Development of a Decision Aid to Address Racial Disparities in Utilization of Knee Replacement Surgery

HAOLING H. WENG, ROBERT M. KAPLAN, W. JOHN BOSCARDIN, CATHERINE H. MACLEAN, IRENE Y. LEE, WEILING CHEN, AND JOHN D. FITZGERALD

Objective. Previous studies suggest that poorer knowledge and expectations about surgical outcomes may be responsible for low rates of total knee replacement (TKR) among African American males. The goal of this study was to pilot test the scope, acceptability, and efficacy of an educational videotape and tailored TKR decision aid designed to reduce disparities in TKR knowledge and expectations.

Methods. African American and Caucasian male veteran volunteers ages 55–85 years with moderate to severe knee osteoarthritis (OA) were recruited. During group meetings, patients viewed a video about knee OA treatments and were provided a personalized arthritis report that presented predicted patient outcomes should they decide to undergo TKR. Patients completed baseline and postintervention questionnaires that included an adapted Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) instrument to measure post-TKR expectations (0–100 scale with higher scores reflecting poorer outcomes).

Results. A total of 102 patients (54 African American, 48 Caucasian) completed the baseline survey and 64 patients attended the intervention. There were no significant differences by race between patients completing and those dropping out of the study. At baseline (n = 102), African American patients expressed lower expectations about post-TKR outcomes than did Caucasian patients for both pain (WOMAC score 41 versus 34; \(P = 0.18\)) and physical function expectations (WOMAC score 38 versus 30; \(P = 0.13\)). Among African Americans who underwent the intervention, expected pain and physical function improved to 31 (\(P = 0.04\) versus baseline) and 30 (\(P = 0.09\) versus baseline), respectively. Caucasian patients’ expectations changed little.

Conclusion. Disparities in baseline knowledge and expectations about TKR may be improved with the combined educational video and tailored decision aid.

KEY WORDS. Total knee replacement; Disparities; Informed decision making.

INTRODUCTION

Utilization of total knee replacement surgery (TKR) among male African American patients is significantly lower than for their Caucasian counterparts (1). In one study, 52% of African Americans with knee osteoarthritis (OA) did not think joint replacement was an effective treatment for knee OA (2). African Americans with knee OA were less willing to consider joint replacement because they were less familiar with the procedure and had lower expectations of benefit (3). African Americans were also more likely to believe that they would experience moderate or extreme pain and would have difficulty walking after the joint replacement (3). Our study targeted African Americans’
perceptions about the efficacy of joint replacements through an educational aid.

The goal of an educational aid is to enhance informed decision making. Informed decision making requires that patients understand their individual risks and benefits of each decision alternative (4). The decision to undergo elective TKR surgery is complicated because the potential improvements in quality of life must be balanced against the associated morbidity and mortality. Optimal decisions about TKR require that physicians understand their patients’ preferences and that patients understand the procedure’s risks and benefits. Prior studies suggest that decision aids can increase patients’ knowledge and promote realistic expectations of the treatments’ potential benefits and harms (5,6).

We developed an intervention consisting of an educational video from the Foundation for Informed Medical Decision Making (FIMDM) and a personalized arthritis report (PAR) describing a patient’s current symptoms compared with mean normative and preoperative TKR patient symptoms and predicted TKR outcomes. This combined intervention was designed to 1) improve patient knowledge about TKR and other knee OA treatments, and 2) improve expectations about TKR outcomes where misperceptions exist. The primary objective of our pilot study was to evaluate the comprehension, acceptability, and satisfaction with the video and PAR. Furthermore, we report the effect of the combined intervention on patient expectations, knowledge, and decision-making quality among Caucasian and African American male veterans.

**PATIENTS AND METHODS**

**Patients.** African American and non-Hispanic Caucasian male patients were recruited from the Greater Los Angeles Veterans Administration (VA) ambulatory care waiting areas for this interventional study. Flyers were posted in the lobby and clinic waiting areas. A research assistant sitting by the posted flyer was available to screen patients. Patients, who were self-referred, responded to the posted flyers by contacting the research assistant either in person or by telephone. The screening instruments described below were administered by computer-assisted interview.

Patients ages 55–85 years who were able to speak and read English and who responded to the posted solicitation for the study were screened in person or by telephone for the presence of knee arthritis using questions from the National Health and Nutrition Examination Survey (7). Arthritis severity was assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (8,9). Patients with a total WOMAC raw score >39 (out of 96) were defined as having moderate to severe arthritis and were invited to participate (10,11).

Patients with significant medical comorbidities were excluded. To assess comorbidities, we used an adaptation of the Charlson comorbidity index that relies on patient interview rather than medical record abstraction (12). Patients were queried for potential contraindications to TKR (13–16), which included dementia, stroke with residual plegia or paresis, cancer (other than skin), end-stage liver disease, and human immunodeficiency virus positivity. In addition to these contraindications, patients acknowledging ≥3 of the remaining Charlson disease categories were excluded from the study. (The remaining Charlson categories include myocardial infarction, heart failure, peripheral vascular disease, psychosis, stroke or transient ischemic attack, pulmonary disease, ulcer, end-stage renal disease, diabetes, and liver disease.) To capture a more homogeneous cohort, patients who reported having inflammatory arthritis, recent significant knee trauma, or residence in a nursing home or prior hip or knee replacement surgery were all excluded. Patients who participated were offered a small monetary compensation.

**Intervention.** All eligible patients were invited to participate in a race-specific group meeting. In the group setting, patients watched a 45-minute videotape created by the nonprofit FIMDM that details the treatment options for knee OA including TKR. Along with explanations about knee OA pathogenesis and treatments, the video includes patient interviews about why they chose their particular treatment (surgical versus medical).

The FIMDM video was developed after a literature search was performed to provide the video with evidence-based information. Patient and physician commentaries supplement graphic data presentations. Patient interviews were conducted to provide a descriptive experience of living with knee OA. The FIMDM videos were then further evaluated by patients and experts in the field.

After viewing the video, each patient was given a PAR. In the PAR, patients’ pain and physical function Short Form 36 (SF-36) scores were compared alongside age- and sex-matched mean normative SF-36 scores as well as mean SF-36 scores using a cohort of 81 preoperative TKR patients from a previous study (17). From this outside data set of 81 TKR patients (17), regression equations were generated using mixed effects linear models to describe patient-expected 1-month, 6-month, and 12-month pain and physical function outcomes using baseline pain and physical function, age, and sex (see Appendix A for the PAR, available at the Arthritis Care & Research Web site at http://www.interscience.wiley.com/pages/0004-3591/1/suppmat/index.html). In a group setting, patients were guided through their PAR. Total time spent watching the videotape, reviewing the PAR, and completing the surveys was ∼2 hours.

**Outcomes.** After meeting eligibility and providing consent (per VA protocol # PCC 2006-010086 and University of California Los Angeles protocol # G05-07-012-01A), patients completed a pre- and postintervention self-administered questionnaire to assess primary and secondary outcomes.

**Patient reaction to the intervention.** Using 5-point Likert scales, patients were asked whether the video was informative, easy to understand, and would help them make a decision about TKR surgery. Patients were also asked if the videotape was balanced. Those who answered
no were asked further whether it was biased in favor of surgical or nonsurgical treatments.

Focusing directly on disparities (of 6 main patient characters the video only included 1 African American patient), we had been concerned that the single African American role model might differentially bias African American patients against surgery. We specifically tested the influence of the patient characters by showing the patient characters’ faces to the study patients and asking whether they recalled the patient discussion (subjective recall), were influenced by the patient, and remembered whether the patient had had surgery or not (objective recall). Using a 3-point Likert scale, patients were also asked to rate how influential they found the character (1 = not at all, 2 = a little bit, 3 = a lot).

Primary outcomes. The 2 primary outcomes were change in expectations about postoperative TKR pain and change in expectations about postoperative TKR physical function. Expected post-TKR pain and functional outcomes were assessed using a validated, shortened version of the WOMAC (18), which we adapted to assess post-TKR expectations (see instrument in Appendix B, available at the Arthritis Care & Research Web site at http://www.interscience.wiley.com/jpages/0004-3591/1/suppmat/index.html). Specifically, patients were asked to describe the outcomes that they expected for a typical TKR patient after full recovery from surgery. Three 5-point Likert response questions addressed pain. Eight 5-point Likert response questions covered physical activities. All scores were rescaled (0–100) where a higher score indicated poorer expected function or more expected pain. The reliability of the adapted instrument was found to be excellent (Cronbach’s α = 0.96).

A detailed description of the instrument is as follows: the shortened WOMAC instrument was selected over the parent instrument because it is highly correlated with the parent WOMAC (Cronbach’s α = 0.96) (19), yet avoids the potential floor effects of the parent instrument by asking an additional question about strenuous exercise (see Appendix C, available at the Arthritis Care & Research Web site at http://www.interscience.wiley.com/jpages/0004-3591/1/suppmat/index.html). To address reliability of the adapted WOMAC expectation instrument, we conducted the following tests. As expected, internal consistency was excellent within each scale (Cronbach’s α ≥ 0.98 for each). We also conducted test–retest evaluations. Thirty-five patients completing the baseline instrument were retested at the time of the group meeting (range 3–45 days between testing). Despite the conceptual instability of patient expectations, test–retest reliability was fairly good (r = 0.61 for the pain scale and r = 0.46 for the physical function scale).

To assess validity of the instrument the following tests were performed. Certain aspects of validation were adopted from the parent instrument. There was little reason to suspect that the parent WOMAC construct, content, or criterion validity would not be applicable to the adapted instrument. Through cognitive interviews, patients reported a good understanding with the concept of the task being requested (face validity). Among the 103 patients completing the baseline survey, there was fair (congruent validity) correlation between each of the expected WOMAC scales and the expected patient global assessment of quality of life at either 6 or 12 months after hypothetical TKR (r = 0.4 for all 4 comparisons). Post-TKR expectations for pain and function were compared with actual outcomes using data from Kinemax investigators (10) for their US patients undergoing unilateral knee replacement under a data sharing agreement. Finally, the results from the current study demonstrate the instrument is sensitive to change (discriminant validity).

Patients’ global TKR expectations were assessed by asking them to evaluate the efficacy of TKR using the question, “How well do you think TKR works to treat arthritis of the knee?” with a 5-point Likert response ranging from 1 (not very well) to 5 (extremely well). Patients were also provided a “don’t know” response option if they were unable to rate the efficacy of TKR.

Secondary outcomes. Other knee OA treatments were evaluated in a similar manner. A list of 10 traditional interventions reviewed in the video (including TKR) and 6 alternative treatments (not reviewed or only briefly reviewed in the video) were provided to patients (for full list of interventions see Table 1). Patients were asked, “How well do you think each of these treatments works for knee arthritis?” using the 5-point Likert scale (1 = not very well to 5 = extremely well). Patients were also provided the “don’t know” response option.

Decision-making characteristics including stage of decision making, decisional conflict, and decision readiness were evaluated using previously validated instruments (20). Stage of decision making was evaluated using a single-item question, “How much consideration do you have for knee replacement surgery as a treatment for your knee arthritis?” Patients chose a response from a 6-point Likert scale (1 = not began to think, and 6 = made final decision) (20). Decision conflict was evaluated using a 16-question Decision Conflict Scale (20). The instrument has been validated and can distinguish between patients ready to implement decisions and undecided patients. Decision readiness was assessed using another single-item instrument (20). Patients were asked, “If you were to make a decision about knee surgery TODAY, how ready would you be to make that decision?” Responses ranged from “not at all” to “very” on a 6-point Likert scale.

Willingness to consider TKR was assessed using a single-item question, “How willing are you to consider total knee replacement surgery within the next year for treatment of your knee osteoarthritis?” (21). Possible responses ranged from “definitely willing” to “definitely not willing” on a 5-point Likert scale. Postintervention willingness to consider TKR was evaluated using the change-in-state question: “Having seen the video and your arthritis report, would you say you are MORE or LESS willing to consider knee replacement surgery?”

Additional evaluations. Additional evaluations included TKR knowledge of someone who has undergone the procedure, response to the video, and potential influence of characters in the video. If patients stated that they did know somebody who underwent joint replacement, a 5-point Likert scale was used to assess whether the patient believed the joint replacement to be effective.
expectations about TKR. Patients who dropped out were WOMAC physical function scores, perceptions of TKR, or completed the study and those who dropped out by race, were no significant differences between patients who completed and met questionnaires. There of the 102 patients (54 African American, 48 Caucasian) were younger (mean age 59 years versus 63 years; $P = 0.06$) and had poorer baseline WOMAC mean pain scores (33 versus 22; $P = 0.04$).

Of the 102 patients completing baseline data, Caucasian patients were older than African American patients (mean age 65 years versus 59 years; $P = 0.001$). There were no significant differences in body mass index between Caucasian and African American patients. However, African American patients reported more severe arthritis as measured by either total WOMAC score (57 versus 49 on a 0–100 scale; $P = 0.02$) or patient global summary arthritis severity (6.8 versus 6.1 on a 0–10 Likert scale; $P = 0.01$). African American patients also demonstrated a trend for poorer SF-36 physical function scores as compared with Caucasian patients ($P = 0.12$).

**Patient reaction to the intervention.** During the group discussion, both racial groups enthusiastically endorsed the video. On a 5-point Likert scale, the majority of patients either agreed or strongly agreed that the video was informative, easy to understand, and would be helpful in deciding about surgery. Patients overwhelmingly reported that they thought the video was balanced. Of those who stated there was a bias to the video, 14 patients stated the bias favored nonsurgical intervention and 5 stated the bias favored surgery as treatment for knee OA.

| Table 1. Proportion of patients rating traditional and alternative knee osteoarthritis treatments and mean rating of each treatment before and after the educational intervention ($n = 64$)* |
|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|                                   | Percentage of patients providing a rating for the treatment listed | Treatment ratings among patients providing ratings, mean ± SD† |                                   |
|                                   | Preintervention | Postintervention | Preintervention | Postintervention |
| Traditional arthritis treatments  |                    |                  |                  |                  |
| Knee replacement‡                 | 31                | 77               | 3.2 ± 1.5        | 3.7 ± 1.1        |
| Knee brace§                      | 44                | 71               | 3.0 ± 1.2        | 2.8 ± 1.1        |
| Knee injection§                   | 47                | 64               | 2.6 ± 1.3        | 3.3 ± 1.1        |
| Orthotics‡                       | 51                | 67               | 2.8 ± 1.2        | 2.9 ± 1.2        |
| Topical creams‡                   | 66                | 84               | 2.7 ± 1.2        | 2.8 ± 1.1        |
| NSAIDs§                          | 69                | 83               | 3.0 ± 1.2        | 2.7 ± 1.0        |
| Physical therapy§                | 79                | 93               | 3.4 ± 1.2        | 3.8 ± 1.1        |
| Acetaminophen®                   | 81                | 87               | 2.9 ± 1.2        | 2.6 ± 1.2        |
| Weight loss§                     | 81                | 97               | 3.5 ± 1.1        | 4.0 ± 0.7        |
| Exercise§                        | 84                | 97               | 3.1 ± 1.1        | 3.7 ± 1.1        |
| Alternative arthritis treatments |                    |                  |                  |                  |
| Acupuncture‡                     | 33                | 59               | 2.4 ± 1.3        | 2.5 ± 1.0        |
| MSM                               | 34                | 46               | 2.8 ± 1.5        | 2.9 ± 1.3        |
| Glucosamine‡                     | 45                | 64               | 2.8 ± 1.2        | 2.6 ± 1.1        |
| Copper bracelets                  | 46                | 58               | 2.5 ± 1.4        | 2.2 ± 1.2        |
| Magnets                           | 46                | 46               | 2.2 ± 1.3        | 2.3 ± 1.3        |
| Prayer                            | 69                | 71               | 2.9 ± 1.5        | 2.9 ± 1.3        |

* Patients answered the question, “How well do you think each of these treatments work for knee arthritis?” Answers ranged from 1 (“not very well”) to 5 (“extremely well”) with higher scores meaning the patients rated the treatment more highly. Patients were also offered a “don’t know” response option for those not willing or able to rate the treatment. NSAIDs = nonsteroidal antiinflammatory drugs; MSM = methylsulfonylmethane.
† After accounting for multiple comparisons using Bonferroni adjustment, only the proportion of patients rating the efficacy of knee bracing remained significant.
‡ $P < 0.05$ for pre- versus postintervention proportion of patients rating intervention (patients who did not respond with “don’t know”).
§ $P < 0.05$ for pre- versus postintervention proportion of patients rating intervention (patients who did not respond with “don’t know”). $P < 0.05$ for pre-versus postintervention mean rating.
¶ $P < 0.05$ for pre-versus postintervention mean rating.
# $P < 0.05$ for differential race effect on pre-versus postintervention mean rating.

**Statistical analysis.** Means between racial groups were compared using Student’s t-test, chi-square test, or other nonparametric equivalents as indicated. Baseline and postintervention differences for the entire sample were compared using Student’s paired t-test for comparison of means or McNemar’s test for comparison of proportions. To test for differential response to the intervention by race, responses between racial groups and across time were analyzed using mixed linear models. The Bonferroni method was used to account for multiple comparisons of secondary outcomes. Both raw and adjusted $P$ values were reported. The study was powered at 80% (2-tailed alpha set = 0.05) to detect the minimal perceptible clinical improvement of 20 units (22) on the WOMAC-based expected pain and function scales assuming baseline standard deviation of 20 units for each scale.

**RESULTS**

Of the 102 patients (54 African American, 48 Caucasian) who completed the baseline survey, 64 patients (33 African American, 31 Caucasian) attended the focus group meeting and completed the followup questionnaire. There were no significant differences between patients who completed the study and those who dropped out by race, WOMAC physical function scores, perceptions of TKR, or expectations about TKR. Patients who dropped out were...
We formally evaluated our concern that African American patients would be differentially influenced by the single African American character opting not to have surgery in the following manner. After the video, patients were shown pictures of the 6 main patient characters and 2 physician characters. Using 3-point Likert response categories, patients were asked 1) if they recalled what the character was talking about (subjective recall), 2) whether the character was influential (where 1 = “not at all,” 2 = “a little bit,” and 3 = “a lot of influence”), and 3) whether the character underwent surgery (objective recall). Among both races, patient subjective and objective recall was best for the 3 patient characters in the videotape (the single African American patient, a Caucasian male patient who had surgery, and a Caucasian female patient who also had surgery).

Overall, the mean ± SD rating for character influence was 1.8 ± 0.7 on the 3-point Likert scale. African American ratings of influence were higher than that of Caucasian patients for both patient characters (2.0 versus 1.6; \( P = 0.05 \)) and physician characters (1.9 versus 1.5; \( P = 0.05 \)). Although the African American patients were more likely to report a greater degree of influence by the African American patient character than were the Caucasian patients (1.9 versus 1.5; \( P = 0.05 \)), African American patients reported similarly high levels of influence from the Caucasian female patient (opting to have surgery, 2.1 versus 1.5; \( P = 0.005 \)), suggesting there was no differentially greater response to the African American character than other well-recalled characters.

Patients had difficulty understanding the PAR if they were asked to review it independently. However, patients stated that they had no difficulties understanding the PAR when guided by a facilitator.

**Primary outcomes.** Patient expectations were assessed using the adapted WOMAC expectations instrument. Again focusing on the 64 patients with pre- and postintervention data, African American patients had poorer post-TKR expectations than did Caucasian patients on both pain (mean ± SD score 41 ± 25 versus 34 ± 20; \( P = 0.18 \)) and physical function (mean ± SD score 38 ± 21 versus 30 ± 20; \( P = 0.13 \)) at baseline (Figure 1).

After the intervention, African American postoperative mean expectations improved from 41 to 31 for pain (\( P = 0.04 \)) and from 38 to 30 for physical function (\( P = 0.09 \)), whereas Caucasian expectations remained largely unchanged (\( P = 0.005 \)) for change in Caucasian patient scores. The difference between African American and Caucasian TKR expectations for either pain or physical function after the intervention was not statistically significant. The baseline disparity in expectations was eliminated.

**Secondary outcomes.** Knowledge of someone who had undergone TKR. Consistent with prior literature (23), of the 102 patients at baseline, African American patients were less likely to have ever heard of TKR (49% versus 72%; \( P = 0.02 \)) and less likely to know someone who had TKR (34% versus 53%; \( P = 0.05 \)) than Caucasian patients. Among the 54 respondents who knew someone with TKR, 40% of African American patients stated that TKR was little or not at all helpful whereas only 27% of Caucasian respondents stated that TKR was little or not at all helpful (\( P = 0.14 \) by Mantel-Haenszel chi-square test) (Figure 2).

Before the intervention, African American patients’ mean assessment of TKR efficacy was lower than Caucasian patients’ mean assessment (2.9 versus 3.6; \( P = 0.26 \)). However, African American assessment of efficacy improved to 3.6 (\( P = 0.02 \) for change) whereas Caucasian expectations decreased nonsignificantly to 3.3 (\( P = 0.06 \) for interaction term between race and change score).
After the intervention, a greater proportion of patients were able to rate all of the traditional interventions except for acetaminophen, which already had a high baseline response (see Table 1). The trends for greater ability to rate the efficacy of alternative treatments were not as strong as noted for the traditional arthritis treatments.

Among the traditional arthritis treatments, the mean efficacy ratings of knee injection, nonsteroidal antiinflammatory drugs, physical therapy, acetaminophen, weight loss, and exercise all improved. Ratings of efficacy did not improve significantly for any of the alternative arthritis treatments.

Aside from TKR, exercise was the only other treatment for which there was a differential response to the intervention, with the Caucasian patients’ mean rating improving from 2.8 to 3.8 (\(P = 0.01\)) whereas the African American patients’ mean rating remained stable from 3.4 to 3.5 (not significant for African American change, \(P = 0.03\) testing for differential response by race). (For the above secondary outcomes, after accounting for multiple comparisons, none of the above \(P\) values remained significant. See Table 1 for further Bonferroni results.)

**Patient decision-making measures.** Using the Decision Conflict Scale, where scores >37.5 are associated with indecision and scores <25 are associated with implementing decisions (on a 0–100 scale where 100 represents maximum conflict [20]), the mean decision conflict score for the entire group improved from 39.4 before the intervention to 25.8 after the intervention (\(P = 0.001\)). Baseline and postintervention scores were similar between races.

Using the O'Connor single-item question to assess stage of decision making, “How much consideration do you have for knee replacement surgery as a treatment for your knee arthritis?” (20), we found that more than half (43 of 62) of patients’ stage of decision making advanced after receiving the intervention (\(P = 0.001\) for preintervention mean response versus postintervention mean response) (see Figure 3).

To assess decision readiness, we asked patients, “If you were to make a decision about knee surgery TODAY, how ready would you be to make that decision?” Prior to the intervention, 30 of 53 patients reported being not at all ready. After the intervention, 24 of 53 patients reported being not at all ready. Overall, 15 patients reported being more ready (10 African American, 5 Caucasian) and 8 reported being less ready (2 African American, 6 Caucasian) after the intervention (\(P = 0.05\) for preintervention mean response versus postintervention mean response) (see Figure 4).

**Willingness to consider TKR.** There was little net change in willingness to consider TKR (16 patients had an increase in willingness to consider surgery, 18 patients had a decrease in willingness to consider surgery). At baseline, 13% of Caucasian patients and 29% of African American patients were willing to consider surgery (\(P = 0.12\)); after the intervention, 13% of Caucasian patients and 33% of African American patients were willing to consider surgery (\(P = 0.06\)).

**DISCUSSION**

Similar to prior studies (2,3,24), we found differences between the races in factual knowledge with respect to TKR and personal knowledge of someone who had undergone TKR. Furthermore, we detected disparities in expectations about TKR outcomes. The combined intervention of the video and PAR brought African American expectations in line with Caucasian expectations, eliminating the baseline disparities, although expectations for both races still remained poorer than reported post-TKR outcomes (10,11).

The intervention improved stage of decision making and decision readiness while reducing decision conflict. However, there was little change in willingness to consider TKR.

There are several reasons why improved mean knowledge did not impact willingness to consider TKR. Decision aids may actually reduce uptake of the surgical treatment options when surgery does not align with a patient’s values and preferences (25–27). Although there is no clear right rate of TKR utilization, better informed patients are more likely to make better decisions based on their values and preferences. Furthermore, the current study was not ready. After the intervention, 24 of 53 patients reported being not at all ready. Overall, 15 patients reported being more ready (10 African American, 5 Caucasian) and 8 reported being less ready (2 African American, 6 Caucasian) after the intervention (\(P = 0.05\) for preintervention mean response versus postintervention mean response) (see Figure 4).

**Figure 3.** Stage of decision making before and after the educational intervention (“How much consideration do you have for knee replacement surgery as a treatment for your knee arthritis?”).

**Figure 4.** Decision readiness before and after the educational intervention (“If you were to make a decision about knee surgery TODAY, how ready would you be to make that decision?”).
designed with power to detect a difference in willingness to consider TKR. To detect a 10% change in willingness to consider TKR, ~700 patients would be required to achieve 90% power with 2-sided 5% significance level.

Risk aversive individuals may opt for lower TKR utilization. There is also evidence that African American patients are less willing to consider joint replacement surgery because they are less likely to have friends and family who have undergone the procedure (3) and more likely to have physician trust issues (28). African Americans may also perceive religion as being more important for their healing (29). None of these topics were addressed by the current intervention.

The intervention was generally well received by both African American and Caucasian patients. The FIMDM video, although balanced, was produced to improve decision making and therefore does not directly address racial disparities. Although the African American patients did not report cultural difficulties when questioned, a culturally targeted video should be developed prior to implementing such an intervention to better address African American concerns about TKR. Furthermore, although patients were able to comprehend the PAR when it was administered in a group setting, additional development would likely improve the instrument’s comprehensibility.

This study used a pretest/posttest design and did not include a control group. As a result, we cannot rule out a variety of alternative explanations. Limitations of pretest/posttest design are well known and well appreciated. Our contribution is generation of pilot data that suggest hypotheses for evaluation in further studies.

Furthermore, although the adapted expectation WOMAC asked specifically about knee symptoms, the primary outcome could be biased due to other concurrent arthritis or medical comorbidities if patients did not properly attribute pain and limitations to their knee OA. Other limitations include the relatively small number of patients and multiple statistical comparisons. Finally, some of the Likert response items for the secondary outcomes in our questionnaire have not been formally validated.

However, the consistent findings of improved expectations on both the adapted WOMAC instrument and the single-item Likert question lend credence to the findings that patient expectations were improved by the intervention. We hope to complete further evaluations using a randomized clinical trial design.

Findings from this pilot study suggest that the combined videotape and PAR intervention improves TKR knowledge. The intervention may empower patients with knee OA to become active participants in their own health care. Patients who are empowered to make informed decisions, whatever their decisions may be, should be more satisfied and have more realistic expectations.

Given the significant disparity in TKR utilization between African American and Caucasian men (1) that has been attributed to patient knowledge (2,3,24) and the call for interventions to address such disparities (30,31), the results from this combined intervention are an important first step in developing an intervention to address TKR disparities. With further modifications, we believe that educational tools, such as those evaluated in this study, could be widely implemented to reduce TKR disparities.

ACKNOWLEDGMENT

The authors would like to thank the Foundation for Informed Medical Decision Making for making their “Treatment Choices for Knee Osteoarthritis” video available to the research team.

AUTHOR CONTRIBUTIONS

Dr. FitzGerald had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Study design. Weng, MacLean, FitzGerald.

Acquisition of data. Weng, Lee, Chen, FitzGerald.

Analysis and interpretation of data. Weng, Kaplan, Boscardin, MacLean, FitzGerald.

Manuscript preparation. Weng, Kaplan, MacLean, FitzGerald.

Statistical analysis. Weng, Boscardin, FitzGerald.

REFERENCES

13. Mancuso CA, Ranawat CS, Esdaile JM, Johanson NA, Charl-


