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Investigating Racial Differences in Coping with Chronic Osteoarthritis Pain

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Abstract

Osteoarthritis is a prevalent disease in older patients of all racial groups, and it is known to cause significant pain and functional disability. Racial differences in how patients cope with the chronic pain of knee or hip osteoarthritis may have implications for utilization of treatment modalities such as joint replacement. Therefore, we examined the relationships between patient race and pain coping strategies (diverting attention, reinterpreting pain, catastrophizing, ignoring sensations, hoping and praying, coping self-statements, and increasing behavior activities) for hip and knee osteoarthritis. This is a cross-sectional survey of 939 veterans 50 to 79 years old with chronic hip or knee osteoarthritis pain recruited from VA primary care clinics in Philadelphia and Pittsburgh. Patients had to have moderate to severe hip or knee osteoarthritis symptoms as measured by the WOMAC index. Standard, validated instruments were used to obtain information on attitudes and use of prayer, pain coping strategies, and arthritis self-efficacy. Analysis included separate multivariable models adjusting for demographic and clinical characteristics. Attitudes on prayer differed, with African Americans being more likely to perceive prayer as helpful (adjusted OR=3.38, 95% CI 2.35 to 4.86) and to have tried prayer (adjusted OR=2.28, 95% 1.66 to 3.13) to manage their osteoarthritis pain. Upon evaluating the coping strategies, we found that, compared to whites, African Americans had greater use of the hoping and praying method ($\beta=0.74$, 95% CI 0.50 to 0.99). Race was not associated with arthritis pain self-efficacy, arthritis function self-efficacy, or any other coping strategies. This increased use of the hoping and praying coping strategy by African Americans may play a role in the decreased utilization of total joint

arthroplasty among African Americans compared to whites. Further investigation of the role this coping strategy has on the decision making process for total joint arthroplasty should be explored.

Keywords

Coping strategies; Health disparities; Joint arthroplasty; Osteoarthritis; Prayer

Introduction

Total joint arthroplasty (TJA) effectively decreases the pain and disability from osteoarthritis (OA) of the hip and knee (Fortin *et al.* 2002; Hawker *et al.* 1998) and is generally recommended for patients with radiographic evidence of OA, clinically significant functional disability, and moderate to severe pain not successfully managed by non-surgical therapies (NIH Consensus Panel on Total Hip Replacement 1995; NIH Consensus Panel 2004; Dieppe *et al.* 1999). Though TJA is widely used, studies performed in both Medicare and Veterans Administration (VA) populations have shown African American patients have lower rates of TJA utilization compared to white patients (Jones *et al.* 2005). This is concerning because evidence suggests African Americans have a significantly higher prevalence of radiographic knee OA and symptomatic radiographic knee OA compared to whites, implying a higher proportion of African Americans with indications to undergo TJA (Dillon *et al.* 2006).

The reasons for these differences in TJA utilization remain unknown. However, a number of patient-level factors have been explored and found to potentially explain, in part, this phenomenon. For example, African American patients compared to white patients who are candidates for TJA are less knowledgeable about this procedure and less likely to know a friend or family member who has had TJA. Furthermore, African American patients are more likely than white patients to perceive negative outcomes after completing the surgery and were more reluctant to consider having the surgery even if their arthritis was to become severe (Figaro *et al.* 2005; Ibrahim *et al.* 2002a, b). These racial variations in knowledge and perception concerning TJA affect the medical decision making process and possibly the use of this effective therapy (Suarez-Almazor *et al.* 2005).

Another patient-level factor that might explain the observed racial differences in TJA utilization is the use of coping strategies for chronic pain associated with OA. Coping can be defined as one's cognitive and behavioral efforts to mitigate stressful environmental and internal demands that are perceived as taxing to one's resources. In non-OA studies of chronic pain sufferers, African Americans compared to whites have shown greater use of the hoping and praying and diverting attention coping strategies for pain (Cano *et al.* 2006; Jordan *et al.* 1998). African Americans have demonstrated higher scores on coping strategy items relating to prayer use for a range of chronic pain disorders (Edwards *et al.* 2005). Also, African Americans have been found to exhibit a greater perception of prayer's helpfulness in relieving hip or knee OA pain compared to whites (Ang *et al.* 2002). However, no studies have investigated the presence of racial differences in a wide range of coping strategies for potential TJA candidates suffering from moderate to severe hip or knee OA pain.

Self-efficacy may be another patient-level factor closely related to coping that may also explain some of the observed racial differences in TJA utilization. Self-efficacy can be defined as one's confidence in one's ability to manage one's symptoms, which, in the setting of OA, includes pain and functional limitations.

The focus of this study is first to examine whether racial differences in the perceived helpfulness of prayer for chronic OA pain exist in a large study sample from multiple study sites, second to examine whether racial differences in coping strategies exist for chronic OA pain, and lastly to examine whether observed racial differences in coping affect arthritis self-efficacy. We hypothesized that higher uses of coping strategies in African Americans compared to whites may increase the ability to deal with chronic OA pain symptoms. We also believe that this increased ability to cope with pain will increase self-efficacy in African Americans and ultimately decreases the consideration of TJR.

Materials and Methods

Sample

Participants were recruited from primary care clinics in the Pittsburgh VA Healthcare System and Philadelphia VA Medical Center. Research assistants posted fliers and personally handed fliers to patients in the waiting rooms of the above mentioned clinics. Interested patients responded by contacting the research assistants and were screened for eligibility. Inclusion criteria for enrollment included age greater than or equal to 50 years but less than 80 years old. To identify patients with chronic frequent hip or knee pain, questions in the Arthritis Supplement National Health and Nutrition Examination Survey I were used (US Department of Health and Human Services *et al.* 1999). To assess severity of disease, the Western Ontario and McMaster Osteoarthritis Index (WOMAC) was used, where a score greater than 38 was considered moderate to severe (Hawker *et al.* 2000). Exclusion criteria included history of prior hip or knee replacement, inflammatory arthritis, presence of any symptoms of neurological disorder similar to OA pain (i.e., sciatica), dementia, prosthetic leg, and terminal illness such as end-stage liver or kidney disease, metastatic cancer, or other relative contraindication to elective TJA.

A total of 2,828 patients were screened. Of these, 1,786 were ineligible based on the above criteria. Of the ineligible, 732 people had inflammatory arthritis, 427 had WOMAC scores less than or equal to 38, 390 did not exhibit chronic pain for the above specified lengths of time, 95 had a prior history of TJA, 86 did not meet age requirements, 81 suffered from neurological pain disorders, and 67 were excluded due to miscellaneous causes including prosthetic leg, absence of hip or knee pain, multiple screenings of the same participant, mental inability to respond appropriately to screening questions, or primary care not received at one of the study sites. Some patients exhibited more than one of these reasons for ineligibility. Of the remaining 1042 patients eligible for the study, an additional 47 were excluded due to incomplete screening data leaving 995 enrolled participants. Fifty-six of these enrolled participants did not self-identify their race as either African American or white; therefore, 939 participants were included for this analysis. The enrolled participants completed all questionnaires in person.

Variables

Multiple dependent variables included patient perceptions of prayer helpfulness, trying prayer for hip or knee pain, seven various coping strategies assessed within the Coping Strategies Questionnaire (CSQ), arthritis pain self-efficacy, and arthritis function self-efficacy. The primary independent variable for this study was race. The non-clinical covariates included in this study were age, education, income, and site. The clinical covariates were OA severity, which was determined by the commonly used WOMAC score, and mental health status, which was determined by the Short Form-12 mental component summary (SF-12 MCS).

The Efficacy of Specific Treatments Questionnaire evaluates patient perceptions of the helpfulness of different treatment options for hip or knee pain. Patients can respond “very helpful,” “somewhat helpful,” “not at all helpful,” “not applicable,” or “don’t know.” Subsequently, the questionnaire asks whether the patient has tried these specific options, “yes” or “no.” This instrument has been used to investigate patient perceptions of treatment in previous studies (Bill-Harvey *et al.* 1989; Ibrahim *et al.* 2001).

The CSQ version used in this study consisted of 14 questions measuring the amount of usefulness participants place on seven different coping strategies. These strategies include diverting attention, reinterpreting pain, catastrophizing, ignoring sensations, hoping and praying, coping self-statements, and increasing behavior activities. The items in each subscale are measured on a seven-point Likert scale ranging from “never use” to “always use.” This instrument is a truncated version of the parent version of CSQ and was specifically designed to decrease respondent burden in large research studies. It strongly correlates with the more widely used parent version of the CSQ (Jensen *et al.* 2003; Tan *et al.* 2006).

The Arthritis Self-Efficacy Scale is a widely used 14-item scale that consists of a pain self-efficacy subscale and a function self-efficacy subscale. Self-efficacy is characterized as one’s confidence in one’s ability to manage one’s arthritis-related pain and accomplish daily tasks in spite of arthritis-related functional disability (Lorig *et al.* 1989, 1993, 1999; Lorig and Holman 1998).

The SF-12 MCS is a six-item subscale within the Short Form-12. The SF-12 MCS assesses an individual’s mental health status, which has demonstrated a strong effect on pain outcomes following total knee arthroplasty (Lingard *et al.* 2004). This instrument was derived by taking six items from the corresponding Short Form-36 mental component summary (SF-36 MCS). The SF-12 MCS has demonstrated high reliability and accuracy when compared with the SF-36 MCS (Jenkinson and Layte 1997; Ware *et al.* 1996).

Statistical analysis

All variables and covariates were examined for significant differences based on race using logistic regression models for dichotomous variables, such as patient perceptions of prayer and whether patients had tried prayer or not, or ordinary least-squares regression analysis for continuous variables, such as the CSQ subscale scores and the Arthritis Self-Efficacy Scale pain and function scores. Then we conducted multivariable analysis evaluating race and controlling for each site to determine the association race had with each dependent variable. Our final multivariable models are dependent variable, race, and the above mentioned clinical and non-clinical covariates. Additionally, as stated above, the response to patient’s perceptions of prayers efficacy had three possible answers, but responses were dichotomized by consolidating the “very helpful” and “somewhat helpful” responses into one “helpful” response. A standard statistical significance value of 0.05 was used for all models, and analyses were performed using SAS 9.1 and STATA 9.0.

This study was approved by the Institutional Review Boards of the VA Pittsburgh Health care System and the Philadelphia VA Medical Center.

Results

Of the predominantly male sample (Table 1), African American participants were significantly younger than white participants, with 72% of African Americans being less than 60 years old compared to 49% of whites, ($p < 0.01$). Also, African Americans reported less education and less income compared to whites. Lastly, higher mean WOMAC scores

(61.1 vs. 55.6, $p<0.01$) and lower mean SF-12 MCS scores (41.5 vs. 44.3, $p<0.01$) in African Americans versus whites suggested greater OA symptom severity and poorer mental health status for African Americans.

African Americans compared to whites were more likely to perceive prayer as helpful and more likely to have tried it for their hip or knee pain. Without adjusting for any covariates, 85% of African Americans considered prayer helpful compared to 66% of whites. In addition, 73% of African Americans reported having tried it for their hip or knee pain compared to 55% of whites. This significantly greater perception of prayer's helpfulness in African Americans continued after adjusting for clinical and non-clinical covariates (adjusted OR 3.38, $p<0.001$). Similarly, the greater likelihood of having tried prayer for OA pain in African Americans also remained after adjustment (adjusted OR 2.28, $p<0.001$).

African Americans scored significantly higher on three out of the seven CSQ subscales including diverting attention, catastrophizing, and hoping and praying with crude analysis (Table 2). However, after adjusting for demographic and clinical covariates, only one coping strategy retained its significance. African Americans showed a greater use of the hoping and praying coping strategy compared to whites as indicated by a β -coefficient of 0.74 ($p<0.01$). Although the diverting attention strategy lost its significance after adjusting, it still trended toward higher use in African Americans compared to whites with a β -coefficient of 0.21 ($p=0.09$). Uses of the remaining five coping strategies assessed in the CSQ were statistically the same by race after adjustment.

African Americans demonstrated similar pain (β -coefficient -0.12 , $p=0.34$) and function (β -coefficient -0.18 , $p=0.16$) self-efficacy (Table 3). When examining the effects of each of the covariates in our final multivariate models, we found that an education level greater than or equal to an associate degree and better mental health status significantly increased arthritis pain self-efficacy, while greater OA symptom severity decreased arthritis pain self-efficacy. Also, we found that an education level greater than or equal to an associate degree, better mental health status, and an annual income greater than or equal to \$30,000 significantly increased arthritis function self-efficacy while the age category 70 to 79 years old, Philadelphia study site, and greater OA severity significantly decreased arthritis function self-efficacy.

Discussion

In this sample of over 900 potential TJA candidates suffering from moderate to severe hip or knee OA pain, the perceptions of prayer's helpfulness and the practice of trying prayer for hip or knee pain were found to be significantly higher in African Americans compared to whites. Appropriately, significant racial differences also existed in the hoping and praying coping strategies, with African Americans utilizing this method more frequently than white patients. However, the other six coping strategies evaluated showed no significant racial differences.

Our findings agree with previous reports of prayer use in African Americans for chronic pain symptoms (Ang *et al.* 2002; Ibrahim *et al.* 2004). Notably, in one previous study, patients that had perceived prayer as helpful were also less likely to consider TJA, which underscores the impact patient perceptions have on the decision making process (Ang *et al.* 2002). Our study did not assess willingness for TJA and cannot support the findings of the above mentioned study, but it does continue to show the important role prayer and possibly faith play in the African American community. Although the effects of prayer on pain have not been clearly demonstrated quantitatively, a qualitative study consisting entirely of African Americans found a belief that prayer did have the ability to alleviate pain (Harrison

et al. 2005; Ibrahim *et al.* 2004). Our study complicates this testimony in that, despite this higher use of the hoping and praying coping strategy, African Americans did not demonstrate higher arthritis pain and function self-efficacy. This may suggest that hoping and praying may not increase a patient's ability to manage arthritis related pain and functional limitations. However, another explanation for this lack of increased self-efficacy in association with higher utilization of the hoping and praying coping strategy may be that coping strategies and self-efficacy are not as closely linked as was hypothesized. The process surrounding coping may have a greater impact on relieving the stressors on mental function versus the physical stressors of pain and disability.

Other important limitations should be considered when interpreting these findings. First, as previously described, there were many demographic and clinical differences between races in our sample, which made adjusting critical in order to make proper comparisons. We were able to control for the known factors in our analysis, but there remains the possibility of differences in unknown confounders influencing our findings. Secondly, the population we studied was predominately male. Therefore, the generalizability of our findings may not extend to racial differences seen in coping between African American women and white women. Nevertheless, similar results in the use of coping strategies have been described in a study sample consisting of all females with rheumatoid arthritis (Jordan *et al.* 1998). Thirdly, we did not assess the duration of disease in these patients, which may have an influence on the specific coping strategies used by participants (Holmes and Stevenson 1990). Our intent was to include only chronic pain sufferers; however, our recruitment method may have allowed enrollment of patients with disease duration lasting as little as one month prior to the study. Fourthly, although all patients have to have presumptive diagnosis of hip or knee OA based on pain and age, we did not exclude patients based on radiologic evidence of hip or knee OA, which is also an important factor in the decision to consider joint replacement as treatment option. Finally, the cross-sectional nature of our study does not allow us to determine causal relationships between independent and dependent variables, only associations.

In summary, we found that African Americans perceived prayer as a coping strategy as more helpful and tried prayer more often compared to whites for hip or knee OA pain. Furthermore, the hoping and praying coping strategy was the only coping strategy to significantly differ racially, with African Americans utilizing it more often than whites. This study demonstrates that prayer may be an important factor in the reason why African Americans receive less TJA, while the other coping strategies we evaluated may not play a major role in the racial differences in TJA utilization. This study also demonstrates the important role prayer plays in helping African Americans manage the stressors related to their chronic OA pain. Although this coping mechanism does not appear to relate strongly with pain self-efficacy or function self-efficacy, it may still have an impact on perceived mental stressors from chronic OA pain. More studies investigating the effect prayer has on pain perceptions and other mental interpretations of OA symptoms should be explored. Furthermore, studies developing interventions to address racial disparity in TJA utilization should consider the influence that psychosocial factors such as prayer can have on patient treatment preferences and decision-making.

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Table 1

Demographic and Clinical Characteristics

Characteristics	White (n=480)	African American (n=459)	P value
Female	4.4%	2.0%	0.04
Age			<0.01
50–59	49.1%	71.4%	
60–69	27.3%	20.5%	
70–79	23.6%	8.1%	
Education			<0.01
<High school	10.4%	10.9%	
High school/GED	58.3%	67.5%	
≥Associates Degree	31.3%	21.6%	
Income			<0.01
<\$15,000	31.2%	47.9%	
\$15,000–\$29,999	30.0%	23.5%	
≥\$30,000	29.8%	22.7%	
missing data	9.0%	5.9%	
WOMAC ^a (mean score)	55.6	61.1	<0.01
SF-12 MCS ^b (mean score)	44.3	41.5	<0.01

^aWestern Ontario and McMaster Osteoarthritis Index

^bShort Form-12 mental component summary

Table 2

Coping Strategies Questionnaire Mean Subscale Scores

Coping strategy	White	African American	<i>P</i> value	Race β -coefficient ^a (95% CI) ^b	<i>P</i> value
Diverting attention	2.06	2.33	0.02	0.21 (-0.04, 0.45)	0.09
Reinterpreting pain	2.02	2.17	0.12	0.08 (-0.14, 0.30)	0.47
Catastrophizing	3.15	3.44	<0.01	0.01 (-0.20, 0.22)	0.92
Ignoring sensations	2.84	2.70	0.21	0.10 (-0.14, 0.33)	0.43
Hoping and praying	2.78	3.73	<0.01	0.74 (0.50, 0.99)	<0.01
Coping self-statements	3.85	3.85	1.00	0.11 (-0.09, 0.31)	0.28
Increasing behavioral activities	3.43	3.21	0.03	-0.07 (-0.30, 0.15)	0.52

^aControlling for age, education, income, Western Ontario and McMaster Osteoarthritis Index score, Short Form-12 mental component summary score, and study site

^bConfidence interval

Table 3 β -Coefficient Values for Final Multivariable Model

Independent Variable/Covariates	Pain Self-Efficacy β -Coefficient (95% CI) ^a	P-value	Function Self-Efficacy β -Coefficient (95% CI)	P-value
Race, African American	-0.12 (-0.37-0.13)	0.34	-0.18 (-0.43-0.07)	0.16
Site, Philadelphia	-0.18 (-0.45-0.05)	0.12	-0.39 (-0.64-(-0.14))	<0.01
Age, 60-69	0.03 (-0.25-0.31)	0.82	-0.02 (-0.29-0.26)	0.91
Age, 70-79	0.30 (-0.04-0.65)	0.09	-0.36 (-0.70-(-0.01))	0.04
Education < high school	0.00 (-0.38-0.38)	0.99	-0.16 (-0.54-0.21)	0.39
Education \geq Associate degree	0.51 (0.24-0.77)	<0.01	0.38 (0.12-0.65)	0.00
Income \$15000-\$29,999	0.13 (-0.15-0.42)	0.36	0.22 (-0.06-0.50)	0.13
Income \geq \$30,000	-0.03 (-0.32-0.26)	0.84	0.31 (0.02-0.59)	0.04
Income missing data	0.04 (-0.44-0.51)	0.89	0.33 (-0.14-0.80)	0.17
WOMAC ^b	-0.36 (-0.45-(-0.26))	<0.01	-0.48 (-0.57-(-0.39))	<0.01
SF-12 MCS ^c	0.26 (0.16-0.36)	<0.01	0.31 (0.21-0.41)	<0.01

^aConfidence interval^bWestern Ontario and McMaster Osteoarthritis Index^cShort Form-12 mental component summary