisions and engagement in positive health-relevant activities (11).

Functional support, on the other hand, may have a positive effect on health decision-making during periods of distress (11, 13). When an individual perceives high levels of social support, he or she may reassess a stressful event as less worrisome and becomes more capable to deal with decisions related to the disease (47). The perceived availability of individuals can reduce the presence of intrusive thoughts, which can also lead to better decision-making (48). If people offer advice, material aid or behavioral assistance (i.e., informational and tangible support), then a person may also feel more capable to make health-related decisions (10). In fact, in a meta-analysis which examined the association between social support and patient treatment adherence, functional measures of social support tend to be more strongly related to adherence than structural measures (22).

Among white patients in our sample, women were less willing to undergo TKR than men; however, social support does not seem to significantly influence this gender difference. Gender population studies have suggested that social supports and networks may be more important for women's than in men's mental health (27, 49). Yet, conflicting studies also exist, suggesting that gender differences in the importance of social support may be explained in part by situational differences and the ways that culture-specific gender roles are affected by the situations (27, 50). Regardless, the decreased willingness of African-Americans of both gender to undergo TKR compared to white males persisted despite social support quantity and quality.

Although we and others have described multiple factors that contribute to racial/ethnic differences in willingness to consider joint replacement which may also contribute to racial/ethnic differences in the utilization of total knee/hip joint replacement (5–7), we did not find that lower social support was associated with decreased preference for TKR among African-Americans of either gender. These results seem to indicate that decreased social support is not an important determinant for TKR decision-making among AA patients. In contrast, our study demonstrates that structural and functional social support were important determinants in white patients' decisions regarding TKR. Moreover, neither depression nor physical health seems to mediate this racial difference in willingness to under TKR. These findings support the idea that other socio-cultural beliefs and attitudes impact treatment preferences among different racial groups. In previous studies, we and others found that racial/ethnic variations in willingness to undergo total knee/hip joint replacement may also be largely attributed to varying expectations in procedure benefit and outcome, different perceptions of usefulness of self-care methods such as prayer and different levels of trust in the medical provider (5–7).

Our study has several limitations. First, our sample is composed primarily of AA and White patients; OA patients in other racial/ethnic groups were not represented in our sample. Therefore, our findings may not be generalizable to other racial/ethnic groups. Yet, we also recruited patients from multiple sources, not relying on clinic-based recruitment, strengthening our study's external validity. In fact, we found that our study cohort's socio-demographic profile is similar to that of US Census Bureau participants living in Allegheny County, PA and a comparable cohort of knee OA patients recruited in another study (Supplement 3). Second, subjects volunteered for our study. Patients with less social support may not have the time and energy to participate in our study. Therefore, the measured relationship between social support and willingness to undergo TKR may be underestimated. Lastly, our study may be subject to residual confounding. Not all potential confounding variables that may affect the association between race/gender and willingness to undergo TKR were assessed. For instance, we did not examine other possible determinants of OA care preferences such as patient risk aversion or provider bias.

In summary, in this sample of patients with OA who are potential candidates for TKR, social support may in part explain variations in patient preference regarding TKR. There is also a significant race and gender interaction in patient preferences for TKR surgery. Social support does not seem to mediate the gender difference in willingness to consider TKR. On the other hand, social support impacts patient preferences for TKR surgery among Whites, but not among African-Americans. Future studies should evaluate the specific aspects of social support that could be targeted for intervention in the national effort to reduce or eliminate disparities in access and utilization of TKR in the management of end-stage OA.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Funding: This study is funded by the NIH/NIAMS (#P60 AR054731).

References

1. Smedley, B.; Stith, A.; Nelson, A. Committee on Understanding & Eliminating Racial and Ethnic Disparities in Health Care BoHSP, Institute of Medicine. Unequal treatment: confronting racial and ethnic disparities in health care. Washington, DC: National Academic Press; 2003.
2. Skinner J, Weinstein JN, Sporer SM, Wennberg JE. Racial, ethnic, and geographic disparities in rates of knee arthroplasty among Medicare patients. N Engl J Med. 2003; 349(14):1350–9. [PubMed: 14523144]
3. Katz BP, Freund DA, Heck DA, Dittus RS, Paul JE, Wright J, et al. Demographic variation in the rate of knee replacement: a multi-year analysis. Health Serv Res. 1996; 31(2):125–40. [PubMed: 8675435]
4. Dunlop DD, Song J, Manheim LM, Chang RW. Racial disparities in joint replacement use among older adults. Med Care. 2003; 41(2):288–98. [PubMed: 12555056]
5. Ang DC, Ibrahim SA, Burant CJ, Siminoff LA, Kwoh CK. Ethnic differences in the perception of prayer and consideration of joint arthroplasty. Med Care. 2002; 40(6):471–6. [PubMed: 12021673]
6. Suarez-Almazor ME, Souchek J, Kelly PA, O'Malley K, Byrne M, Richardson M, et al. Ethnic variation in knee replacement: patient preferences or uninformed disparity? Arch Intern Med. 2005; 165(10):1117–24. [PubMed: 15911724]
7. Ibrahim SA, Siminoff LA, Burant CJ, Kwoh CK. Differences in expectations of outcome mediate African American/white patient differences in "willingness" to consider joint replacement. Arthritis Rheum. 2002; 46(9):2429–35. [PubMed: 12355491]

8. Hawker GA, Wright JG, Coyte PC, Williams JI, Harvey B, Glazier R, et al. Differences between men and women in the rate of use of hip and knee arthroplasty. N Engl J Med. 2000; 342(14):1016–22. [PubMed: 10749964]
9. Karlson EW, Daltroy LH, Liang MH, Eaton HE, Katz JN. Gender differences in patient preferences may underlie differential utilization of elective surgery. Am J Med. 1997; 102(6):524–30. [PubMed: 9217666]
10. Cohen, S.; Gottlieb, BH.; Underwood, LG. Social relationships and Health. In: Cohen, S.; Underwood, LG.; Gottlieb, BH., editors. Social support measurement and intervention. New York: Oxford University Press; 2000. p. 3-25.
11. Cohen S. Social relationships and health. Am Psychol. 2004; 59(8):676–84. [PubMed: 15554821]
12. Sherbourne CD, Stewart AL. The MOS social support survey. Soc Sci Med. 1991; 32(6):705–14. [PubMed: 2035047]
13. Midboe, AM. Worry and Health Decision-Making: The Moderating Role of Social Support: ProQuest. UMI Dissertation Publishing; 2011.
14. Maton KI, Teti DM, Corns KM, Vieira-Baker CC, Lavine JR, Gouze KR, et al. Cultural specificity of support sources, correlates and contexts: three studies of African-American and caucasian youth. Am J Community Psychol. 1996; 24(4):551–87. [PubMed: 8969449]
15. Groeneveld PW, Kwoh CK, Mor MK, Appelt CJ, Geng M, Gutierrez JC, et al. Racial differences in expectations of joint replacement surgery outcomes. Arthritis Rheum. 2008; 59(5):730–7. [PubMed: 18438917]
16. Dole N, Savitz DA, Siega-Riz AM, Hertz-Picciotto I, McMahon MJ, Buekens P. Psychosocial factors and preterm birth among African American and White women in central North Carolina. Am J Public Health. 2004; 94(8):1358–65. [PubMed: 15284044]
17. Sagrestano LM, Feldman P, Rini CK, Woo G, Dunkel-Schetter C. Ethnicity and social support during pregnancy. Am J Community Psychol. 1999; 27(6):869–98. [PubMed: 10723538]
18. Steffen PR, Hinderliter AL, Blumenthal JA, Sherwood A. Religious coping, ethnicity, and ambulatory blood pressure. Psychosom Med. 2001; 63(4):523–30. [PubMed: 11485105]
19. Mendes de Leon CF, Dilillo V, Czajkowski S, Norten J, Schaefer J, Catellier D, et al. Psychosocial characteristics after acute myocardial infarction: the ENRICHD pilot study. Enhancing Recovery in Coronary Heart Disease. J Cardiopulm Rehabil. 2001; 21(6):353–62. [PubMed: 11767809]
20. King KM. Gender and short-term recovery from cardiac surgery. Nurs Res. 2000; 49(1):29–36. [PubMed: 10667626]
21. Norris CM, Spertus JA, Jensen L, Johnson J, Hegadoren KM, Ghali WA. Sex and gender discrepancies in health-related quality of life outcomes among patients with established coronary artery disease. Circ Cardiovasc Qual Outcomes. 2008; 1(2):123–30. [PubMed: 20031799]
22. DiMatteo MR. Social support and patient adherence to medical treatment: a meta-analysis. Health Psychol. 2004; 23(2):207–18. [PubMed: 15008666]
23. Davis MA, Ettinger WH, Neuhaus JM. Obesity and osteoarthritis of the knee: evidence from the National Health and Nutrition Examination Survey (NHANES I). Semin Arthritis Rheum. 1990; 20(3 Suppl 1):34–41. [PubMed: 2287947]
24. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol. 1988; 15(12):1833–40. [PubMed: 3068365]
25. Davis MA, Ettinger WH, Neuhaus JM, Barclay JD, Segal MR. Correlates of knee pain among US adults with and without radiographic knee osteoarthritis. J Rheumatol. 1992; 19(12):1943–9. [PubMed: 1294744]
26. Altman R, Asch E, Bloch D, Bole G, Borenstein D, Brandt K, et al. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. Arthritis Rheum. 1986; 29(8):1039–49. [PubMed: 3741515]
27. Ahern J, Galea S, Fernandez WG, Koci B, Waldman R, Vlahov D. Gender, social support, and posttraumatic stress in postwar Kosovo. J Nerv Ment Dis. 2004; 192(11):762–70. [PubMed: 15505520]

28. Nandi A, Tracy M, Aiello A, Des Jarlais DC, Galea S. Social support and response to AIDS and severe acute respiratory syndrome. Emerg Infect Dis. 2008; 14(5):825–7. [PubMed: 18439373]
29. Kellgren JH, Lawrence JS. Radiological assessment of osteo-arthrosis. Ann Rheum Dis. 1957; 16(4):494–502. [PubMed: 13498604]
30. Chaudhry S, Jin L, Meltzer D. Use of a self-report-generated Charlson Comorbidity Index for predicting mortality. Med Care. 2005; 43(6):607–15. [PubMed: 15908856]
31. Ware, JE., Jr; Kosinski, M.; Bjorner, JB.; Turner-Bowker, DM.; Gandek, B.; Maruish, ME. User's Manual for the SF-36v2TM Health Survey. 2. Lincoln, RI: Quality Metric Incorporated; 2007.
32. Ware J Jr, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 1996; 34(3):220–33. [PubMed: 8628042]
33. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001; 16(9):606–13. [PubMed: 11556941]
34. Sherman AM. Social relations and depressive symptoms in older adults with knee osteoarthritis. Soc Sci Med. 2003; 56(2):247–57. [PubMed: 12473311]
35. Ethgen O, Vanparijs P, Delhalle S, Rosant S, Bruyere O, Reginster JY. Social support and health-related quality of life in hip and knee osteoarthritis. Qual Life Res. 2004; 13(2):321–30. [PubMed: 15085904]
36. Ferreira VM, Sherman AM. The relationship of optimism, pain and social support to well-being in older adults with osteoarthritis. Aging Ment Health. 2007; 11(1):89–98. [PubMed: 17164163]
37. Weinberger M, Tierney WM, Booher P, Katz BP. Can the provision of information to patients with osteoarthritis improve functional status? A randomized, controlled trial. Arthritis Rheum. 1989; 32(12):1577–83. [PubMed: 2688659]
38. Cronan TA, Groessl E, Kaplan RM. The effects of social support and education interventions on health care costs. Arthritis Care Res. 1997; 10(2):99–110. [PubMed: 9313398]
39. Khan CM, Iida M, Stephens MA, Fekete EM, Druley JA, Greene KA. Spousal support following knee surgery: roles of self-efficacy and perceived emotional responsiveness. Rehabil Psychol. 2009; 54(1):28–32. [PubMed: 19618700]
40. Lopez-Olivo MA, Landon GC, Siff SJ, Edelstein D, Pak C, Kallen MA, et al. Psychosocial determinants of outcomes in knee replacement. Ann Rheum Dis. 2011; 70(10):1775–81. [PubMed: 21791452]
41. Ajrouch KJ, Antonucci TC, Janevic MR. Social networks among blacks and whites: the interaction between race and age. J Gerontol B Psychol Sci Soc Sci. 2001; 56(2):S112–8. [PubMed: 11245365]
42. Griffin ML, Amodeo M, Clay C, Fassler I, Ellis MA. Racial differences in social support: kin versus friends. Am J Orthopsychiatry. 2006; 76(3):374–80. [PubMed: 16981816]
43. Bell CN, Thorpe RJ Jr, Laveist TA. Race/Ethnicity and hypertension: the role of social support. Am J Hypertens. 2010; 23(5):534–40. [PubMed: 20186126]
44. Bertera EM. Psychosocial factors and ethnic disparities in diabetes diagnosis and treatment among older adults. Health Soc Work. 2003; 28(1):33–42. [PubMed: 12621931]
45. Rees CA, Karter AJ, Young BA. Race/ethnicity, social support, and associations with diabetes self-care and clinical outcomes in NHANES. Diabetes Educ. 2010; 36(3):435–45. [PubMed: 20332281]
46. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. Psychol Bull. 1985; 98(2): 310–57. [PubMed: 3901065]
47. Lazarus, RS.; Folkman, S. Stress, appraisal, and coping. New York: Springer Publishing; 1984. The individual and society; p. 226-60.
48. Lepore SJ, Silver RC, Wortman CB, Wayment HA. Social constraints, intrusive thoughts, and depressive symptoms among bereaved mothers. J Pers Soc Psychol. 1996; 70(2):271–82. [PubMed: 8636882]
49. Bultmann U, Kant IJ, Van den Brandt PA, Kasl SV. Psychosocial work characteristics as risk factors for the onset of fatigue and psychological distress: prospective results from the Maastricht Cohort Study. Psychol Med. 2002; 32(2):333–45. [PubMed: 11871373]

50. Farhood L, Zurayk H, Chaya M, Saadeh F, Meshefedjian G, Sidani T. The impact of war on the physical and mental health of the family: the Lebanese experience. Soc Sci Med. 1993; 36(12): 1555–67. [PubMed: 8327919]

51. Nevitt, MC.; Felson, DT.; Lester, G. The Osteoarthritis Initiative: Protocol for the Cohort Study. 2006. p. 1-74.http://oai.epi-ucsf.org/datarelease/docs/StudyDesignProtocol.pdf

52. American Community Survey Selected Population Tables. 2006–2010. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml: American Fact Finder

SIGNIFICANCE AND INNOVATIONS

- African-American (AA) patients with knee osteoarthritis (OA) had lower preference for TKR (total knee replacement) surgery compared with white patients.
- AA patients with knee OA reported less structural and functional social support than white patients.
- Social support appears to be an important determinant of TKR preference among white patients but not AA patients.
- Social support does not seem to mediate the gender difference in willingness to consider TKR.

Table 1

Demographic, Clinical, Psychosocial and Social Support Characteristics by Race

Characteristic	White (n=514)	African-American (n=285)	p-value[a]
Demographic Characteristics			
Age, mean (SD) years	64.54 (9.39)	58.68 (8.13)	<0.001
Sex, n (%) Female	302 (58.8)	207 (72.6)	<0.001
Education, n (%)			<0.001
≤High School or GED	200 (39.1)	170 (60.1)	
Post-Secondary Training[b], Associates/Bachelors Degree	194 (38.0)	98 (34.6)	
Graduate Degree	117 (22.9)	15 (5.3)	
Income, n (%)			<0.001
<$10000	32 (6.9)	84 (31.7)	
$10000–$19999	72 (15.6)	83 (31.3)	
$20000–$29999	75 (16.2)	35 (13.2)	
$30000–$39999	50 (10.8)	17 (6.4)	
$40000–$49999	51 (11.0)	12 (4.5)	
≥$50000	183 (39.5)	34 (12.8)	
Employment Status, n (%)			<0.001
Full Time	145 (28.4)	70 (24.6)	
Part Time	51 (10.0)	23 (8.1)	
Unemployed	36 (7.0)	46 (16.2)	
Disabled	53 (10.4)	81 (28.5)	
Retired	226 (44.2)	64 (22.5)	
Health Insurance[c], n (%)			
Medicare	225 (46.2)	98 (35.5)	0.004
Medicaid	53 (11.2)	63 (22.9)	<0.001
HMO or Private/Group	381 (77.6)	161 (57.7)	<0.001
No Insurance	12 (2.6)	21 (7.7)	0.001
Recruitment Site, n (%)			<0.001
Non-VA	467 (90.9)	278 (97.5)	
VA	47 (9.1)	7 (2.5)	
Clinical Characteristics			
# Comorbidities, mean (SD)	3.22 (1.71)	3.56 (1.69)	0.007
WOMAC, mean (SD)	42.98 (15.27)	53.98 (15.10)	<0.001
Psychosocial Characteristics			

Characteristic	White (n=514)	African-American (n=285)	p-value[a]
PHQ-9 Depression, mean (SD)	4.77 (4.67)	6.63 (5.5)	<0.001
SF-12 Physical Health, mean (SD)	38.50 (11.01)	36.25 (10.00)	0.004
SF-12 Mental Health, mean (SD)	53.58 (8.96)	48.80 (10.91)	<0.001
Social Support Measures			
Currently Married, n (%)	275 (53.5)	65 (22.8)	<0.001
Household Composition, n (%)			
Lives Alone	172 (33.5)	142 (49.8)	<0.001
Lives with Spouse/Significant Other	284 (55.3)	62 (21.8)	<0.001
Other [d]	96 (18.7)	94 (33.0)	<0.001
# Close friends/relatives, n (%)	10.31 (13.13)	7.52 (8.88)	<0.001
MOS Social Support, mean (SD)	15.17 (4.79)	13.44 (5.26)	<0.001

[a] Pearson Chi-Square or t-test p-value

[b] Certificate program or vocational training

[c] Individuals may be included in multiple categories

[d] Lives with child, other relative or non-relative

MOS=Medical Outcomes Study; PHQ-9=Patient Health Questionnaire; SF= MOS 12-Item Short Form Health Survey; WOMAC=Western Ontario McMaster Instrument

Arthritis Care Res (Hoboken). Author manuscript; available in PMC 2014 June 01.

Table 2

Logistic regression analyses of willingness to undergo arthroplasty and the individual social support measures, stratified by race.

	Willing	Unwilling	Unadjusted		Adjusted [d]	
			OR (95% CI) [b]	p- value[c]	OR (95% CI) [b]	p- value [c]
All Patients	585	208				
Married, n	279	59	2.30 (1.63, 3.24)	<0.001	1.72 (1.14, 2.60)	0.010
# Close Friends or Family [a]			1.07 (0.94, 1.22)	0.338	1.05 (0.91, 1.21)	0.489
Quartile 1	140	55				
Quartile 2	146	52				
Quartile 3	83	33				
Quartile 4	216	68				
MOS Social Support, mean (SD)	15.0 (4.8)	13.5 (5.5)	1.06 (1.03, 1.09)	<0.001	1.03 (1.00, 1.07)	0.079
White Patients	409	102				
Married	237	37	2.42 (1.54, 3.79)	<0.001	1.87 (1.11, 3.15)	0.029
# Close Friends or Family [a]			1.01 (0.84, 1.20)	0.952	1.03 (0.84, 1.26)	0.801
Quartile 1	93	22				
Quartile 2	90	24				
Quartile 3	63	17				
Quartile 4	163	39				
MOS Social Support	15.5 (4.5)	13.7 (5.5)	1.08 (1.03, 1.13)	0.001	1.06 (1.00, 1.12)	0.036
African-American Patients (n=282)	176	106				
Married	42	22	1.20 (0.67, 2.15)	0.544	1.15 (0.61, 2.17)	0.671
# Close Friends or Family [a]			1.05 (0.85, 1.28)	0.669	1.02 (0.82, 1.27)	0.843
Quartile 1	47	33				
Quartile 2	56	28				
Quartile 3	20	16				
Quartile 4	53	29				
MOS Social Support	13.6 (5.0)	13.3 (5.6)	1.01 (0.97, 1.06)	0.601	1.01 (0.96, 1.06)	0.750

[a]Transformed into quartiles and entered into models as linear categorical variable

[b] Odds Ratio (95% Confidence Interval); 95% CIs are calculated using robust variance estimates

[c] Likelihood Ratio Test p-value

[d] Adjusted for site (VA or non-VA), sex, age, income, and WOMAC total score

MOS=Medical Outcomes Study; WOMAC=Western Ontario McMaster Instrument

Table 3

Relationships between patient race/gender and willingness to undergo arthroplasty

	Willing, n	Unwilling, n	OR (95% CI) [a]
Model 1 [b,f]			
White Male (Referent)	177	35	
White Female	232	67	0.68 (0.44, 1.08)
AA Female	131	75	0.35 (0.22, 0.55)
AA Male	45	31	0.29 (0.16, 0.51)
Model 2 [c,f]			
White Male (Referent)	163	28	
White Female	205	57	0.57 (0.34, 0.96)
AA Female	119	64	0.33 (0.18, 0.60)
AA Male	44	31	0.26 (0.13, 0.52)
Model 3 [d,f]			
White Male (Referent)	163	28	
White Female	205	57	0.59 (0.35, 1.01)
AA Female	119	64	0.36 (0.20, 0.65)
AA Male	44	31	0.28 (0.14, 0.55)
Model 4 [e,f]			
White Male (Referent)	163	28	
White Female	205	57	0.60 (0.35, 1.02)
AA Female	119	64	0.35 (0.19, 0.64)
AA Male	44	31	0.28 (0.14, 0.54)

[a] Odds Ratio (95% Confidence Interval); 95% CIs are calculated using robust variance estimates

[b] Model 1 = Race by sex only

[c] Model 2 = Model 1 + site (VA or non-VA), age, income, and WOMAC total score

[d] Model 3 = Model 2 + marital status + #close friends or family

[e] Model 4 = Model 3 + MOS Social Support

[f] Likelihood Ratio Test for Heterogeneity, $p \leq 0.001$

AA=African-American; MOS=Medical Outcomes Study; WOMAC=Western Ontario McMaster Instrument