

Effect of patient decision aid was influenced by presurgical evaluation among patients with osteoarthritis of the knee

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Accepted July 17, 2017; Published online
 Dec. 1, 2017

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DOI: 10.1503/cjs.003316

Background: Decision aids help patients make total joint arthroplasty decisions, but presurgical evaluation might influence the effects of a decision aid. We compared the effects of a decision aid among patients considering total knee arthroplasty at 2 surgical screening clinics with different evaluation processes.

Methods: We performed a subgroup analysis of a randomized controlled trial. Patients were recruited from 2 surgical screening clinics: an academic clinic providing 20-minute physician consultations and a community clinic providing 45-minute physiotherapist/nurse consultations with education. We compared the effects of decision quality, decisional conflict and surgery rate using Cochran–Mantel–Haenszel χ^2 tests and the Breslow–Day test.

Results: We evaluated 242 patients: 123 from the academic clinic (61 who used the decision aid and 62 controls) and 119 from the community clinic (59 who used the decision aid and 60 controls). Results suggested a between-site difference in the effect of the decision aid on the patients' decision quality ($p = 0.09$): at the academic site, patients who used the decision aid were more likely to make better-quality decisions than controls (54% v. 35%, $p = 0.044$), but not at the community site (47% v. 51%, $p = 0.71$). Fewer patients who used decision aids at the academic site than at the community site experienced decisional conflict ($p = 0.007$) (33% v. 52%, $p = 0.05$ at the academic site and 40% v. 24%, $p = 0.08$ at the community site). The effect of the decision aid on surgery rates did not differ between sites ($p = 0.65$).

Conclusion: The decision aid had a greater effect at the academic site than at the community site, which provided longer consultations with more verbal education. Hence, decision aids might be of greater value when more extensive total knee arthroplasty presurgical assessment and counselling are either impractical or unavailable.

Contexte : Les aides à la décision guident les patients dans leurs choix quant à l'arthroplastie par prothèse totale, mais l'évaluation préopératoire pourrait modifier leur influence. Nous avons comparé cette influence chez les patients qui envisagent une arthroplastie totale du genou dans 2 cliniques de dépistage chirurgical ayant des processus d'évaluation différents.

Méthodes : Nous avons effectué une analyse par sous-groupes d'un essai clinique randomisé. Les patients ont été recrutés dans 2 cliniques de dépistage chirurgical : une clinique universitaire offrant des consultations de 20 minutes avec un médecin et une clinique communautaire offrant des consultations de 45 minutes avec un physiothérapeute ou une infirmière et de l'enseignement. Nous avons comparé l'influence sur la qualité des décisions, les conflits décisionnels et le taux d'intervention chirurgicale à l'aide des tests de Cochran–Mantel–Haenszel (χ^2) et du test de Breslow–Day.

Résultats : Nous avons évalué 242 patients : 123 de la clinique universitaire (61 qui ont utilisé l'outil et 62 témoins) et 119 de la clinique communautaire (59 qui ont utilisé l'outil et 60 témoins). Les résultats semblaient indiquer une différence entre les sites quant à l'influence de l'aide sur la qualité des décisions des patients ($p = 0,09$) : au site universitaire, les patients qui l'ont utilisée étaient plus susceptibles de prendre des décisions de qualité que les témoins (54 % c. 35 %, $p = 0,044$), mais ce n'était pas le cas au site communautaire (47 % c. 51 %, $p = 0,71$). Moins de patients qui ont utilisé les aides à la décision au site universitaire qu'au site communautaire avaient vécu un conflit décisionnel ($p = 0,007$) (33 % c. 52 %, $p = 0,05$ au site universitaire; 40 % c. 24 %, $p = 0,08$ au site communautaire). L'influence de l'outil sur les taux d'intervention chirurgicale était la même aux 2 sites ($p = 0,65$).

Conclusion : L'aide à la décision a eu un plus grand effet au site universitaire qu'au site communautaire, qui offrait de plus longues consultations et plus d'enseignement verbal. Ce type d'outil aurait donc plus de valeur dans les cas où il est difficile ou impossible d'offrir une évaluation préopératoire détaillée et des conseils approfondis pour l'arthroplastie totale du genou.

In Canada, patients considering total knee arthroplasty (TKA) have traditionally been referred from primary care directly to an orthopedic surgeon, causing unequal referral distribution and variation in wait times among surgeons.¹ Centralized osteoarthritis (OA) surgical screening clinics were established to improve timely assessment and promote appropriate surgical referrals.^{1,2} Health care professionals assess patients to determine their surgical candidacy, with candidates referred to an orthopedic surgeon and others returned to primary care for conservative management.³

Achieving patient-centred care and positive patient experiences requires that decisions are based on informed patients' preferences.⁴ Decision aids are evidence-based clinical tools that help patients reach informed preferences. They provide patient-friendly information about the options, including their benefits and harms, and guide patients in the decision-making process.⁵⁻⁷ In Canada and the United States, randomized controlled trials (RCTs) evaluating decision aids for patients considering TKA showed that patients who used decision aids were more knowledgeable, had more realistic expectations, achieved better decision quality (i.e., extent that informed decisions were consistent with patient preferences), were more prepared for the surgical consultation, and had reduced decisional conflict (i.e., uncertainty about the best treatment option).⁷⁻⁹ Orthopedic surgeons also reported improved satisfaction and consultation efficiency when their patients were exposed to a decision aid.⁹ A Canadian trial showed that decision aids resulted in lower costs and more quality-adjusted life years for patients considering total joint arthroplasty.¹⁰

In a larger study, we evaluated a decision aid in 2 clinics using different presurgical evaluation approaches for total joint arthroplasty.⁷ At the academic clinic, most patients were scheduled for a 15- to 20-minute presurgical assessment with a sports medicine physician or advanced practice physiotherapist (Table 1). At the community clinic, patients were scheduled for a 45-minute presurgical assessment with an advanced practice physiotherapist or nurse practitioner. Despite exposure to the same decision aid, we noted discrepancies in findings between the 2 sites, suggesting that the presurgical evaluation influenced the outcomes. With ongoing efforts to implement decision aids in surgical pathways, more knowledge is needed to better understand the circumstances that optimize the use of decision aids.^{11,12} Therefore, in the present study we compared findings between patients exposed to a TKA decision aid and controls at 2 different surgical screening clinics.

METHODS

Design

We conducted a subgroup analysis of a larger prospective 2-site RCT designed to examine the effectiveness of a decision aid compared with standard education for patients considering hip and knee total joint arthroplasty.⁷ Our methods are described briefly here, with additional details published elsewhere.⁷ Research ethics board approval was obtained at each participating hospital.

Participants and setting

Participants were recruited at 2 OA surgical screening clinics in Eastern Ontario, Canada: an academic teaching hospital and a community hospital. In the original RCT, allocations were stratified by site and type of joint needing surgery (i.e., hip or knee). Our subgroup analysis eliminated the hip joint strata owing to the small number of patients undergoing hip surgery at one of the sites. Eligible patients had moderate to severe knee OA. We excluded patients who had inflammatory arthritis, had previous total joint arthroplasty surgical consultation, were unable to read or understand English, or did not have access to a television with a VCR/DVD player to view the decision aid.

At both sites, patients were assessed for surgical candidacy using the 7-item Western Canada Wait List Hip Knee Priority Tool mapped onto 3 guideline criteria indicating those appropriate for TKA (moderate to severe pain, moderate to severe functional limitations, abnormal radiographic findings).¹³ Surgical candidates were then scheduled for a consultation with 1 of 7 surgeons at the academic site or 1 of 6 surgeons at the community site.

Intervention

Intervention groups were given a decision aid entitled, "Treatment choices for knee OA," which included a video and booklet (Health Dialog, USA). Patients were instructed to take the decision aid home, review it, and complete study questionnaires to assess their knowledge, values, preferred treatment choice and decisional conflict. These findings, combined with the patients' clinical data, were summarized in a 1-page report and sent to the surgeon.^{5,8}

All patients (control and intervention) received clinic-specific written information about the prerehabilitation

program and TKA. For the control group participants, surgeons were given a half-page summary of patients' clinical findings (i.e., Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC] and Hip-Knee Priority Tool scores).

Outcome measures

We evaluated the quality of the decisions, decisional conflict, surgery rates and wait times. Quality of the decision was measured as a knowledge test score greater than 66% and whether the patient's predicted probability of having surgery matched their actual choice.^{5,7} The predicted probability of surgery was calculated using a logistic regression equation derived from items that assessed the patient's values from the validated Hip and Knee Decision Quality Instrument.¹⁴ We screened for decisional conflict using the validated 4-item SURE test.¹⁵ Patients who answered "no" to any SURE test item were experiencing decisional conflict. Wait times were calculated as the number of days from the patient's presurgical screening to the date he/she implemented the OA management decision (i.e., surgery date, date of decision to decline surgery).

Statistical analysis

All data were analyzed using SAS software version 9.3. We analyzed wait times using Cox proportional hazards regression with group, site and group × site interaction as independent variables. We compared other outcomes using Cochran–Mantel–Haenszel χ^2 tests with the Breslow–Day test for examining heterogeneity across sites. Differences within and between sites were estimated using relative risk (RR) with 95% confidence intervals (CIs). Tests were conducted at the 2-sided 5% level of significance.

RESULTS

Between May 2008 and October 2009, 242 patients with knee OA were recruited. In this subgroup analysis, 123 were from the academic site (61 who used the decision aid and 62 controls) and 119 were from the community site

(59 who used the decision aid and 60 controls). There were no clinically important baseline differences between the decision aid and control groups based on demographic characteristics or OA severity (Table 2).

There was a suggestion of a difference between sites for decision quality (Breslow–Day between sites $p = 0.09$). At the academic clinic, a significantly higher number of patients in the decision aid arm than the control arm achieved an informed decision based on patient preferences (i.e., decision quality; 54% v. 35%, RR 1.53, 95% CI 1.00–2.33, $p = 0.044$; Table 3). At the community clinic, there were no significant differences in decision quality between the decision aid and control arms (47% v. 51%, RR 0.93, 95% CI 0.64–1.86, $p = 0.71$)

There was a significant difference in the effect of the decision aid on decisional conflict between the academic and community sites within 2 weeks ($p = 0.007$) but not at 6 months ($p = 0.19$). At the academic clinic, fewer patients who used the decision aid than controls experienced decisional conflict at 2 weeks (33% v. 52%, RR 0.62, 95% CI 0.42–1.00, $p = 0.05$), whereas at the community clinic, more patients who used the decision aid than controls experienced decisional conflict (40% v. 24%, RR 1.68, 95% CI 0.95–2.96, $p = 0.08$). At the 6-month follow-up, there was no significant difference in the proportions of participants in the decision aid and control arms who were still experiencing decisional conflict at the academic clinic (13% v. 23%, RR 0.57, 95% CI 0.23–1.44, $p = 0.24$) or at the community clinic (18% v. 13%, RR 1.38, 95% CI 0.53–3.59, $p = 0.50$).

At 2 years, there was no significant difference in the effect of the decision aid on surgery rates between the academic and community sites ($p = 0.65$). Patients exposed to the decision aid at both sites had lower surgery rates than controls; at the academic site, 73% of patients who used the decision aid had surgery compared with 86% of controls, whereas at the community site, 68% of patients who used the decision aid had surgery compared with 78% of controls. Overall, intervention patients were 14% less likely to have surgery than controls (RR 0.86, 95% CI 0.75–1.00; $p = 0.043$).

The effect of the decision aid on wait times did not differ significantly between the academic and community sites ($p = 0.41$). Overall, the decision aid had no statistically

Table 1. Characteristics of the academic and community presurgical screening clinics

Characteristic	Academic site	Community site
Setting	Academic tertiary care hospital	Community hospital
Patient volume (2008)	800	850
Population served	1.2 million people across Eastern Ontario	More than 400 000 in a city in Ontario
No. of surgeons	7	6
Trained assessor	Sports medicine physician primarily; occasionally advanced practice physiotherapist	Advanced practice physiotherapist and nurse practitioner
Appointment duration	15–20 min	45–60 min
Assessment	Clinical, functional and radiological findings	Clinical, functional and radiological findings
Usual care	Basic counselling, verbal presentation of options, and written information about surgical procedure	Extensive counselling, recommendation from health care professional, and written information about the recommended approach

significant effect on wait times ($p = 0.53$). The median time from referral to removal from the wait list (i.e., date of surgery or date of decision to decline the surgery) at the academic site was 194 days for patients who used the decision aid compared with 195 days for controls ($p = 0.47$). At the community clinic, the median wait time was 110 days for patients who used the decision aid compared with 116 days for controls ($p = 0.23$).

DISCUSSION

We compared decision aid findings for patients considering TKA at 2 centralized surgical screening clinics with different presurgical evaluation processes. We found that the presurgical evaluation influenced the quality of the decision and decisional conflict in patients who received the decision aid. The decision aid reduced the uptake of surgery at both sites and did not impact wait times at either site.

Patients at the academic site who were exposed to the decision aid were 53% more likely to achieve a quality decision than controls, but there was no difference in quality of decisions between the decision aid and control groups at the community site. Additionally, patients who used the decision aid reported less decisional conflict than controls at the academic site, whereas there was no significant difference between the decision aid and control group participants' decisional conflict at the community site. One potential explanation for these findings is that patients

treated at the community site were already highly engaged in the decision-making process (i.e., longer visits with additional verbal counselling), yielding limited additional benefit from the decision aid. Additionally, there was a difference in how patients were counselled during the presurgical evaluation, which might have influenced decision aid findings. We noted that counselling at the community site often included a treatment recommendation, whereas the consultation at the academic site was less directive. In contrast, decision aids engage patients by informing them about options, weighing the risks and benefits, and clarifying their preference. As such, the control group at the community site might have been aware of fewer treatment options. Thus, it was not surprising that decisional conflict increased immediately after patients became informed of the options and subsequently resolved after discussing their preferred option with the surgeon.^{16,17} Our results showed that decisional conflict decreased for all groups after patients had consulted with their surgeon.

We found that patients given the decision aid were less likely to choose surgery than controls. Decision aids have been shown to moderate unwarranted practice variation by preventing the overuse of options that informed patients do not value, such as invasive elective surgery over more conservative management.^{5,18,19} A recent RCT found a nonsignificant reduction in the proportion of patients choosing hip or knee arthroplasty after learning about other options described in a decision aid.⁹ As the

Table 2. Characteristics of included participants

Characteristic	Academic site; mean \pm SD*		Community site; mean \pm SD*	
	Decision aid, $n = 61$	Control, $n = 62$	Decision aid, $n = 59$	Control, $n = 60$
Age, yr	65 \pm 10.3	67 \pm 9.2	69 \pm 8.2	67 \pm 7.8
HKPT†	39.7 \pm 15.4	41.7 \pm 16.2	47.3 \pm 10.1	47.9 \pm 8.9
WOMAC‡	57 \pm 19.1	53 \pm 18.7	56 \pm 16.8	55 \pm 14.6
Sex, male:female	23:38	23:39	29:30	22:38
BMI	32.5 \pm 7.3	32.2 \pm 6.0	31.6 \pm 6.1	32.8 \pm 6.6
Language, English:other	61:1	58:3	58:1	60:0
Education				
< High school	3	6	3	5
High school	25	25	32	29
College	14	8	12	7
University	19	23	12	19
Living arrangements, alone:with someone	15:46	20:42	11:48	15:45
Employment				
Full-time	14	11	8	8
Part-time	5	8	5	6
Retired	30	39	43	42
Other	12	4	3	4
Household income, \leq \$58 000:more§	28:33	30:3	33:26	44:16
Change in household income, yes:no:no response	16:45:0	7:55:0	9:49:1	6:53:1

BMI = body mass index; HKPT = Hip-Knee Priority Tool; SD = standard deviation; WOMAC = Western Ontario and McMaster Universities Osteoarthritis Index.

*Unless indicated otherwise.

†Scores range from 0 to 80, without x-rays. Higher scores indicate greater severity of osteoarthritis.

‡Scores range from 0 to 96. Higher scores indicate greater severity of osteoarthritis.

§The typical Canadian household income for adults aged 65 years and older was \$58 000 at the time of study recruitment.

uptake of TKA varies significantly among geographical locations, decision aids might help determine the “right rate” of TKA based on patients’ informed preferences.¹⁹

Although our original RCT found no overall effect of the decision aid on wait times, patients at the community site waited a median of 20 days less for surgery than controls; there were no differences between groups at the academic site.⁷ Our subgroup analysis showed no statistically significant differences between academic and community sites for wait times. This suggests that original trial differences in median wait times at the community site are likely accounted for in the hip OA patient sample, which we excluded in this study.

Finally, our findings have important practice implications pertaining to the use of decision aids and cost-effective approaches to involving patients in decision-making. We found that additional decision support strategies, whether intensive counselling or use of a decision aid, benefited patients and decreased surgery rates. Although it is clear

that patients value involvement in the decision-making process, selecting the most effective and efficient approach for presurgical evaluation must consider factors that will influence positive patient outcomes. Our study suggests that using the decision aid at the academic site could have compensated for the shorter consultation process, with no difference in outcomes compared with those of patients who received lengthier presurgical evaluations at the community site. Therefore, this shorter presurgical evaluation with a patient decision aid is likely to improve clinical efficiency and surgeon satisfaction, inform and empower patients, and help reduce unwarranted practice variation in surgery rates.^{5,18,19}

Limitations

Two important study limitations should be considered. The original sample was powered for the wait time outcome.⁷ Given that we excluded patients with hip OA (*n* =

Table 3. Outcomes comparing academic and community sites

Outcome	Academic site; no. (%)		Community site; no. (%)	
	Decision aid	Control	Decision aid	Control
Decision quality				
Informed values-based choice	30/56 (54)	21/60 (35)	27/57 (47)	27/53 (51)
Knowledge scores				
Knows pain from hip/knee osteoarthritis gets worse	49/57 (86)	53/60 (88)	52/57 (91)	49/54 (91)
Knows recovery time for most people to get back to usual	5/57 (8)	6/60 (10)	7/57 (12)	2/54 (4)
Knows rates for replacing the same joint in < 15 yr	14/57 (25)	14/60 (23)	7/57 (12)	12/54 (22)
Knows 75% have less pain when walking after surgery	43/57 (75)	34/60 (57)	43/57 (75)	42/54 (78)
Knows rates of serious complication from surgery	42/57 (74)	26/60 (43)	45/57 (79)	38/54 (70)
Patient preferred and actual choice				
Surgery				
Preferred	38/57 (67)	45/60 (75)	34/57 (60)	44/54 (82)
Actual	43/59 (73)	53/62 (86)	40/59 (68)	45/58 (78)
Non-surgery				
Preferred	7/57 (12)	4/60 (7)	7/54 (13)	3/54 (6)
Actual	11/59 (19)	8/62 (13)	13/59 (22)	10/58 (17)
Unsure				
Preferred	12/57 (21)	11/60 (18)	7/54 (13)	7/54 (7)
Actual	5/59 (9)	1/62 (2)	6/59 (10)	3/58 (5)
Decisional conflict (SURE test)				
Felt sure about best choice	40/57 (70)	45/60 (75)	37/57 (65)	44/54 (82)
Knew the benefits and harms of each option	51/57 (90)	36/60 (60)	53/57 (93)	50/54 (93)
Was clear about benefits and risks that mattered most	47/57 (83)	39/60 (65)	49/57 (86)	48/54 (89)
Had enough support and advice to make choice	49/57 (86)	41/60 (68)	50/54 (79)	50/54 (93)
Total screened positive for decisional conflict	19/57 (33)	53/60 (52)	23/57 (40)	13/54 (24)
Total screened positive for decisional conflict at 6 mo	6/45 (13)	10/43 (23)	9/51 (18)	6/47 (13)

101) from this study, it was likely underpowered for wait time analyses. Additionally, in this study we did not measure or analyze consultations, counselling and/or information exchange between the health care professionals and patients.

CONCLUSION

Our findings showed that using different decision support strategies in presurgical evaluation can achieve comparable outcomes. Policy-makers and health care professionals should consider using decision aids with clinical counselling as an alternative to lengthy screening procedures when determining efficient high-quality service delivery models for TKA presurgical screening. Future research involving economic evaluations of patient decision support is required to confirm the most efficient strategy for particular approaches.

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Competing interests: G. Dervin is a paid consultant for Stryker and Microport Corporations, advising on total and partial knee replacement. At the time of the study, the Informed Medical Decisions Foundation that provided funding for the study had a licensing agreement with Health Dialog, a commercial company who markets decision aids and health coaching. No other competing interests declared.

Funding: The original trial was supported by funding and access to the patient decision aid from the not-for-profit Informed Medical Decisions Foundation (Grant #0099-1). The study sponsors had no involvement in the study design, collection, analysis and interpretation of data; in the writing of the manuscript; or in the decision to submit the manuscript for publication.

Contributors: L. Boland and D. Stacey designed the study. D. Stacey acquired the data, which all authors analyzed. L. Boland and L. Trenaman wrote the article, which all authors reviewed and approved for publication.

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