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Orthopedic communication about osteoarthritis treatment: Does patient race matter?

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Abstract

Objectives—To understand racial disparities in the use of total joint replacement, we examined whether there were racial differences in patient-provider communication about treatment of chronic knee/hip osteoarthritis in a sample of African American and white patients referred to Veterans Affairs (VA) orthopedic clinics.

Methods—Audio-recorded visits between patients and orthopedic surgeons were coded using the Roter Interaction Analysis System and the Informed Decision Making Model. Racial differences in communication outcomes were assessed using linear regression models adjusted for study design, patient characteristics, and clustering by provider.

Results—The sample (N=402) included 296 white and 106 African American patients. Most patients were male (95%) and 50-64 years old (68%). Almost half (41%) reported an income < $20,000. African American patients were younger and reported lower incomes than white patients. Visits with African American patients contained less discussion of biomedical topics (Beta=-9.14, 95% CI=-16.73,-1.54) and more rapport-building statements (Beta=7.84, 95% CI=1.85,13.82) than visits with white patients. However, no racial differences were observed with regard to length of visit, overall amount of dialogue, discussion of psychosocial issues, patient activation/ engagement statements, physician verbal dominance, display of positive affect by patients or providers, or discussion related to informed decision making.

Conclusions—In this sample, communication between orthopedic surgeons and patients regarding the management of chronic knee/hip osteoarthritis did not, for the most part, vary by patient race. These findings diminish the potential role of communication in VA orthopedic

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settings as an explanation for well-documented racial disparities in the use of total joint replacement.

There are large and well-documented racial disparities in the use of total joint replacement (TJR) as a treatment for advanced knee and hip osteoarthritis.[1-9] In particular, African American patients are significantly less likely than white patients to undergo knee or hip TJR.[7, 10-12] Reasons for these disparities remain unclear, although research suggests they are not explained by differences in healthcare access or clinical need.[8, 13-15] Patient preference may play a role, as studies have shown that African American patients are less willing than white patients to consider TJR as a treatment option for knee/hip osteoarthritis.[16-19]

What has not been well-studied as a contributing factor to racial disparities in TJR is the role of patient-provider communication regarding the management of knee/hip osteoarthritis in the orthopedic setting. Because osteoarthritis is progressive and incurable, the goals of treatment are to alleviate pain, improve function, and limit disability.[20] Non-surgical treatments such as physical therapy or analgesic medications can be effective for moderate cases, but TJR is often the most appropriate and effective treatment for severe cases.[21, 22] TJR is an elective and preference-sensitive procedure, however, as there are no established criteria indicating the need for TJR based on absolute levels of pain or disability. Patient-provider communication about osteoarthritis treatment options in the orthopedic setting is therefore likely to play a prominent role in the decision-making process about TJR.

Examining whether racial differences occur in orthopedic discussions of osteoarthritis management is important given that racial variation in patient-provider communication has been documented in other healthcare settings. For instance, in primary care, visits with African American (vs. white) patients have been found to be more narrowly focused on biomedical issues[23], less patient-centered, more dominated by physicians, and less positive (i.e., patients and physicians display less positive affect).[24] Studies of patients with particular medical conditions (e.g., HIV[25], lung cancer[26], breast cancer[27], depression[28]) have also found that African American patients tend to talk less than white patients in general or engage less in specific kinds of communication, such as rapport-building. Less research has examined racial differences in patient-provider communication in the orthopedic setting. In one analysis of orthopedic consultations among patients with a variety of conditions, Levinson and colleagues found that informational content of communication did not differ substantially by patient race, but visits with African American patients contained less relationship-building communication (i.e., responsiveness, respect, and listening) than visits with white patients.[29]

The current study examined whether there were racial differences in patient-provider communication in a sample of white and African American patients referred to orthopedic clinics specifically for the treatment of advanced knee or hip osteoarthritis. To provide a comprehensive analysis of communication, we coded patient-provider interactions using two methods. The Roter Interaction Analysis System (RIAS)[30, 31] was used to examine the types of statements made by providers and patients (i.e., biomedical, psychosocial, rapport-building, or patient-activation), the provider-to-patient ratio of communication (i.e., physician verbal dominance), and the display of positive affect by patients and providers. The extent to which providers invited patients to participate in decision-making about treatment options was further assessed using the Informed Decision Making (IDM) Model.[32, 33] IDM, which refers to thoughtful dialogue between a healthcare provider and a patient that leads to a clinical decision, exemplifies patient-centered care.[32] IDM requires the discussion of technical aspects of a decision (e.g., nature of decision, alternatives, risks) as well as the assessment of patient understanding and preferences.[32] We hypothesized that the

previously discussed racial differences in patient-provider communication observed in other patient populations23–29 would be observed in our sample.

Methods

Study sample and Procedures

Patients and orthopedic surgeons were recruited for a study of patient-provider communication and decision-making about joint replacement. Full details of study recruitment and procedures are available elsewhere.19 Briefly, data were collected from two orthopedic surgery clinics in Department of Veterans Affairs (VA) hospitals. IRBs at both hospitals approved the study and informed consent was obtained from all participating patients and surgeons. Patients were eligible if they were aged 50 or older, were being seen for chronic knee or hip pain, had not been diagnosed with an inflammatory arthritis, and had no prior history of TJR. All attending and resident orthopedic surgeons who saw patients during the recruitment period (December 2005 to July 2008) were eligible.

Data were collected before, during, and after a patient's scheduled appointment at the orthopedic clinic. Immediately before their appointment, patients completed a researcher-administered survey of clinical and sociodemographic characteristics. Patients then had their appointment with an orthopedic surgeon, which was audio-recorded with the knowledge of patients and surgeons. After the appointment, patients completed another survey about the visit. Patients' electronic medical records were reviewed to determine whether they had been seen previously in the orthopedic clinic. Medical records were also used to determine whether total joint replacement was recommended for the patient based on that visit, but this outcome was the focus of a separate analysis.19 Patients who had a complete audio-recording were included in the current analysis.

Measures of patient-provider communication

Audio-recordings were coded using RIAS30, 31 and the IDM model.32, 33 RIAS is a widely-used and validated method of coding patient-provider communication in which every utterance by patients and providers is classified into one of 42 categories that reflect socio-emotional or biomedical/task-focused communication.30, 31 The total number of utterances and several composite measures were derived from RIAS codes for analyses.34 Composite measures included the number of statements related to biomedical exchange, psychosocial exchange, rapport building, and patient activation/engagement, as well as a measure of physician verbal dominance (see Table 1 for full details).

Affect displayed during the visit was also assessed by coders using RIAS-based rating scales that ranged from 1 (low/none) to 5 (high). Coders rated patients and providers separately on the dimensions of anger/irritation, anxiety/nervousness, dominance/assertiveness, interest/attentiveness, friendliness/warmth, responsiveness/engagement, sympathy/empathy, interactivity, respectfulness, and hurried/rushed. Items that were included in summary measures of patient and provider affect were identified through factor analysis using varimax rotation and are listed in Table 1. Cronbach's alpha = 0.90 and 0.92 for the patient and provider affect scales, respectively.

The RIAS coding was completed by two research staff members who were trained by a RIAS expert from Johns Hopkins University. After achieving adequate reliability with the RIAS expert and with each other on a subsample of the recordings, each coder independently coded a subset of the remaining recordings. Twenty percent of the recordings were double-coded for the purpose of calculating inter-coder reliability. Satisfactory reliability was achieved for each of the composites (Intra-class correlation = 0.82, 0.68, 0.77,

and 0.73 for biomedical exchange, psychosocial exchange, rapport building, and patient activation/engagement, respectively).

The IDM Model was used to code for nine communication elements that reflect the extent to which providers informed patients about their condition, discussed treatment options, and invited patients to participate in the treatment decision (see Table 2).[29, 32, 33] Each element was coded as absent, partially/briefly mentioned by either the patient or provider, or completely discussed (i.e., discussed in-depth with some reciprocal interchange between the patient and provider). Preliminary analyses indicated that very few elements were ever entirely absent from visits. We therefore dichotomized each element into absent/partial/brief (0) or complete (1) and used the total number of complete elements (possible range 0-9) as a composite measure of IDM for analyses.

The IDM coding was completed by the same staff members who performed the RIAS coding. A co-author (BSL) who was trained by the developers of the IDM coding system and well-experienced in IDM coding consulted with the coding team prior to the coding. Preparatory coding was conducted until coders achieved a minimum of 70% agreement on all frequently occurring codes. Coders then coded the remaining visits independently. Inter-coder reliability was achieved for the IDM composite (ICC = .78).

Visit length served as the final measure of communication. Visit length was defined as the number of minutes providers were in the room with patients based on the audio-recordings.

Clinical and socio-demographic covariates—We measured several patient characteristics that could vary by race or affect patient-provider communication. These included patient age (< 65 or ≥ 65), gender, highest educational attainment (≤ or > high school diploma/GED), annual household income (< $20,000, ≥ $20,000, or missing), joint for which patients were being treated (hip or knee), whether patients had been seen in the orthopedic clinic previously (yes or no), and severity of osteoarthritis as measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), a scale designed to assess lower extremity pain and function in patients with osteoarthritis.[35] For analyses, the WOMAC was split into quartiles ranging from least to worst disease severity.

Data analysis—Chi-square statistics were used to compare characteristics of patients with and without complete audio-recordings and characteristics of African American and white patients included in the study. For patients included in the study, each communication outcome was tested for differences between African Americans and whites with a series of linear regression models. First, racial differences were tested in models that adjusted for the study design by clustering patients under providers and by including study site and time of study enrollment as covariates. Total number of utterances was also included as a covariate in all models to adjust for variation in the amount of communication that occurred across visits. Second, racial differences in each outcome were tested in models that further adjusted for patient age, gender, education, income, joint for which patients were being treated, whether patients had been seen in the orthopedic clinic previously, and severity of osteoarthritis (WOMAC). Third, the multivariable models were scanned to identify and remove covariates that were not significant predictors of any of the communication outcomes at $p < .10$. Disease severity was not related to any communication outcomes and was therefore excluded from the final models. Conducting the analyses using Poisson regression and negative binomial regression yielded equivalent results. Results based on linear regression models are reported because the interpretation of coefficients from these models is the most straightforward (e.g., coefficients can be translated directly into number of utterances for the RIAS verbal composite measures). STATA version 11 was used for all analyses (StataCorp, College Station, Texas).

Results

Sample Characteristics

Of the 526 patients in the study, 402 had complete audio-recordings and were included in the current analysis. Audio-recordings were not available for 60 patients who met with surgeons who had not yet consented to be in the study and for 64 patients who had inaudible or incomplete recordings. Most of the patients excluded from the analysis (76%, n = 94) were recruited at one study site where there was a delay in the recruitment of orthopedic surgeons. Patients included in this analysis did not differ from excluded patients in any other way.

Table 3 displays the characteristics of the analytic sample. Consistent with the typical VA patient population, most patients were male (95%) and of modest socioeconomic status, with 41.3% reporting an income <$20,000 and 74.4% having a high school education or less. Most patients were being treated for knee (vs. hip) osteoarthritis (76.6%) and many had been to the clinic previously (41.3%). The sample included 296 white and 106 African American patients who were similar on all characteristics except for age and income. African American patients were younger and had lower incomes than white patients.

Racial Variation in Communication Outcomes

Table 4 displays descriptive statistics for the communication outcomes. It also displays the results of linear regression models testing whether there were significant racial differences in each outcome in models that only took into account the study design (i.e., unadjusted models) and in models that further adjusted for patient characteristics (i.e., adjusted models).

RIAS verbal composite measures—As shown in Table 4, visits contained an average of 370 utterances. Total number of utterances did not differ for African American and white patients in unadjusted or adjusted models. Most of the communication during visits was related to biomedical exchange, followed by rapport building, patient activation/ engagement, and psychosocial exchange (mean utterances = 229, 69, 30, and 14, respectively). Visits with African American patients contained significantly less biomedical exchange than visits with white patients an all models (adjusted Beta = -9.14, 95% CI = -16.73, -1.54). In contrast, visits with African American patients contained significantly more rapport building than visits with white patients (adjusted Beta = 7.84, 95% CI = 1.85, 13.82). That is, after correcting for the study design, patient characteristics, and total number of utterances, visits with African American patients contained 9.14 fewer biomedical utterances and 7.84 more rapport-building utterances than visits with white patients. Psychosocial exchange and patient activation/engagement did not differ by race in any models. The average physician verbal dominance score was 1.59, indicating that physicians talked more than patients during visits. Physician verbal dominance did not differ by race in any models (see Table 4).

Positive patient and provider affect ratings—On a scale of 1 to 5, average patient and provider positive affect ratings were 3.44 and 3.51, respectively. There were no racial differences in patient or provider affect in any models (see Table 4).

Informed decision making—Elements of IDM were frequently and thoroughly discussed in this sample, with half the visits containing complete discussions of at least 8 of the 9 elements. The number of IDM elements discussed did not differ by race in any models (see Table 4).

Visit length—Visits lasted an average of 18.74 minutes and this did not differ by race in any models (see Table 4).

Discussion

In this study of African American and white VA patients discussing the management of advanced knee or hip osteoarthritis with orthopedic surgeons, we found few racial differences in patient-provider communication. Visits did not differ with regard to the overall amount of dialogue, discussion of psychosocial issues, discussion related to patient activation/engagement, physician verbal dominance, display of positive affect by patients or providers, discussion related to IDM, or visit length. Our findings are inconsistent with other studies that have found medical visits with African American patients to be more dominated by physicians, less patient-centered, less positive, and to contain less dialogue overall.[23-28, 36]

We did observe racial differences in two aspects of communication. Specifically, visits with African American patients contained less discussion of biomedical topics and more rapport-building statements than visits with white patients. Past studies, however, have found visits with African American patients to be more focused on biomedical issues[23, 24] and less likely to contain rapport-building dialogue.[28, 29] The distinct pattern observed in our study could be due to our specific focus on medical encounters in which patients discussed treatment options for osteoarthritis. There are well-documented racial differences in treatment preferences for osteoarthritis, in that African American (vs. white) patients tend to report greater reliance on coping strategies such as prayer and more reluctance to consider surgical intervention such as TJR.[18, 19, 37-42] These preferences could guide communication about osteoarthritis treatment away from biomedical topics and towards rapport-building exchanges in an effort to develop patient-provider trust.

We found that IDM in our study occurred to the same extent for African American and white patients. This is consistent with the findings of Levinson et al., who observed little racial variation in IDM during orthopedic consultations in a sample that differed from ours in terms of patient characteristics, the types of orthopedic decisions being discussed, and the clinics from which surgeons were sampled.[29] Collectively these studies suggest that patient race does not affect the extent of IDM communication during visits of African American and white patients with orthopedic surgeons.

It is not clear why our study showed less racial variation in other aspects of patient-provider communication than has been reported in the literature. One reason could be the VA study setting. Most studies of racial differences in patient-provider communication have been conducted in academic or community settings.[23-25, 27, 28, 43] The VA serves a relatively socio-economically homogeneous patient population in which racial differences in healthcare encounters and behavior may be less pronounced.

The lack of racial variation in this study may also be due to our focus on patients who were being treated for advanced knee or hip osteoarthritis in the orthopedic setting. It is possible that racial differences in patient-provider communication about osteoarthritis treatment occur prior to patients consulting with an orthopedist, such as in the primary care setting. If this is the case, differences in communication outside of orthopedics may result in racial differences in who gets referred to the orthopedic setting, patient preferences for osteoarthritis treatment options, and/or the course of treatment that is ultimately chosen. These possibilities were not explored in the current study, given its focus on patients who had already entered the orthopedic setting.

Once patients begin being treated for osteoarthritis in the orthopedic setting, the treatments available tend to follow a relatively standard progression from conservative to surgical options as symptoms worsen. Following a standard protocol to determine which level of treatment is appropriate for a patient's given disease state may have contributed to the uniformity in treatment discussions across patients of different races in our sample. Anecdotal feedback from our coders suggested that the orthopedic providers in our study followed consistent verbal scripts while discussing which treatment options were appropriate and available for each stage of the disease. The use of scripted dialogue should be explored as a possible method to reduce racial differences in doctor-patient communication regarding medical conditions for which there are widely accepted treatment protocols.

There are important limitations to consider in interpreting our results. First, the study was conducted in only 2 VA facilities, so the findings may not generalize to all VA patients or to non-VA settings. Second, based on the agreed upon informed consent process, we had no information on characteristics of the participating surgeons and could not adjust for specific provider characteristics in the analyses, although we did cluster patients within providers. Third, because coding was done directly from audio-recordings rather than transcripts, coders could not be completely blinded to patient race if race was audibly discernable. Lastly, participating surgeons were aware that the study was being conducted by researchers who study racial disparities in health care. Although such knowledge could have affected surgeons' communicative behavior, it is unlikely that recruiting surgeons for a study would be a sufficiently powerful intervention to alter well-ingrained patterns of communication.

Questions for future research include how factors other than patient race, such as patient preferences, shape communication about treatment options and how communication ultimately affects treatment decisions. In the larger study from which the current data were drawn, a separate analysis indicated that African American patients were less likely than white patients to be recommended for TJR, and that this difference was largely due to pre-existing differences in patients' treatment preferences.19 Although examining whether TJR recommendations were related to communication processes was beyond the scope of the current analysis, the lack of racial differences in communication suggests that disparities observed in treatment recommendations did not likely stem from racial differences in communication during the orthopedic visits examined in this study.

In conclusion, in a sample of African American and white patients being treated for knee or hip osteoarthritis in VA orthopedic clinics, we found little racial variation in patient-provider communication. The findings of this study suggest that, at least in the VA setting, disparities in orthopedic doctor and patient communication do not likely explain racial differences in utilization of elective knee/hip TJR in the management of osteoarthritis. More studies are needed to confirm our findings and to explore other dimensions of patient-provider interactions and decision-making that could account for disparities in TJR utilization.

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References

1. Baron BJ, Barrett J, Katz JN, Liang MH. Total hip arthroplasty: use and select complications in the U.S. Medicare population. Am J Public Health. 1996; 86:70–72. [PubMed: 8561246]
2. Escarce JJ, Epstein KR, Colby DC, Schwartz JS. Racial differences in the elderly's use of medical procedures and diagnostic tests. Am J Public Health. Jul; 1993 83(7):948–954. [PubMed: 8328615]
3. Sharkness C, Hamburger S, Moore R, Kaczmarek R. Prevalence of artificial hip implants and use of health services by recipients. Public Health Rep. 1993; 106:70–74. [PubMed: 8434101]
4. Wilson MG, May DS, Kelly JJ. Racial differences in the use of total knee arthroplasty for osteoarthritis among older Americans. Ethn Dis. 1994; 4:57–67. [PubMed: 7742733]
5. Hoagland FT, Oishi CS, Gialamas GG. Extreme variations in racial rates of total hip arthroplasty for primary coxarthrosis: a population-based study in San Francisco. Ann Rheum Dis. 1995; 54:107–110. [PubMed: 7702396]
6. Giacomini M. Gender and ethnic differences in hospital based procedure utilization in California. Arch Intern Med. 1996; 156:1217–1224. [PubMed: 8639016]
7. 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; 349:1350–1359. [PubMed: 14523144]
8. Jones A, Kwoh CK, Kelley ME, Ibrahim SA. Racial disparity in knee arthroplasty utilization in the veterans health administration. Arthritis Rheum. Dec 15; 2005 53(6):979–981. [PubMed: 16342110]
9. Skinner J, Zhou W, Weinstein J. The influence of income and race on total knee arthroplasty in the United States. J Bone Joint Surg Am. Oct; 2006 88(10):2159–2166. [PubMed: 17015592]
10. Centers for Disease Control and P. Racial disparities in total knee replacement among Medicare enrollees--United States, 2000-2006. MMWR Morb Mortal Wkly Rep. Feb 20; 2009 58(6):133–138. [PubMed: 19229164]
11. Dunlop DD, Manheim LM, Song J, et al. Age and racial/ethnic disparities in arthritis-related hip and knee surgeries. Med Care. Feb; 2008 46(2):200–208. [PubMed: 18219249]
12. Jha AK, Fisher ES, Li Z, Orav EJ, Epstein AM. Racial trends in the use of major procedures among the elderly. N Engl J Med. Aug 18; 2005 353(7):683–691. [PubMed: 16107621]
13. Francis ML, Scaife SL, Zahnd WE, Cook EF, Schneeweiss S. Joint replacement surgeries among medicare beneficiaries in rural compared with urban areas. Arthritis Rheum. Dec; 2009 60(12): 3554–3562. [PubMed: 19950278]
14. Ang DC, Tahir N, Hanif H, Tong Y, Ibrahim SA. African Americans and Whites are equally appropriate to be considered for total joint arthroplasty. J Rheumatol. Sep; 2009 36(9):1971–1976. [PubMed: 19605675]
15. Lopez JP, Burant CJ, Siminoff LA, Kwoh CK, Ibrahim SA. Patient perceptions of access to care and referrals to specialists: A comparison of African-American and white older patients with knee and hip osteoarthritis. J Natl Med Assoc. May; 2005 97(5):667–673.PMC2569351 [PubMed: 15926643]
16. Ibrahim SA, Siminoff LA, Burant CJ, Kwoh CK. Variation in perceptions of treatment and self-care practices in elderly with osteoarthritis: a comparison between African American and white patients. Arthritis Rheum. Aug; 2001 45(4):340–345. [PubMed: 11501721]
17. Ibrahim SA, Siminoff LA, Burant CJ, Kwoh CK. Understanding ethnic differences in the utilization of joint replacement for osteoarthritis: the role of patient-level factors. Med Care. 2002; 40(1 Suppl):I44–I51. [PubMed: 11789631]
18. Suarez-Almazor ME, Souchek J, Kelly PA, et al. Ethnic variation in knee replacement: patient preferences or uninformed disparity? Arch Intern Med. May 23; 2005 165(10):1117–1124. [PubMed: 15911724]

19. Hausmann LR, Mor M, Hanusa BH, et al. The effect of patient race on total joint replacement recommendations and utilization in the orthopedic setting. J Gen Intern Med. 2010; 25(9):982–988. [PubMed: 20509053]
20. Altman RD, Hochberg MC, Moskowitz RW, Schnitzer TJ. Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update. American College of Rheumatology Subcommittee on Osteoarthritis Guidelines. Arthritis Rheum. 2000; 43:1905–1915. [PubMed: 11014340]
21. NIH consensus conference: total hip replacement. NIH consensus development panel on total hip replacement. JAMA. 1995; 273:1950–1956. [PubMed: 7783307]
22. National Institute of Health. Consensus development conference statement on total knee replacement. 2003. http://consensus.nih.gov/2003/2003totalkneereplacement117html.htm
23. Roter DL, Stewart M, Putnam SM, Lipkin M, Stiles W, Inui TS. Communication patterns of primary care physicians. JAMA. 1997; 277(4):350–356. [PubMed: 9002500]
24. Johnson RL, Roter D, Powe NR, Cooper LA. Patient race/ethnicity and quality of patient-physician communication during medical visits. American Journal of Public Health. 2004; 94(12):2084–2090. [PubMed: 15569958]
25. Beach MC, Saha S, Korthuis PT, et al. Patient-provider communication differs for black compared to white HIV-infected patients. AIDS Behav. in press.
26. Gordon HS, Street RL Jr, Sharf BF, Souchek J. Racial differences in doctors' information-giving and patients' participation. Cancer. Sep 15; 2006 107(6):1313–1320. [PubMed: 16909424]
27. Siminoff LA, Graham GC, Gordon NH. Cancer communication patterns and the influence of patient characteristics: Disparities in information-giving and affective behaviors. Patient Educ Couns. Sep; 2006 62(3):355–360. [PubMed: 16860520]
28. Ghods BK, Roter DL, Ford DE, Larson S, Arbelaez JJ, Cooper LA. Patient-physician communication in the primary care visits of African Americans and whites with depression. J Gen Intern Med. May; 2008 23(5):600–606. [PubMed: 18264834]
29. Levinson W, Hudak PL, Feldman JJ, et al. “It's not what you say…” Racial disparities in communication between orthopedic surgeons and patients. Med Care. 2008; 46(4):410–416. [PubMed: 18362821]
30. Roter DL, Larson S. The relationship between residents' and attending physicians' communication during primary care visits: An illustrative use of the roter interaction analysis system. Health Communication. 2001; 13(1):33–48. [PubMed: 11370921]
31. Roter DL, Larson S. The roter interaction analysis system (RIAS): Utility and flexibility for analysis of medical interactions. Patient Education and Counseling. 2002; 46:243–251. [PubMed: 11932123]
32. Braddock CH 3rd, Fihn SD, Levinson W, Jonsen AR, Pearlman RA. How doctors and patients discuss routine clinical decisions. Informed decision making in the outpatient setting. J Gen Intern Med. Jun; 1997 12(6):339–345. [PubMed: 9192250]
33. Braddock CH 3rd, Edwards KA, Hasenberg NM, Laidley TL, Levinson W. Informed decision making in outpatient practice: time to get back to basics. Jama. Dec 22-29; 1999 282(24):2313–2320. [PubMed: 10612318]
34. Cene CW, Roter D, Carson KA, Miller ER 3rd, Cooper LA. The effect of patient race and blood pressure control on patient-physician communication. J Gen Intern Med. Jul 3; 2009 24(9):1057–1064. [PubMed: 19575270]
35. 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. Dec; 1988 15(12):1833–1840. [PubMed: 3068365]
36. Schouten BC, Meeuwesen L. Cultural differences in medical communication: a review of the literature. Patient Educ Couns. Dec; 2006 64(1-3):21–34. [PubMed: 16427760]
37. 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; 40:471–476. [PubMed: 12021673]

38. Jones AC, Kwoh CK, Groeneveld PW, Mor M, Geng M, Ibrahim SA. Investigating racial differences in coping with chronic osteoarthritis pain. J Cross Cult Gerontol. Dec; 2008 23(4): 339–347. [PubMed: 18561011]

39. Byrne MM, Souchek J, Richardson M, Suarez-Almazor M. Racial/ethnic differences in preferences for total knee replacement surgery. J Clin Epidemiol. Oct; 2006 59(10):1078–1086. [PubMed: 16980148]

40. Figaro MK, Russo PW, Allegrante JP. Preferences for arthritis care among urban African Americans: “I don't want to be cut”. Health Psychol. May; 2004 23(3):324–329. [PubMed: 15099175]

41. Ibrahim SA, Zhang A, Mercer MB, Baughman M, Kwoh CK. Inner city African-American elderly patients' perceptions and preferences for the care of chronic knee and hip pain: findings from focus groups. J Gerontol A Biol Sci Med Sci. Dec; 2004 59(12):1318–1322. [PubMed: 15699532]

42. Ibrahim SA, Siminoff LA, Burant CJ, Kwoh CK. Differences in expectation of outcome mediate African-American/White patient differences in “willingness” to consider joint replacement. Arthritis Rheum. 2002; 46:2429–2435. [PubMed: 12355491]

43. Street RL Jr, Gordon H, Haidet P. Physicians' communication and perceptions of patients: Is it how they look, how they talk, or is it just the doctor? Soc Sci Med. 2007; 65:586–598. [PubMed: 17462801]

Table 1

Composite measures of patient-provider communication based on the Roter Interaction Analysis System (RIAS)

Communication Dimension	Description
Biomedical exchange	Information-giving, questions, education, and counseling pertaining to the medical condition or therapeutic regimen
Psychosocial exchange	Information-giving, questions, education, and counseling pertaining to psychosocial issues or lifestyle
Rapport building	Social talk, laughter, compliments, and statements that reflect concern, reassurance, approval, agreement, empathy, legitimizing, and partnership
Patient activation/engagement	Providers' back-channeling, paraphrasing, and asking for the patient's permission, opinion, reassurance, and understanding, and patients' paraphrasing, request for services, and asking for reassurance, understanding, and clarification from providers
Physician verbal dominance	The ratio of provider-to-patient utterances during a visit (score >1 indicates more talk by provider than by patient)
Positive patient affect	Average coder rating of interest/attentiveness, friendliness/warmth, responsiveness/engagement, sympathy/empathy, interactivity, and respectfulness expressed by patient during a visit
Positive provider affect	Average coder rating of interest/attentiveness, friendliness/warmth, responsiveness/engagement, sympathy/empathy, interactivity, respectfulness, and hurried/rushed (reverse-coded) expressed by provider during a visit

Table 2
Individual elements of informed decision making

Discuss the clinical issue or nature of the decision[a]
Discuss the alternatives[a]
Discuss the risks and potential benefits of the alternatives[a]
Discuss the uncertainties associated with the decision[a]
Discuss the patient's role in making the decision (an invitation to participate)[b]
Assess the patient's understanding of the decision at hand[a]
Elicitation or acknowledgment of the patient's preferences[a]
Explore context of the decision (how the decision affects the patient's life)[c]
Assess patient's desire for input on the decision from trusted others[c]

[a] Original element of the Informed Decision Making (IDM) Model32

[b] Added as an element in 199933

[c] Added as an element in 2008 in a study of IDM in older adults29

Table 3

Baseline characteristics of African American and white patients with knee or hip osteoarthritis.

	Total Sample (N=402)		African American (N=106)		White (N=296)		
Characteristics	**N**	**(%)**	**N**	**(%)**	**N**	**(%)**	**P***
Age							0.045
50 – 64	272	(67.7)	80	(75.5)	192	(64.9)	
≥65	130	(32.3)	26	(24.5)	104	(35.1)	
Male	382	(95.0)	101	(95.3)	281	(94.9)	0.887
≤ High school education	299	(74.4)	79	(74.5)	220	(74.3)	0.967
Annual household income							0.001
<$20,000	166	(41.3)	58	(54.7)	108	(36.5)	
≥$20,000	197	(49.0)	36	(34.0)	161	(54.4)	
Missing	39	(9.7)	12	(11.3)	27	(9.1)	
Knee (vs. hip) OA**	308	(76.6)	80	(75.5)	228	(77.0)	0.745
Prior visit to this clinic (yes)	166	(41.3)	49	(46.2)	117	(39.5)	0.229
WOMAC Index quartiles**							0.161
1st quartile	83	(20.1)	19	(17.9)	64	(21.6)	
2nd quartile	120	(29.9)	26	(24.5)	94	(31.8)	
3rd quartile	100	(24.9)	27	(25.5)	73	(24.7)	
4th quartile	99	(24.6)	34	(32.1)	65	(22.0)	
Site							<0.001
Pittsburgh	257	(63.9)	42	(39.6)	215	(72.6)	
Cleveland	145	(36.1)	64	(60.4)	81	(27.4)	

*P-values compare African Americans and whites using chi-square tests

**OA=Osteoarthritis; WOMAC=Western Ontario and McMaster Universities Osteoarthritis Index

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Table 4

Racial variation in measures of patient-provider communication

	Descriptive Statistics			Race Comparison*		Adjusted Race Comparison**	
Communication Outcomes	**Mean**	**Median**	**Range**	**Beta**	**95% CI**	**Beta**	**95% CI**
Total number of utterances	370	344	101-1140	13.19	-27.70, 54.09	17.56	-22.32, 57.43
Biomedical exchange	229	214	50-608	**-8.85**	**-16.38, -1.32**	**-9.14**	**-16.73, -1.54**
Psychosocial exchange	14	11	0-81	2.53	-0.58, 5.64	2.23	-0.96, 5.42
Rapport building	69	60	7-238	**7.05**	**1.35, 12.75**	**7.84**	**1.85, 13.82**
Patient activation/engagement	30	25	1-122	0.41	-2.70, 3.53	0.07	-3.21, 3.34
Physician verbal dominance	1.59	1.52	0.40-4.13	-0.04	-0.18, 0.10	-0.04	-0.18, 0.11
Positive patient affect	3.44	3.50	1.00-5.00	-0.08	-0.21, 0.05	-0.07	-0.20, 0.07
Positive provider affect	3.51	3.57	1.14-5.00	-0.01	-0.22, 0.20	0.01	-0.20, 0.22
Informed decision making	6.57	8	0-9	-.50	-1.04, 0.05	-0.53	-1.11, 0.05
Visit length (minutes)	18.74	16.93	3.67-56.27	-0.28	-2.29, 1.74	-0.07	-2.19, 2.05

* Race comparison reflects the association of the outcome with African American race based on linear regression models. All models were clustered by provider and controlled for site and time of enrollment in the study. For all outcomes except visit length and total number of utterances, total number of utterances was included as an additional covariate. Total number of utterances was omitted from the model for visit length because these variables were highly correlated (Pearson correlation = 0.83, p <.001).

** For the adjusted race comparisons, the following control variables were added to the models: gender, age, income, education, whether patients had previous visits in the same orthopedic clinic, and whether patients were treated for hip vs. knee osteoarthritis.