

Development of a personalized shared decision-making tool for knee osteoarthritis and user-testing with African American and Latina women

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ABSTRACT

Background: Patients with chronic knee pain are often unaware of treatment options and likely outcomes—information that is critical to decision-making. A consistent framework for communicating patient-personalized information enables clinicians to provide consistent, targeted, and relevant information. Our objective was to user-test a shared decision-making (SDM) tool for chronic knee pain. **Methods:** A cross-functional team developed a Markov-based health economics model and tested the model outputs with patient panels, patient and clinician focus groups, and clinical specialists. The resulting SDM tool was user-tested in a parallel-designed, randomized controlled study with 52 African American and 52 Latina women from geographically representative areas of the US. Participants were randomized to counseling with or without the SDM tool. Feedback was collected at intervention and at 1 month after intervention and analyzed with Student's t-tests and Chi-squared analyses ($\alpha = 0.05$). **Results:** Qualitative results indicated patients understood the material, rated the overall experience highly, and were likely to recommend the physician. The SDM group reported high satisfaction with the tool. A greater proportion of the SDM group (56%) reported increased physical activity over baseline at 1 month compared with the control group (33%) ($P = 0.0005$). New use of medications for knee pain (58% SDM; 49% control) did not differ significantly between groups ($P = 0.15$). **Conclusion:** Use of this innovative SDM tool was associated with high satisfaction and a significant increase in self-reported physical activity level at 1 month. The SDM tool may elicit behavioral changes to promote musculoskeletal health.

Keywords: Activity level, knee pain, shared decision-making

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Introduction

Knee osteoarthritis is an increasingly common and disabling condition. The prevalence of knee osteoarthritis has nearly

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doubled over the past 50 years^[1] and is more prevalent in women,^[2] especially African American and Latina women.^[3,4] Left untreated, the progression of knee osteoarthritis over time will affect an individual's ability to perform the activities of daily living; impose a financial burden through the out-of-pocket costs of clinical care and medication, reduction or loss of employment, and the subsequent burden on the family financial situation^[5]; and lead to total joint replacement.^[6]

Nonoperative treatment of mild to moderate knee osteoarthritis often alleviates symptoms and may delay disease progression.^[7,8] Increased physical activity is one of the hallmarks of nonoperative self-care.^[9,10] Increasing activity is critical to improving health,^[11] particularly for women of color, as 60% of African-American and 56% of Hispanic-Latina women are inactive or insufficiently active with respect to federal guidelines.^[12]

Motivating patients to change behaviors may be supported through shared decision-making (SDM), an approach in which clinicians and patients make decisions together using the best available evidence.^[13,14] By considering the available screening, treatment, or management options and the likely benefits and disadvantages of each, patients can communicate their preferences and better select their best treatment option, potentially leading to improved outcomes, engagement, and patient satisfaction.^[13,14] SDM can increase patients' knowledge, quality of life, satisfaction, and compliance with therapy and can decrease potential decisional regret.^[15] SDM can be facilitated through the use of educational materials^[16,17] and SDM tools.^[13,18]

Recognizing the urgent need to address musculoskeletal health disparities, Movement is Life, a multidisciplinary consortium comprising racially and ethnically diverse individuals,^[16,17] created an innovative SDM tool to facilitate discussions between clinicians and patients regarding treatment options for chronic knee pain. As disparities in the treatment of osteoarthritis in diverse populations have been reported,^[19] and these patients may have lower odds of receiving treatment aligned with their choices,^[20] the user-testing specifically recruited African American and Latina women. Primary care providers and family physicians are often the first healthcare providers to become aware of a patient's symptoms associated with early stage osteoarthritis. The outcome of the knee osteoarthritis SDM tool is personalized to the patient's age, race, ethnicity, and current pain and function. This tool provides a framework for a clear, concise, and patient-specific treatment discussion to help the physician communicate options effectively. The treatment is then more likely to align with the patient's treatment preferences^[20] and result in better compliance.

The objective of this user-testing was to analyze the patient experience with a personalized knee osteoarthritis SDM tool in African American and Latina women. Specifically, our goals were to obtain qualitative feedback on the use of the tool, overall patient satisfaction, and likelihood that participants would recommend their physician; and to determine whether

use of the tool was associated with increased physical activity, changes in medication (new use; type), and outreach to family or healthcare providers.

Methods

Creation of the knee osteoarthritis SDM tool

A cross-functional development team, including racially and ethnically diverse clinicians, health economists, and researchers, developed an interactive Markov-based health economics model.^[21] With diverse groups, including African American, Latino, and Caucasian women and men, outputs were discussed with participant panels, participant and clinician focus groups, and specialists to optimize information presentation and validate predicted outcomes.^[21] Treatment pathways were validated against a private-payer database (Truven Health Analytics, IBM Watson, Armonk, NY). Focus group patients (African American and Latina women) prioritized information on likely pain and activity levels, and approximately 20% of patients, primarily those who were financially supporting their families, were interested in lost productivity.^[22] The SDM tool was programmed to compare likely outcomes at 1, 5, and 10 years of two treatment pathways versus no treatment. Treatment choices for knee osteoarthritis patients included weight loss resulting from diet and exercise (and possibly physical therapy), increased physical activity, pain medication, injections (intraarticular corticosteroids or hyaluronic acid), nonsteroidal anti-inflammatory drugs and glucosamine chondroitin, unloader knee braces, and total knee arthroplasty.^[8,21] The tool output is the most likely statistical outcome for a group of patients with the same demographic characteristics [Figure 1]. These characteristics included age, race, ethnicity, gender, selected comorbidities (hypertension, obesity, diabetes), and educational level. Participants understood that these were likely outcomes and that their individual results may vary. Because the SDM tool was derived from multiple data sources, a diverse group of experts was consulted regularly to confirm assumptions, test outcomes, and ensure the tool's clinical relevance.

User-testing of the knee osteoarthritis SDM tool

Study design

This parallel-design, randomized controlled study was approved by the institutional review boards of the Hospital for Special Surgery (New York, NY) and the individual study centers in accordance with the Helsinki Declaration of 1975, as revised in 2000. The inclusion criteria were as follows: self-identified Black or African American and/or Hispanic/Latina women, aged 45–65 years, with mild to moderate knee pain. Eligible patients had experienced at least 3 months of chronic knee pain and had at least one comorbidity [obesity (≥ 50 body mass index (BMI) value) hypertension, and/or diabetes]. We excluded patients who had rheumatoid arthritis, who had undergone or were recommended for total knee replacement, who had experienced acute knee trauma, or who had a BMI value >45 . Randomization was pre-determined using a computer-generated process by the study coordination center (Hospital for Special Surgery); assignments were concealed

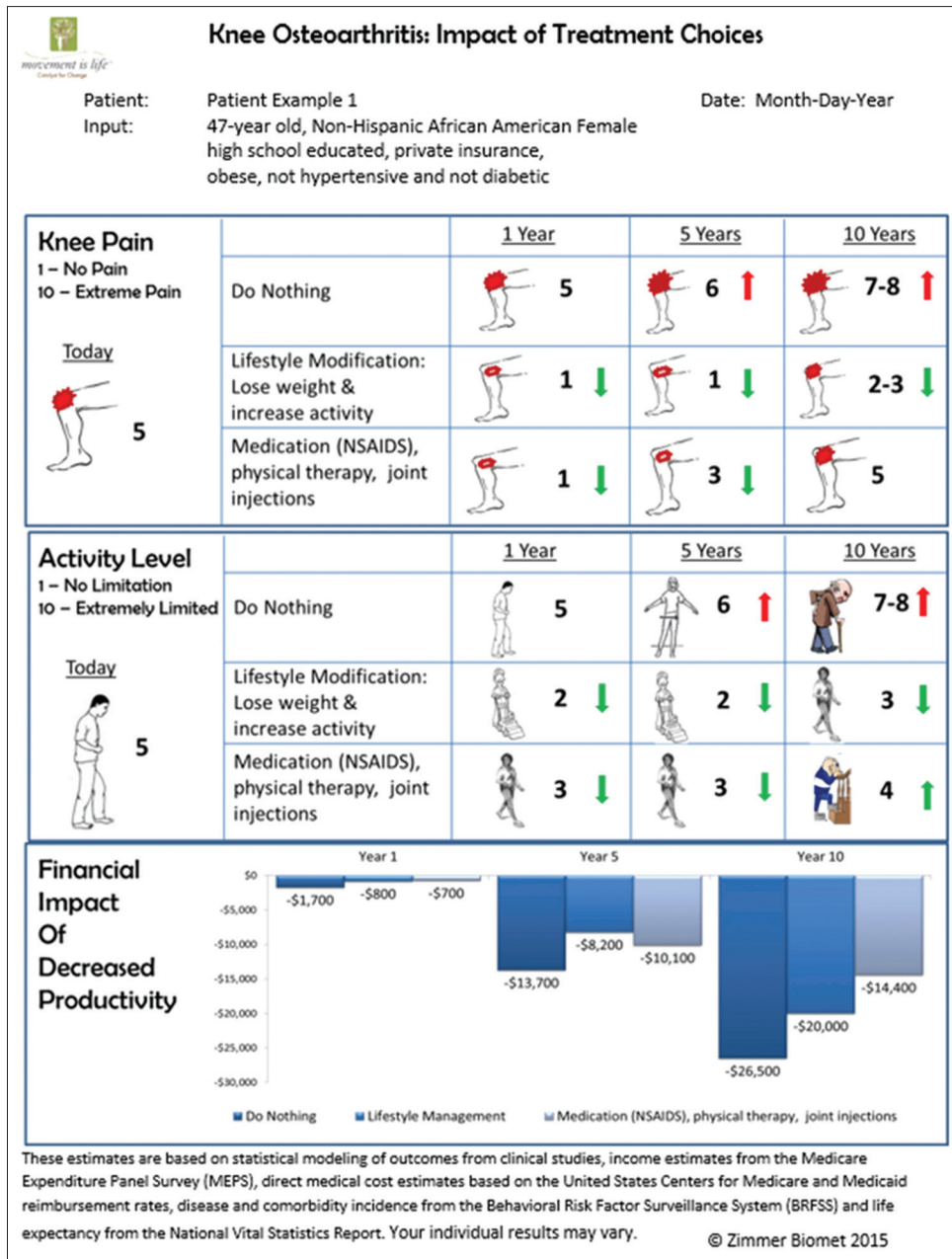


Figure 1: The shared decision-making (SDM) tool for patients with knee osteoarthritis. In this example, the clinical study coordinator entered the patient’s information and 3 pathways into the online program: 1) do nothing; 2) weight loss and increased physical activity; and 3) physician recommended, nonoperative pathway. The 1-page, color printout shown is generated to support a shared decision-making discussion. The output page summarizes the average or statistically likely outcome for similar patients at 1, 5, and 10 years. For projected knee pain and activity level, a score and an arrow are provided. A green arrow points down if the pain or activity limitation is projected to improve relative to today, and a red arrow points up if pain or activity limitation is projected to worsen relative to today. The projected calculations for loss of income are cumulative over time and are a statistical model of averages, using educational level as the input. This calculation is valid only for large populations and is intended to promote discussion with the patient about comparative lost productivity, with the most important point being that productivity loss is highest when the patient “does nothing.” The SDM tool relies on multiple data sources, including the Hospital Cost and Utilization Project, the Behavioral Risk Factor Surveillance System, Truven Health MarketScan Research Databases, the Medicare Expenditure Panel Survey, the National Vital Statistics Report, treatment guidelines from the American Academy of Orthopaedic Surgeons, and treatment effects extracted from systematic literature reviews, meta-analyses of randomized, controlled trials, and published randomized controlled trials,^[19] as well as patient and health care provider focus groups.^[20]

until each study visit. Participants were assigned randomly to the SDM group (n = 52) or the control group (n = 52). Randomization was stratified across each site of this multicenter study, so that each site was balanced between study arms.

Clinical study coordinators (CSCs), who were also racially and ethnically diverse, underwent a 1-day training that included techniques in motivational interviewing, “teach-back” methods, active listening, cultural awareness, and recognizing cues signaling

difficulty in patient understanding. Before the discussion with the CSC, participants completed a background survey, the Patient Health Questionnaire Depression Scale,^[23] and the Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS JR).^[24] If the participant had indications of limited literacy, the CSC reviewed each question with the participant.

Both the control group and the SDM group participants were given printed copies of general information about osteoarthritis obtained from the FamilyDoctor.org website.^[16] The SDM group received the same general information, and the CSC used the SDM tool in English or Spanish, according to participant preference. Two treatment options for knee pain were selected according to clinical recommendations, resulting in the printed tool output [Figure 2]. The CSC reviewed the tool output, answered questions, and used the teach-back technique. All participants (both groups) completed the Patient Experience Survey and Patient Information Survey, and the CSC completed the CSC Survey.

One month after the initial discussion, participants returned for a follow-up survey and interview with the CSC. Participants were asked to: 1) rate their overall experience with the study, 2) indicate the likelihood that they would recommend their physician to a friend or family member, 3) describe specific behavior changes they had made during the 30 days after the initial discussion, such as medication use and changes, 4) report their activity level, 5) answer qualitative survey questions, and 6) assess specific aspects of the SDM tool.

The participating medical centers were the Hospital for Special Surgery, The Johns Hopkins School of Medicine (Baltimore, MD), McGovern School of Medicine, University of Texas (Houston, TX), Baylor College of Medicine (Houston, TX), Case Western Reserve University School of Medicine (Cleveland, OH), University Hospitals Otis Moss Jr. Health Center (Cleveland, OH), University of Pennsylvania, and Yale University (New Haven, CT).

Participant groups

Between September 23, 2016, and November 14, 2017, 104 African American (n = 72) or Latina (n = 32) women with a mean age of 55 years (range, 45–68) were enrolled after providing informed consent during routine clinical visits. The demographic characteristics of the SDM tool (control) group and intervention (SDM tool) group are provided in Table 1.

Data analysis

Statistical analysis was performed using SAS Enterprise Guide, version 7.15 (SAS Institute Inc., Cary, NC). *P* values of < 0.05 were considered significant. Baseline demographic variables (age, gender, race, ethnicity, education, insurance type, comorbidities) and most participant outcomes (composite survey scores, quantitative ratings, recommendations) were compared between the control and SDM groups using two-tailed Student's *t*-tests. Categorical data (e.g., activity level) were analyzed using likelihood ratio Chi-squared tests; top box analysis was used for the likelihood of recommending the physician. With continued input from our co-investigators, additional outcome

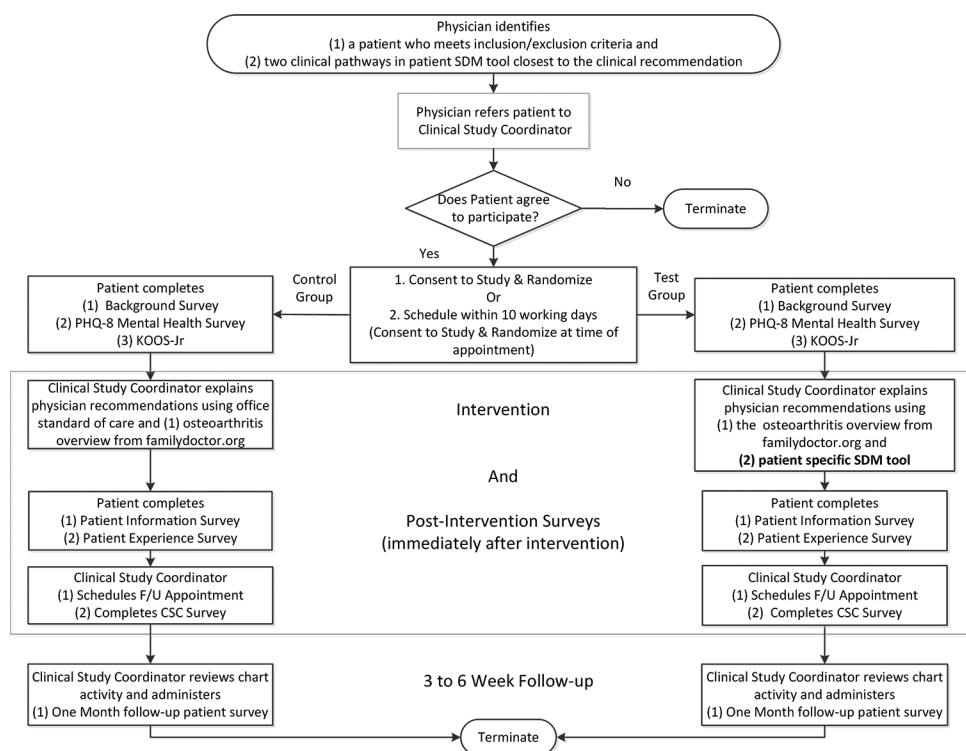


Figure 2: Diagram of the study design. CSC, clinical study coordinator; F/U, follow-up; KOOS JR, Knee Injury and Osteoarthritis Outcome Score for Joint Replacement; PHQ-8, Patient Health Questionnaire Depression Scale; SDM, shared decision-making

Table 1: Characteristics of 104 African American and Latina patients enrolled in shared decision-making user testing, by cohort

Characteristic	n (%)		P
	Control Group (n=52)	SDM Group (n=52)	
Age, years	54±5.9*	56±6.2*	0.14
African American	37 (71)	35 (67)	0.68
Latina	15 (29)	17 (33)	0.68
Diabetes	27 (52)	15 (29)	0.03
Hypertension	32 (62)	36 (69)	0.42
Depression [†]	28 (54)	22 (42)	0.24
Obesity [‡]	41 (79)	43 (83)	0.62
Educational level			
High school degree or less	22 (42)	24 (46)	0.74
Some college	19 (37)	14 (27)	
College degree	10 (19)	11 (21)	
Advanced degree	1 (2)	3 (6)	
Annual household income, [§]			
0	8 (15)	3 (6)	0.21
1-24,999	19 (37)	21 (40)	
25,000-50,000	15 (29)	13 (25)	
>50,000	5 (10)	8 (15)	
No answer	5 (10)	7 (13)	
Health insurance			
None	15 (29)	12 (23)	0.13
Private	25 (48)	21 (40)	
Medicare	5 (10)	6 (12)	
Medicaid	7 (14)	13 (25)	
Patient-reported pain [§]	6.4±2.2*	5.8±2.7*	0.21
Patient-reported activity	5.9±1.9*	5.9±1.8*	0.96
KOOS JR	42±14*	48±16*	0.08

KOOS JR, Knee Injury and Osteoarthritis Outcome Score for Joint Replacement; SDM, shared decision-making. *Presented as mean±standard deviation. [†]Measured using the Patient Health Questionnaire-8 Depression Scale. [‡]Body mass index >30 kg/m². [§]Measured using a 10-point scale, with 10 representing the worst possible pain. ^{||}Measured using a 10-point scale, with 10 representing the highest activity level.

analysis was performed and completed in 2021, adjusting for demographic variables that were significantly different between the two groups.

Results

Demographic analysis

The groups did not differ significantly in terms of demographic characteristics (all, $P > 0.05$; Table 1) except for a higher incidence of diabetes in the control group (52%) than in the SDM group (29%) ($P = 0.03$). Using analysis of variance, we adjusted for this difference in diabetes incidence and found that it did not influence statistical outcomes. Control and SDM groups were not significantly different in proportion of participants with BMI values >30, or the proportion of participants with hypertension (both, $P > 0.05$). Similarly, we found no significant differences at baseline between groups in self-reported knee pain, self-reported activity level, or KOOS JR (all, $P > 0.05$).

Qualitative outcomes: Participant perspectives

Participant experience

Most participants in both groups understood the information provided and believed that they better understood their knee arthritis and treatment options [Table 2]. No significant differences were found between groups in participants' ratings of their overall experience at intervention ($P = 0.53$) or at 1 month ($P = 0.85$) [Table 3]. Participant experience ratings within both groups decreased significantly over 1 month: the control group's mean experience rating declined from 9.6 to 8.5 ($P = 0.003$), and the SDM group's mean experience rating declined from 9.4 to 8.4 ($P = 0.002$) when comparing initial ratings to 1-month ratings. When asked to evaluate the information provided, both groups ranked the information positively [Table 4].

Qualitative highlights

Participants in both groups liked the personal attention they received and ranked the value of information about knee pain and the Patient Experience Survey questions highly (composite patient information survey score of 33/35 for both groups, and composite patient experience survey score of 57/60 for both groups) [Table 3]. When asked whether the tool was too complicated, 38 of 39 of the SDM group responded that it was easy to understand or "not complicated." Regarding the SDM tool, one participant responded that, "The survey helped me to understand the impact of choices we make in life affect our health. Leading a healthier life reduces stress, and keeping active is very helpful on your joints." Another participant stated that, "The loss of income was very valuable to know."

Likelihood of recommending physician

At the time of the intervention, both groups rated their likelihood of recommending their physician as high (98% of control group; 100% of SDM group; $P = 0.89$) [Table 3]. At 1-month follow-up, participant ratings were not significantly different between groups (100% of control group; 98% of the SDM group; $P = 0.77$). The participant experience regarding their doctor/nurse/physician assistant was highly positive for both groups [Table 5].

Behavior change

At 1 month, the proportion of participants who reported an increase in activity level was significantly higher in the SDM group (56%) than in the control group (33%) ($P = 0.0005$; Table 3). Although more of the SDM group started taking recommended medication for chronic knee pain (58%) than the control group (49%), this difference was not significant. There were no significant differences between the groups in talking to family ($P = 0.20$) or their healthcare provider ($P = 0.45$) about knee pain or in discussing comorbidities with their family ($P = 0.12$).

Table 2: Patient Information Survey Individual Questions

Item	Control Group, % (n=52)			SDM Group, % (n=52)		
	Agree/ Strongly Agree	Neither	Disagree/ Strongly Disagree	Agree/ Strongly Agree	Neither	Disagree/ Strongly Disagree
I understand the information given	98	0	2	100	0	0
The information helped me understand what is likely to happen with my knee arthritis over time	96	2	2	100	0	0
Based on this information, I am more likely to speak to my doctor about treatment options at my next visit	96	2	2	92	6	2
Based on this information, I understand the effect of obesity, diabetes, or hypertension on my knee arthritis	96	2	2	98	2	0
My treatment decisions will impact the progression of my knee arthritis	94	4	2	98	0	2
I understand the possibility of losing income due to my knee arthritis	94	2	4	90	6	4
I think you should continue to use this type of information with patients	98	0	2	100	0	0

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; PA, physician assistant; SDM, shared decision-making. *All participants did not answer all questions. The response rate decreased from 100% to 78% (by the last question) in the control cohort and from 100% to 89% (by the last question) in the SDM group.

Table 3: Patient-reported survey results from 104 respondents enrolled in the shared decision-making user testing, by cohort

Patient-Reported Data	Mean±SD		n (%)		P
	Control Group (n=52) [†]	SDM Group (n=52) [†]	Control Group (n=45) [†]	SDM Group (n=48) [†]	
Survey composite scores*					
Value of information about knee pain	33±4.3	33±2.8			0.94
Relevant HCAHPS questions	57±7.6	57±4.5			0.75
Follow-up survey at 1 month [†]	39±4.2	40±3.9			0.82
Participant experience ratings [‡]					
At intervention	9.6±1.0	9.4±0.9			0.53
At 1 month [†]	8.5±2.4	8.4±2.3			0.85
Likelihood of recommending physician [§]					
At intervention (n=52, both groups)			51 (98)	52 (100)	0.89
At 1 month [†]			45 (100)	47 (98)	0.77
Self-reported behaviors [†]					
Talked to family member			35 (78)	34 (71)	0.20
Discussed comorbidities with family			34 (76)	32 (67)	0.12
Started taking medication			22 (49)	28 (58)	0.15
Increased activity level at 1 month			15 (33)	27 (56)	0.0005
Talked to healthcare provider			16 (36)	19 (40)	0.45
Changed medication			4 (9)	5 (10)	0.49

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; SD, standard deviation; SDM, shared decision-making. *Survey composite scores are based on a 5-point scale, with 5 as the most positive score and 1 as the least positive score. The higher the score, the better the outcome. Survey 1 (value of information about knee pain) consisted of 7 ratings, for a possible 35 points. Survey 2 (relevant HCAHPS questions) consisted of 11 ratings for a possible 60 points. The 1-month follow-up survey consisted of 10 questions for a possible 50 points. [†]One-month follow-up data, including self-reported behaviors included 45 participants in the control group and 48 participants in the SDM group, except for "changed medication" which only included 44 participants in the control group. [‡]Measured using a 10-point scale, with 10 representing the best score.

Discussion

The knee osteoarthritis SDM tool is patient-centered, innovative, and interactive. The outcome of the tool is personalized, using the patient's age, sex, race, ethnicity, and comorbidities. It provides multiple options for treatment and determines the likely pain, function, and productivity outcomes—outputs that patients valued highly. With use of the SDM tool, a significantly greater proportion of participants reported increased physical activity levels compared with those in the control group, suggesting that the tool supports positive behavior change in African American and Latina women with knee pain. Qualitative feedback from the SDM group was overwhelmingly positive, indicating high

satisfaction with the tool. We believe that the likelihood to recommend their physician by both groups at 1 month reflects the influence of the time and attention given to each participant. SDM tools that have been developed for the treatment of early-stage osteoarthritis range from providing basic information and questions or questionnaires in print, video, computer tablet, or website^[18,25-27] to using computerized modeling.^[28,29] Dolan *et al.*^[28] reported consistently positive patient responses for the use of a computerized interactive clinical decision dashboard for treatment of osteoarthritis pain with nine analgesic options. Inclusion of the financial impact of a patient's treatment decisions may strengthen the effectiveness of a SDM tool.^[22]

Table 4: Patient 1-Month Follow-up Survey Individual Questions

The information that I received:	Control Group				SDM Group			
	n	Agree/Strongly Agree, %	Neither, %	Disagree/Strongly Disagree, %	n	Agree/Strongly Agree, %	Neither, %	Disagree/Strongly Disagree, %
helped me understand the likely outcome if I do nothing	45	98	2	0	48	96	2	2
helped me understand the impact of my health condition (which might be obesity, diabetes, or hypertension) on my knee pain	45	100	0	0	48	94	4	2
helped me decide to start walking more	45	91	4	4	48	94	6	0
helped me decide to start eating healthier foods	45	91	4	4	48	92	8	0
helped me understand how my treatment decisions will impact my knee pain and activity levels	45	98	2	0	48	96	2	2
helped me understand that my treatment decisions will impact my ability to earn a living	44	82	9	9	47	87	11	2
helped me develop questions for my doctor at my next visit	44	84	11	5	47	81	19	0
made me feel more like I can have a positive impact on my health	45	98	2	0	48	98	0	2
didn't help me very much (question was reversed)	44	9	5	86	46	7	2	91
was too complicated (question was reversed)	41	7	7	85	46	11	0	89

Table 5: Patient Experience Survey Individual Questions (Modified HCAHPS)

Item	Control Group				SDM Group			
	n	Agree/Strongly Agree, %	Neither, %	Disagree/Strongly Disagree, %	n	Agree/Strongly Agree, %	Neither, %	Disagree/Strongly Disagree, %
The doctor/nurse/PA I saw was helpful	52	98	0	2	52	100	0	0
The doctor/nurse/PA I saw was respectful and treated me with dignity	52	98	0	2	52	100	0	0
The doctor/nurse/PA was knowledgeable about and understood my health condition or problem	52	98	0	2	52	100	0	0
The doctor/nurse/PA was clear and easy to understand	52	98	0	2	52	100	0	0
The doctor/nurse/PA involved me in decisions about my treatment	52	96	0	4	52	100	0	0
I was given a full explanation in clear language about what caused my condition or problem	52	98	0	2	52	100	0	0
I was given full explanation in clear language about how to manage my condition or problem	52	98	0	2	52	100	0	0
I was given a full explanation in clear language about the benefits and side effects or complications and risks of treatment	52	98	0	2	52	100	0	0
I was given the opportunity to ask questions	52	98	0	2	52	100	0	0
I was given the opportunity to discuss problems in my life	52	90	8	2	52	92	8	0
I was given reassurance about my condition	52	92	6	2	52	92	6	2
I was given advice about my health or condition	49	96	2	2	51	98	2	0

HCAHPS, Hospital Consumer Assessment of Healthcare Providers and Systems; PA, physician assistant; SDM, shared decision-making. *Not all participants answered all questions

Based on the results of the user-testing, the knee osteoarthritis SDM tool provides a framework for discussion of treatment options and likely outcomes. This may result in better patient compliance for the treatment option selected. For example, we observed increases in patient self-reported physical activity level when the tool was used.

The knee osteoarthritis SDM tool provides additional perspective to each patient and their healthcare provider by presenting the likely outcomes of treatment decisions in terms of both personal (i.e., symptoms and function) and economic impact. The SDM tool is an innovative translation of complex health economic modeling.^[21] With minimal explanation, patients were able to understand projected outcomes of their healthcare choices. An interactive SDM tool such as this would enable the individualized treatment for patients with knee osteoarthritis that is recommended by leading professional groups.^[7,8,28,30-34]

SDM tools have the potential to reduce healthcare disparities related to race and ethnicity during the clinical encounter by providing a framework for discussion.^[35] In a systematic review of 18 articles regarding the use of decision aids in minority populations,^[35] decision aids, especially those that were culturally tailored, improved communication, decision quality, and outcomes (i.e., clinical decision behaviors). We received positive feedback from the Latina and African American women in our study on the utility of the tool, likely reflecting the ability of the tool to incorporate personalization with respect to patient characteristics, including age, gender, race, and comorbidities.

The strengths of the study include the use of a SDM tool that can be personalized to the patient's age, race/ethnicity, number of comorbidities, pain, activity level, educational level, and insurance carrier. It is able to illustrate the impact of up to three treatments (including no treatment) on knee pain, activity level, and the financial impact of decreased productivity. This study was also conducted in a patient population that has been increasingly recognized to have concerns with communication and trust with healthcare providers and has the potential to increase patient engagement in their musculoskeletal care and to increase satisfaction.

This study has several limitations. Ceiling effects were observed for satisfaction and likelihood of recommending the physician. A larger sample size and longer-term follow-up to determine sustainability of behavior changes are needed in future studies. Because we followed participants for only 1 month, we could not assess objective changes in pain, weight loss, function, or productivity. The clinic visit for the control group may not be representative of routine medical practice, given that time constraints during clinic visits often result in simply providing the patient with general, printed information on knee osteoarthritis without further discussion. In our study, CSCs implemented the tool and led the SDM discussion; the results may be different when used by health care providers in different settings. As our study included African American and Latina women aged 45 to

65 years with chronic knee pain and at least one comorbidity of obesity, hypertension, and/or diabetes, the results may not reflect the experience of other patient populations. Our study targeted this group that is traditionally difficult to reach to determine effectiveness; however, the tool has been developed for the general population. The tool includes race, gender, ethnicity, and some comorbidities as factors that impact likely outcomes.

In summary, various nonoperative treatments are recommended to patients to treat mild to moderate knee pain indicative of early-stage osteoarthritis. Effectiveness of these measures is influenced by how early the patient is in the disease process and the level of patient compliance with their treatment regimen. We propose that an effective SDM tool incorporates individual patient characteristics and the projected outcomes of different treatment options. A tool that helps patients envision their likely future outcomes may motivate them to change behaviors that promote health. The personalized knee osteoarthritis SDM tool includes input of specific patient characteristics to predict knee pain, activity level, and financial impact of decreased productivity for various strategies for nonoperative treatment, including doing nothing. The SDM tool was useful as a guide for conversation with patients about their treatment and the effect their treatment may have on outcomes that are important to them. The results of this study support the use of this SDM tool to encourage patients to engage in healthy behaviors, particularly increased levels of physical activity, which may ultimately delay the onset and progression of knee osteoarthritis.

In conclusion, our innovative SDM tool proved effective in increasing patient self-reported levels of physical activity. The ability to create a personalized patient profile linked to likely outcomes may engage patients more effectively than generic SDM tools and combat health disparities. Further research is needed to understand the impact of personalizing SDM tools on effectiveness of desired outcomes.

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Conflicts of interest

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