Improving Informed Decision-Making for Patients with Knee Pain

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ABSTRACT. ***Objective.*** Studies have shown that patients with knee pain are not well informed of their potential treatment options and that patient preferences are often discordant with physician practices. The objective of this pilot study was to test the efficacy of a computer tool to improve informed decision-making for patients with knee pain in an outpatient primary care clinic setting.

Methods. Patients with knee pain were randomized to receive an information pamphlet or to perform a computer task. The latter was designed to elicit preferences based on patient tradeoffs for route of administration, benefits, and side effects of commonly used treatment options for knee pain. After performing the task, participants were given a printed handout illustrating their preferences.

Results. In total, 87 patients were randomized. Decisional self-efficacy, preparedness to participate in decision-making, and arthritis self-efficacy were greater in participants randomized to the intervention arm compared to those receiving the information pamphlet ($p < 0.05$ for all comparisons).

Conclusion. Participants using a tool designed to increase patient awareness of choice and evaluate the tradeoffs related to available treatment options were more confident in their ability to obtain information about available treatment options, were better prepared to participate in their visit, and had better arthritis related self-efficacy compared to patients receiving an information pamphlet. The results of this pilot study justify future large-scale trials to determine the effectiveness of similar interventions. (First Release August 1 2007; J Rheumatol 2007;34:1894–8)

Key Indexing Terms:
DECISION-MAKING PATIENTS KNEE PAIN COMPUTER-ASSISTED INSTRUCTION

Knee pain is responsible for more than 7 million physician visits per year in the US, and is the leading cause of lower extremity disability in the geriatric population[1]. Treatment for most patients with knee pain is aimed at reducing symptoms and maintaining or improving function. Multiple therapeutic options are available. All have modest efficacy in decreasing the pain, but differ significantly with respect to their risk of toxicity and cost. Joint replacement surgery is generally reserved for patients who are refractory to medical management.

Studies have demonstrated that many patients with knee pain are not adequately informed about the side-effects related to their current medications[2,3], and that, after explicit consideration of the benefits and side-effects of different treatment options, patient preferences for treatment of knee pain frequently conflict with physician practices[4,5]. Given this background, we sought to develop an intervention to improve informed decision-making in the clinical practice setting. We chose to base this intervention on Adaptive Conjoint Analysis (ACA), an interactive computer tool that has a strong theoretical basis, obtains high levels of internal consistency, and is able to generate immediate respondent-specific feedback[6-8].

MATERIALS AND METHODS

Study design. The design of this pilot study was a single-site, nonblinded, randomized controlled trial. The study took place in the Veterans Affairs Connecticut Healthcare System primary care outpatient clinics. A research assistant recruited participants by approaching patients waiting in the primary care waiting room area. She described the study, determined eligibility among those interested in participating, and obtained written consent. Consenting participants were then immediately randomized to receive an Arthritis Foundation (AF) information pamphlet (control group) or to perform an ACA task (intervention group) before seeing their physician. Baseline data were collected using paper and pencil questionnaires in face to face interviews. Outcomes were collected immediately following the visit using self-administered questionnaires. Pre-intervention measures were not administered due to time constraints.

Eligibility criteria. Eligibility criteria included age at least 60 years old, self-report of pain involving one or both knees on most days of the month, the ability to read and understand English, and the ability to perform a choice task. This task asked the participant to examine 3 hypothetical treatment options and to choose the one they would prefer. The options were described such that one was objectively preferable because it maximized benefit while minimizing risk. Use of a choice task was chosen to identify patients who do

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not have the cognitive skills required to perform an ACA task without the risk of upsetting patients with formal mental status questionnaires.

Patients were excluded if they were judged to be too ill to participate as determined by the medical staff, were scheduled for an urgent visit, had a disease other than osteoarthritis (OA) that causes knee pain (inflammatory arthritis, Paget's disease, cancer, hyperparathyroidism), or had relative or absolute contraindications to one or more of the proposed treatment options (i.e., on warfarin or heparin, renal disease, heart or other disease requiring limitation of physical activity). These criteria were ascertained by self-report.

Randomization and intervention. Randomization was performed at the level of the individual patient by a computer-generated randomization sequence. Patients randomized to the control arm received an AF information pamphlet on OA ("Living with Osteoarthritis"). The AF pamphlet consisted of a 2-page printed handout highlighting the definition, risk factors, and symptoms and treatment of OA. Patients randomized to the intervention performed an ACA task (ACA Web System Version 3.5, Sawtooth Software Inc., Seattle, WA, USA) and received a handout illustrating their treatment preferences (see Figure 3).

ACA is an interactive computer survey that enables patients to construct their treatment preferences by asking them to make tradeoffs between competing treatment characteristics in a series of rating tasks. Preferences are predicted based on tradeoffs between specific treatment characteristics, and not the treatments themselves. Therefore, bias due to product recognition, brand preferences, or previous experience with any particular treatment is minimized.

The treatment characteristics included in the ACA task were route of administration (pills, cream, injection, exercise), likelihood of expected benefit (decrease in pain and improvement in strength and endurance), and risk of adverse effects (dyspepsia and ulcer). All characteristics were described using lay terminology. Risk information was obtained from randomized controlled trials[9] and presented using natural frequencies and pictographs to facilitate communication of probabilistic data[10,11].

The ACA task included 3 sets of questions. In the first, respondents were asked to rank different routes of administration. In the second, participants rated the importance of the difference between the best and worst alternative for each treatment characteristic. For example, assuming a respondent felt that "cream" was the most favorable route of administration and "injection" the least favorable, he would be presented with the rating task presented in Figure 1. In the third series of questions (see Figure 2), respondents were asked to rate a series of paired-comparisons. Participants were subsequently given a handout illustrating the relative influence of each characteristic on their treatment preferences and a scale showing the relative ranking of the options (see examples, Figure 3).

The relative influences reflect the extent to which each characteristic drives the decision to choose a treatment alternative. ACA automatically calculates the relative influences by dividing the range of utilities for each characteristic by the sum of ranges and multiplying by 100. The relative influences sum to 100.

The relative treatment preferences were demonstrated on a scale ranging from 0 (worst choice) to 100 (best choice). We used ACA to predict patients' preferences for capsaicin, acetaminophen, antiinflammatory drugs, intraarticular injections, exercise, and a combination of exercise and medications. ACA predicts preferences based on the utilities derived from the conjoint questionnaire using least-squares regression analysis. Details on how ACA predicts treatment preferences are available at http://www.sawtoothsoftware.com/download/techpap/acatech.pdf. The research assistant explained the output to participants and explained that they could use the graph to talk to their doctor about treatment options for their knee pain.

Data collection. Independent variables were collected in face to face interviews and included sociodemographic characteristics (age, ethnicity, maximum level of education attained, and marital status) and clinical factors (level of knee pain with walking[12], global health status[13], and history of peptic ulcer disease[14]). All characteristics were ascertained by self-report.

Outcomes were collected using self-administered paper and pencil questionnaires. Self-confidence in one's abilities to participate in shared decision-making was measured using the Decisional Self-Efficacy Scale, an 11-item instrument in which each response is coded on a 3-point scale ranging from "A lot confident" to "Not confident." Psychometric properties of this measure include: Cronbach's alpha = 0.86, and scale discriminates between those who make and delay decisions about schizophrenia; correlates with: decisional conflict (r = 0.55), particularly with subscales of feeling informed and supported, and knowledge (r = 0.61)[15,16]. Sample items include: "I feel confident

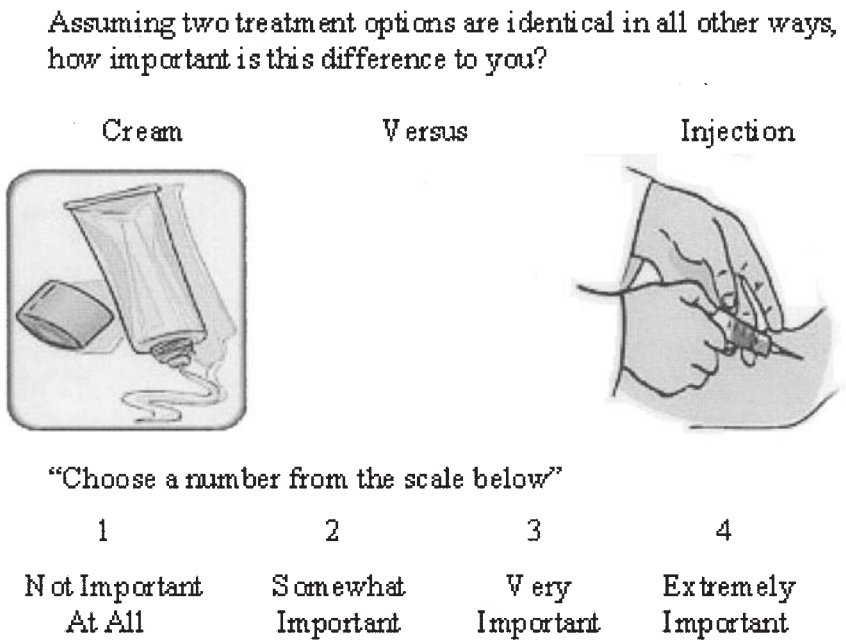


Figure 1. Example of a question rating the importance of route of administration.

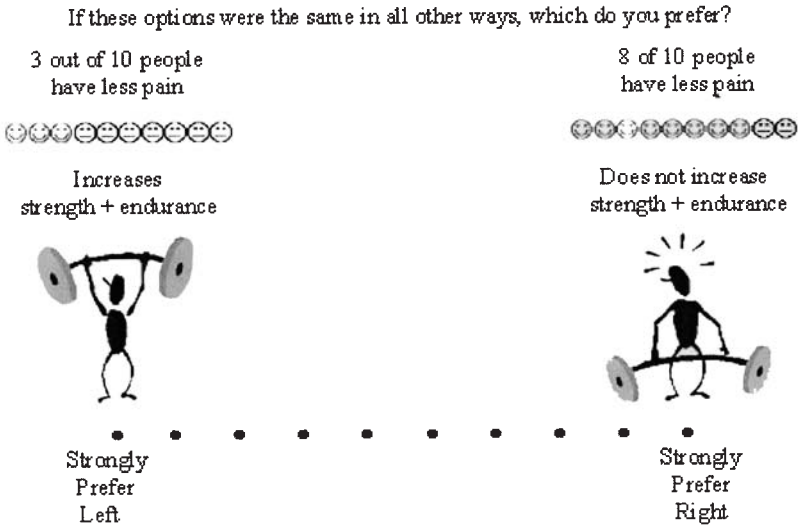


Figure 2. Example of a paired-comparison question.

that I can — Get the facts about the medication choices, — Understand the information enough to be able to make a choice, — Delay my decision if I feel I need more time."

Patients' perception of the usefulness of the intervention in preparing them to communicate with their physician was evaluated using the 11-item Preparation for Decision-Making Tool[17]. Responses for this instrument are coded on a 5-point scale ranging from "Not at all" to "A great deal." Psychometric properties of this measure include: Cronbach's alpha = 0.92 and scale discriminates significantly between different decision support interventions[17]. Sample items include: "How much did the study materials: — Help you to come up with questions you wanted to ask your doctor? — Prepare you for the visit with your doctor? — Help you to make a better decision?"

Arthritis self-efficacy was measured using the Arthritis Self-Efficacy Scale[18]. Acceptability of the ACA task was assessed by asking respondents to rate level of difficulty of the task (4-point scale ranging from "very easy to do" to "very hard to do"), whether or not they would recommend the ACA task for other patients with knee pain (yes/no), and whether or not they felt the ACA bar graph reflected their values (4-point scale ranging from "very much" to "not at all").

Analysis. We described baseline demographic data by treatment group using descriptive statistics. Because the distributions of the outcomes were skewed, we utilized the median to present outcomes by treatment group. We used the Wilcoxon 2-sample test to determine whether the observed differences in outcomes were statistically significant. Adjustments were not made for multiple comparisons. We then utilized general linear models and logistic regression to test for the significance of differences in continuous and dichotomous outcomes by treatment group, respectively, while controlling for differences in baseline characteristics. Power calculations were not performed, as this pilot trial was originally designed as a planning study for a large-scale trial. This study was approved by the Human Investigations Committee at our institution.

RESULTS

Participant characteristics. One hundred ten patients were eligible to participate. Of these, 8 failed the choice task and 15 refused to participate, leaving 87 patients to be randomized. Forty patients were randomized to receive the AF pamphlet and 47 to perform the ACA task. Data are available for all 40 control patients and for 44 of the 47 patients randomized to perform the ACA task. In 3 cases, patients performing the ACA task were called to see their physician before the intervention could be completed. Baseline characteristics of study participants by group assignment are presented in Table 1.

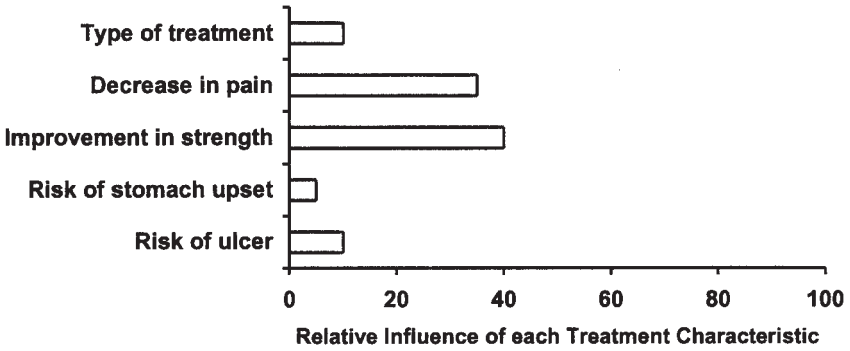
Outcomes by treatment group. The median outcomes according to treatment group assignment are presented in Table 2.

Decisional self-efficacy (standardized ß = 0.4, p = 0.0004) and preparedness to participate in decision-making (standardized ß = 0.6, p = 0.0001) remained significantly higher in the intervention group after controlling for race and health status. Arthritis self-efficacy (p = 0.05) was of borderline significance (standardized ß = 0.2, p = 0.05) in this multivariate model. Outcomes by age and education (Table 3) suggest that older adults may be among those most likely to benefit. Formal hypothesis testing was not performed given the sample size.

Acceptability of the ACA task. Seventy-four percent of respondents randomized to perform the ACA task felt that the ACA task was "very easy" to do, 24% felt the task was "easy" to do, and 2% thought the task was "very hard" to do. Eighty-six percent would recommend the ACA task for other patients with knee pain. Sixty-eight percent felt that the bar graph "very much" reflected their values, 27% felt that the bar graph "somewhat" reflected their values, while the remaining 5% were equally divided between feeling that the graph reflected their values only "a little" or "not at all."

DISCUSSION

Previous studies demonstrating that many older adults are not adequately informed about the side effects of their medications, and that widespread treatment practices often conflict with patient preferences, have led to the recognition that new approaches are needed to improve informed decision-making[5,19-21]. In this pilot study, we developed an intervention to



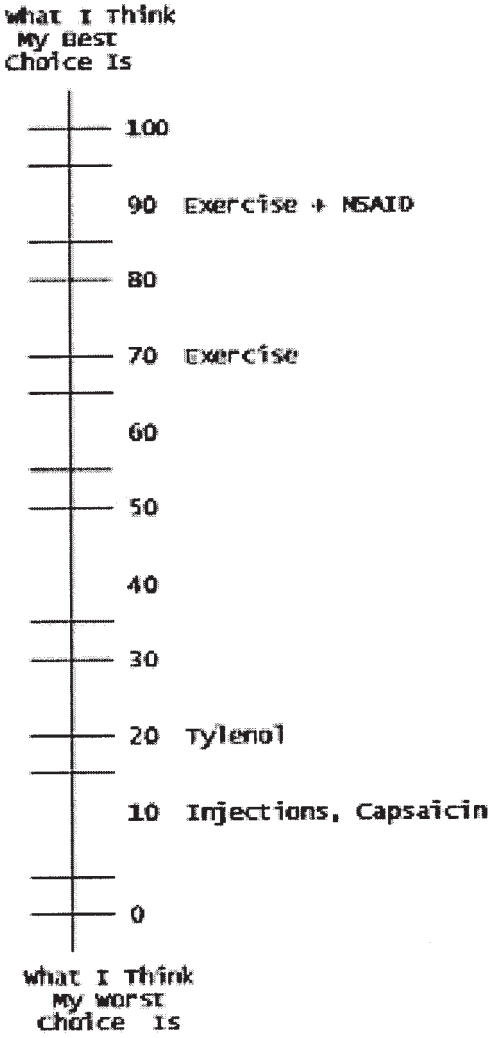


Figure 3. Example of handout illustrating a hypothetical respondent's preferences.

enable patients to evaluate the tradeoffs related to competing treatment options. Patients randomized to perform this intervention had greater self-confidence in their abilities to participate in shared decision-making, felt more prepared to participate in decision-making, and had greater arthritis self-efficacy compared to the control group.

Table 1. Baseline characteristics.

Characteristic	Arthritis Foundation Pamphlet, N = 40	ACA Task, n = 43
Age, yrs, mean ± SD	74 ± 9	74 ± 7
Caucasian, n (%)	26 (65)	31 (72)
African American, n (%)	12 (30)	9 (21)
College graduate, n (%)	8 (20)	8 (19)
Married, n (%)	20 (50)	21 (49)
Knee pain*, median (range)	2 (1–4)	2 (1–4)
Peptic ulcer disease, n (%)	7 (18)	7 (16)
Excellent/very good health status, n (%)	13 (33)	16 (37)

* Measured on 4-point Likert scale: 0 = no pain, 4 = extreme pain. ACA: Adaptive Conjoint Analysis.

Table 2. Median outcome by treatment group.

Outcome (possible range)	Arthritis Foundation Pamphlet	ACA Task	p
Decisional self-efficacy (0–44)	27	32	0.001
Preparedness to participate (9–45)	20.5	35	0.0001
Arthritis self-efficacy (4–40)	21.5	26	0.02

ACA: Adaptive Conjoint Analysis.

Our pilot study highlights several points that need to be addressed in future larger-scale trials. The study was not blinded, and although most patients completed the outcome questionnaires independently, replication of the results should be sought in future blinded studies. In addition, the study was performed at a single site serving primarily men. Future studies are needed to determine more widespread generalizability of our results. Unlike many studies of decision-support tools, however, the majority of participants in this study were older and less well educated. Our results add to the literature supporting the use of decision-support systems in these sociodemographic groups[22]. The randomization process did not result in equal distribution of baseline characteristics across both groups, most probably because of an inadequate sample size. We did not include cost as an attribute, since out-of-pocket costs are restricted within the VA Healthcare System. In addi-

Table 3. Median outcome by age and education.

Characteristic	Decisional Self-efficacy		Preparedness to Participate		Arthritis Self-efficacy	
	AF Pamphlet	ACA Task	AF Pamphlet	ACA Task	AF Pamphlet	ACA Task
Age, yrs						
≥ 75	24 (n = 12)	32 (n = 12)	19 (n = 12)	43 (n = 12)	23 (n = 12)	29 (n = 12)
< 75	30 (n = 28)	30 (n = 31)	24 (n = 28)	34 (n = 31)	21 (n = 28)	25 (n = 31)
College graduate						
No	26 (n = 32)	31 (n = 35)	21 (n = 32)	35 (n = 35)	23 (n = 32)	26 (n = 35)
Yes	30 (n = 8)	32 (n = 8)	20 (n = 8)	35 (n = 8)	21 (n = 8)	28 (n = 8)

ACA: Adaptive Conjoint Analysis; AF: Arthritis Foundation.

tion, although the majority of participants felt that the ACA output strongly reflected their values, one-third of the participants stated that the bar graph only "somewhat reflected their values." Future qualitative or debriefing interviews are needed to help further refine the ACA survey.

Current practice is frequently not concordant with patient preferences for treatment of knee pain, the primary cause of disability among older adults. Our study demonstrated the promise of an approach to address this discrepancy. We found that participants using an interactive computer tool designed to increase patient awareness of choice and evaluate the trade-offs related to available treatment options were more confident and better prepared to participate in their visit, and had better self-efficacy. If replicated in larger blinded studies, interventions such as this should increase patient knowledge, ensure that decisions are based on accurate perceptions of possible risks and expected benefits, and increase concordance between patients' informed preferences and prescribed treatment plans.

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