Patient Decision Aids for Prostate Cancer Treatment
A Systematic Review of the Literature

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ABSTRACT

Treatment decision-making can be difficult and complex for patients with low-risk prostate cancer. To the authors’ knowledge, there is no consensus regarding an optimal treatment strategy and the choice of therapy involves tradeoffs between differing harms and benefits that are sensitive to patient values. In such situations, patients are often asked to participate actively in the decision-making process, and high-quality decisions require a well-informed patient whose values and preferences have been taken into consideration. Prior studies have indicated that patients have poor knowledge and unrealistic expectations regarding treatment, and physician judgments concerning patient preferences are often inaccurate. Decision aids (DAs) have been developed to help inform patients with low-risk prostate cancer about treatment options and assist in the decision-making process; however, little is currently known regarding the effects of such programs in this population. Thirteen studies of DAs for patients with prostate cancer were reviewed and it was found that the use of DAs can improve knowledge, encourage more active patient involvement in decision-making, and decrease levels of anxiety and distress. The effect of DAs on treatment choice was less clear, although fewer patients chose surgery compared with historical controls, particularly in Europe. Further studies are needed to determine how best to implement DAs into practice, and whether they improve the consistency between patient preferences and treatment choice.

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Introduction

Prostate cancer is the most common malignancy diagnosed and the second leading cause of cancer-related death for men living in the United States.1 As a result of screening, many patients are found to have low-risk prostate cancer based on serum prostate-specific antigen (PSA) level, Gleason score, and clinical stage of disease at the time of diagnosis.2,3 These patients have choices for primary treatment: active surveillance or “watchful waiting,” in which patients defer therapy and undergo monitoring for disease progression, or active treatment, which may include prostatectomy, radiation therapy (brachytherapy, cyberknife, and/or external beam) alone or in combination with hormonal therapy, or cryotherapy. Because there are no or very small differences in mortality between...
treatment options and each treatment has side effects that can significantly affect quality of life,⁴,⁵ there is currently no consensus regarding the optimal treatment strategy. Therefore, treatment decision-making is often difficult for both patients and physicians, because the choice of optimal therapy can be very sensitive to patient preference.⁶,⁷

In this setting, one might expect patients to receive extensive education regarding their options. However, studies have demonstrated that most patients with prostate cancer do not receive the information needed to make an informed decision, and instead rely on physician opinion, anecdotes, and the opinions of others.⁸-¹⁰ Because of a poor understanding of the disease and treatment options, fear and misconceptions dominate the decision-making process,¹¹-¹³ and patients often defer treatment decisions to their physician.⁹,¹⁴ However, evidence suggests that physicians and patients have different goals for prostate cancer care¹⁵ and physicians’ perceptions of the preferences of their own patients are not accurate.¹⁶-¹⁸ The strongest predictor of treatment choice is not patient preference but physician specialty; specialists overwhelmingly recommend the treatment they deliver.¹⁹,²⁰ Thus, it is not surprising that the treatment of low-risk prostate cancer is highly variable by geography and patient sociodemographics and is strongly influenced by nonclinical factors.²¹-²³

If physicians guide prostate cancer treatment decisions without the participation of adequately informed patients, it is not clear that patients will receive treatments that are consistent with their values and preferences.¹⁷ In its seminal report, Crossing the Quality Chasm: A New Health System for the 21st Century, the Institute of Medicine recommends that patients “be given the necessary information and the opportunity to exercise the degree of control they choose over health care decisions that affect them” and encourages shared decision-making and the use of decision aids (DAs).²⁴ Some investigators believe that prostate cancer, with its multitude of treatment options, is an archetypal condition for using DAs, and DAs have been developed and tested for this condition.²⁵

There is great potential for DAs to assist in ensuring high-quality decision-making for patients with prostate cancer. However, there does not appear to be consensus regarding the goal of using DAs, even among experts in the field; commentators have focused on the potential of DAs to influence outcomes ranging from patients’ participation in decision-making to final treatment choice.²⁶,²⁷ In addition, a recent review of prostate cancer educational materials, including DAs, did not examine the effect of those materials on decision-making outcomes.²⁸ Therefore, we undertook a systematic review of the literature to assess whether, for patients with low-risk prostate cancer, the use of DAs is feasible and acceptable in routine practice (measured by, for example, completion rates and consultation times) and improves care in the key domains of decision-making: patients’ knowledge, how actively patients participated in the decision regarding their care (their decision-making role), patients’ anxiety concerning or satisfaction with their decision, and final treatment choice.²⁶

Methods

Data Sources, Study Selection, and Data Extraction

We searched MEDLINE, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Web of Science, and the Cochrane Library for articles in peer-reviewed journals from database inception through March 2009. Search terms included: “decision support technologies” or “decision aid” or “patient education,” combined with “prostate cancer treatment” or “prostatic neoplasm/therapy” and “patient participation” or “decision-making.” All citations identified were reviewed. Studies were eligible for review if they involved quantitative evaluation of a clinical trial of DAs for patients with low-risk prostate cancer and were published in English. Study quality for randomized controlled trials (RCTs) was judged using the Jadad scale, which includes criteria assessing trial randomization, blinding, and withdrawals.²⁹ Two authors (G.A.L. and D.S.A.) independently reviewed the articles for eligibility and extracted study quality data; disagreements were resolved through discussion and consensus of the study team.

Data Synthesis

Not all studies measured all DA outcomes, contained a control group, or performed pre-/post-DA testing. Two outcomes, knowledge and treatment choice, were considered for quantitative meta-analysis. In studies assessing patient knowledge, several different
methods were used, and the majority of these studies did not provide evidence of the validity or reliability of the knowledge scale. The lack of standardized questionnaire use or controls made a meta-analysis impossible for the knowledge outcome. However, meta-analysis of treatment choice was performed using fixed- and random-effect models with reporting of summary measures and 95% confidence intervals (95% CIs). We limited the analysis to patients with low-risk prostate cancer who had the option of choosing surgery, radiation therapy (external beam, cyberknife, and/or brachytherapy), or watchful waiting. Patients receiving primary hormone therapy, those noted to have metastatic disease, or those with a contraindication to surgery were excluded. Statistical analysis was performed with STATA/SE statistical software (version 10; StataCorp, College Station, Texas).

Results

Literature Search

The MEDLINE search yielded 213 articles. Four additional unique articles were identified from CINAHL, and 2 were identified through Web of Science. No additional unique publications were found after searching the Cochrane Library. After reviewing the abstracts of these articles and their reference lists, 36 articles were selected for more extensive review. Of these, 14 were eligible. Two articles by van Tol-Geerdink et al were considered as 1 article because they reported results from the same trial, leaving 13 original studies (Fig. 1). We evaluated 3 RCTs and 10 nonrandomized trials.

Study Settings, Recruitment, and Participants

Eight studies were performed in the United States or Canada, and 5 in Europe (Table 1). The DAs were delivered in 4 settings: hospitals (4 studies), physician’s offices (1 study), patient education centers (4 studies), and nonmedical settings such as home or research office (4 studies). Participants were recruited from academic and community settings. Participants in all studies were recruited or referred from urology or radiation oncology practices; the study by Schostak et al also included participants who self-referred or were referred by a family physician.

Study quality was assessed for the 3 RCTs using the Jadad score. The trial by Davison et al (published in 1997) had a 2/6 rating (poor quality) and the trials by Auvinen et al and Davison et al (published in 2007) had a 3/6 rating (good quality).

A total of 1821 men participated in the trials. The mean ages of the participants ranged from 62 to 72 years (age range across all studies, 48–89 years). Trial participants tended to be well-educated; most had at least a 12th grade education. The trials by Auvinen et
TABLE 1. Characteristics of 13 Trials of Patient Decision Aids for Prostate Cancer Treatment

| STUDY                | PARTICIPANTS AND SETTING | INTERVENTION                                                                 | TREATMENT(S) DISCUSSED                  | OUTCOME MEASURES                                         |
|----------------------|--------------------------|------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------|
| Davison & Degner 1997 | 60 men with newly diagnosed prostate cancer from 1 clinic in Canada          | Written information package + consultation with nurse + audiotape of visit (optional) vs written information only | Not described                                         | Decision-making involvement,* anxiety level,† depression‡ |
| Auvinen 2004         | 210 men with prostate cancer at 4 major hospitals in Finland               | Extensive consultation with urologist + patient defined own role in decision-making vs standard treatment protocol | Watchful waiting, surgery, radiation therapy           | Treatment choice                                          |
| Davison 2007         | 324 men with newly diagnosed localized prostate cancer referred to patient education center in Canada | Personalized treatment information + generic video + written information vs generic video + written information | Watchful waiting, surgery, radiation therapy           | Decision-making involvement,* decisional conflict,§ satisfaction with treatment choice |
| Holmes-Rovner 2005   | 60 men with recently diagnosed prostate cancer in the United States         | Decision aid (Internet, audio, booklet)                                      | Watchful waiting, surgery, radiation therapy           | Knowledge, decision-making involvement, discussion with physician, evaluation of decision aid material |
| van Tol-Geerdink 2008 | 244 men with localized prostate cancer undergoing 3-dimensional conformal radiation therapy in the Netherlands | Written decision aid vs usual care                                           | Radiation therapy (low/high dose)                     | Knowledge, decision-making involvement, mental adjustment to cancer,¶ general health, health-related quality of life,‖ anxiety and depression,‖ satisfaction with treatment choice |
| Onel 1998            | 111 men with newly diagnosed localized prostate cancer presenting to 4 physician offices in the United States | Video decision aid                                                           | Watchful waiting, surgery, radiation therapy, hormonal therapy | Knowledge, decision-making involvement, satisfaction with treatment decision |
| Brink 2000           | 29 men with prostate cancer and 14 female partners in the United States     | Interactive CD-ROM decision aid                                              | Radiation therapy (brachytherapy only)                 | Knowledge, self-efficacy, evaluation of decision aid     |
| Kim 2001             | 30 men with newly diagnosed prostate cancer at 2 Veterans Affairs hospitals in the United States | Interactive CD-ROM decision aid                                              | Watchful waiting, surgery, radiation therapy, hormonal therapy, combination therapy | Knowledge, health literacy,‖ treatment preference, satisfaction with program, treatment received |
| Davison 2003         | 74 men with newly diagnosed prostate cancer and their partners referred to a patient education center in Canada | Interactive computer program + individualized counseling session              | Not described                                          | Decision-making involvement, information needs, anxiety,† depression‡ |
| Flynn 2004           | 67 men with newly diagnosed prostate cancer in the United Kingdom           | Interactive CD-ROM decision aid                                              | Surgery, radiation therapy, hormonal therapy          | Knowledge, decision-making involvement,* information needs, psychosocial functioning |
| Schostak 2004        | 362 men with prostate cancer presenting to 1 hospital in Germany           | Personalized, multidisciplinary consultation                                  | Surgery, radiation therapy                            | Knowledge, decision-making involvement, fear of surgery or radiation therapy, satisfaction with consultation, treatment choice |
al33 and van Tol-Geerdink et al34 included both patients with low-risk prostate cancer and those with locally advanced and metastatic cancer, but only those patients with low-risk disease were included in the analyses.

Types of DAs and Control Interventions

Various types of DAs were studied (Table 1). The majority of the DAs were developed de novo; 2 trials used a DA developed by Holmes-Rovner et al35,36 Kim et al used a DA produced by a pharmaceutical company.37 Most DAs presented information in multiple formats, including written materials (8 trials)30,31,33-36,38-40 and multimedia presentations (8 trials),35-38,40-43 and provided individualized information for patients based on their disease stage. Two trials tested interventions involving information exchange via in-person consultation with urologists and a multidisciplinary team.32,33 Davison and Degner tested an “empowerment” intervention, in which patients in the experimental group were coached through an information packet prior to consultation with the physician.38 van Tol-Geerdink et al tested a written DA within the context of an interview.30,31,34

Treatment options discussed in the DAs varied. Six DAs discussed “watchful waiting,” surgical options, and radiation therapy (external beam radiation or brachytherapy).33,35-37,40,42 Four DAs also discussed hormonal or combination therapy.33,37,42,43 One trial discussed surgery and radiation therapy only,32 and 3 DAs described radiation therapy only.30,31,34,41 The interdisciplinary consulting service described by Schostak et al involved both a urologist and radiation oncologist who jointly recommended a preferred treatment.32 DAs developed or used in the United States and Canada were more likely to include all treatment options compared with DAs used in Europe.

Five studies included control interventions. Three studies used usual care as the control,30,31,33,34 and 2 used generic DAs (compared with DAs providing individualized information).38,40 Holmes-Rovner et al used historical controls.36

How Acceptable and Feasible is the Use of DAs in Practice?

Nine DAs were designed to be completed outside the physician visit, after diagnosis but prior to making a decision.35-43 Four trials referred patients to a patient education center to view the DAs.38-40,43 Four studies incorporated the DA into the physician visit.30-34 Only 1 study reported data concerning the length of

| STUDY | PARTICIPANTS AND SETTING | INTERVENTION | TREATMENT(S) DISCUSSED | OUTCOME MEASURES |
|-------|--------------------------|--------------|-----------------------|-----------------|
| van Tol-Geerdink 200630,31‡‡ | Uncontrolled study | Written decision aid | Radiation therapy (low/high dose) | Knowledge, decision-making involvement,† information preference, cancer worries, adjustment to cancer,¶ quality of life,§ anxiety and depression,** treatment choice |
| Isebaert 200835 | Uncontrolled study | Decision aid booklet (adapted from Holmes-Rovner 200536) | Watchful waiting, surgery, radiation therapy | Decision-making involvement, evaluation of decision aid, treatment choice |

*Control Preferences scale.
†Spielberger State-Trait Anxiety scale.
‡Center for Epidemiologic Studies Depression (CES-D) scale.
§Decisional Conflict scale.
¶Problem-Solving Decision-Making scale.
§Mental Adjustment to Cancer (MAC) scale.
#European Organization for Research and Treatment of Cancer (EORTC) QLQ-PR 25 quality-of-life prostate cancer module.
**Hospital Anxiety and Depression Scale (HADS).
††Rapid Estimate of Adult Literacy in Medicine (REALM) scale.
‡‡Counted as 1 study.
time required to complete the DA or consultation—van Tol-Geerdink et al found that discussion with the DA required an average of 18 minutes. However, Onel et al concluded that the implementation of a DA into a busy office practice was feasible, with the video not changing the amount of time needed for consultation. Only Davison and Degner reported completion rates for a DA (85% of participants reviewed all or part of the DA).

In general, participants found DAs to be helpful and were satisfied with the content. Brink et al and Holmes-Rovner et al reported data concerning the clarity and usefulness of the DAs themselves. In the study by Brink et al, 79% of participants thought the amount of information presented was appropriate and 91% were satisfied with the presentation and narration; in the study by Holmes-Rovner et al, greater than 75% of the participants thought the length of the presentation and the amount of information presented were “about right,” and the treatment descriptions were balanced. Furthermore, in the study by Holmes-Rovner et al, 91% of participants stated that the DA improved their understanding of their treatment options and 76% thought the DA helped in the decision-making process at least moderately. Davison and Degner found that men shared the DA with others; Holmes-Rovner et al reported that 98% of men stated they would most likely or definitely recommend the DA to a friend. Davison et al found that the DA helped patients consider the pros and cons of therapy (P = .002), and helped prepare them to communicate their preference (P = .05) to their physician significantly better than individuals in the control group.

Only 1 study examined physicians’ perceptions of DAs. Isebaert et al found that 82% of physicians believed that DAs had a positive influence on the consultation and decision-making process. The improvement in the decision-making process manifested in 3 ways: (1) patients were more prepared for the consultation, allowing more focus on the patients’ values and preferences; (2) patients were better able to formulate their own preferences; and (3) DAs helped patients discuss the disease and treatment options with family members. A minority of physicians (18%) believed that DAs complicated the decision-making process, particularly in patients with low health literacy.

Do DAs Affect Patient Knowledge?

The primary stated goal of most DAs is to increase the patient’s knowledge about the disease and present unbiased, balanced information regarding the relevant treatment options. None of the RCTs evaluated knowledge as an outcome. Among 8 nonrandomized trials measuring knowledge, the DAs appeared to increase patients’ knowledge concerning prostate cancer and its treatment (Table 2). For example, Onel et al used a pre/post-test subjective knowledge question and found that the proportion of participants stating that they had a good or very good understanding of the disease and treatment options increased from 38% to 80%. Similarly, van Tol-Geerdink et al found that the DA group had more accurate risk perception than controls (55% vs 39%; P < .001). Holmes-Rovner et al found a trend toward increased knowledge in the DA group compared with historical controls, particularly with regard to side effects.

Do DAs Impact the Patient’s Role in Decision-Making?

DAs are designed to promote patient involvement in decisions to the extent that it is desired, because patients vary with regard to how much they want to participate. Patient participation in decision-making ranges from passive (defers decision to the physician) to collaborative (collaborates with physician) to active (wants to be the primary decision-maker). Overall, DAs appear to increase the proportion of patients wanting and assuming a more active role in the treatment decision-making process, although this difference was noted primarily in the nonrandomized trials (Table 2). The majority of patients believed that being offered a choice was a positive development, and patients in the study by van Tol-Geerdink et al who used a DA were much more likely to perceive both that they had a choice for treatment (70% in the intervention group vs 28% in the control group; P < .001) and that they were involved in treatment decision-making (74% in the intervention group vs 29% in the control group; P < .001), even 6 months after therapy.

Do DAs Affect Patients’ Anxiety and Distress?

Seven studies examined the effect of DAs on psychologic measures such as decisional conflict (ie, the degree of uncertainty the patient feels about a deci-
sion), anxiety, depression, and adjustment to cancer (Table 2). A variety of measures were used, including scales for decisional conflict, anxiety, and depression, and the results were mixed. Two RCTs measured psychologic outcomes. Davison and Degner found a decrease in anxiety scores after patients used a DA. Davison et al used the Decisional Conflict scale to measure uncertainty concerning the treatment decision, and found that a DA appeared to have no effect. However, decisional conflict scores were low at baseline. Five nonrandomized trials had measures of psychologic distress; in 3 trials (Isebaert et al, Davison et al, and Flynn et al), participants demonstrated improvements in psychologic well-being. Conversely, van Tol-Geerdink et al found that the use of a DA had no effect on anxiety and depression or adjustment to cancer.

How Do DAs Affect Satisfaction with Treatment Decisions?
DAs appeared to have a mixed effect on satisfaction with the treatment decision, although only 2 trials measured this outcome (Table 2). Only 1 of 3 RCTs measured satisfaction; Davison et al found no difference in satisfaction with treatment choice between patients receiving individualized DAs and controls using a generic DA. Only 1 nonrandomized trial measured satisfaction with treatment decision and found that 93% of patients were satisfied with their treatment choice and greater than half (approximately 55–71%, depending on treatment modality) would choose the same treatment again, but this trial lacked a control group.

Do DAs Affect Treatment Choice?
Seven studies (2 RCTs and 5 nonrandomized trials) measured the effect of the DA on treatment choice (Fig. 2). Auvinen et al found that patients in the DA arm selected what their physician considered the treatment of choice less often than patients receiving usual care (58% vs 86%; \( P < .001 \)). Davison et al found no difference in treatment choice between patients viewing an individualized DA and those viewing a generic DA. Isebaert et al found that 60% of patients chose a therapy other than surgery after viewing a DA in a hospital in which, historically, the majority of patients underwent surgery; 2 additional studies from Europe also found that patients chose surgery less often (20% less often and up to 31% less often, respectively). In the study by Kim et al, both treatment preference and treatment received were recorded, and approximately two-thirds of patients received a treatment other than their stated preference. Finally, meta-analysis was performed using the 2 RCTs measuring treatment choice with a total of 273 patients, and no significant differences in treatment choice were found between the groups (odds ratio [OR] for watchful waiting, 0.81 [95% CI, 0.31–2.07]; OR for surgery, 1.44 [95% CI, 0.72–2.87]; and OR for radiation therapy, 0.45 [95% CI, 0.10–2.02]).

Discussion
Low-risk prostate cancer is a common disease among older men, and the multitude of available treatments leads to a complex decision-making scenario. In such settings, many have argued that informed decision-making based on patient preferences is a key component to ensuring appropriate treatment. We found evidence in our review that DAs designed to assist men in choosing a prostate cancer treatment appear to be acceptable to patients and feasible to use in practice, and increased patient knowledge of and involvement in decision-making, although our conclusions were limited by the paucity of trials, particularly RCTs, and variations in outcome measures. There is also evidence that the use of DAs may decrease anxiety and uncertainty regarding decision-making. Across the trials, patients appeared to welcome the information provided by the DAs and the opportunity to participate in the decision-making process, and believed that the DA provided valuable assistance in the decision-making process.

The information needs of prostate cancer patients are enormous, and there is evidence that their needs are not being met through usual care. Variations in treatment decisions may be partly attributable to differences in the information patients receive. Consistent use of DAs may help fill the information void and allow for more efficient and more effective discussions between physicians and patients; the DAs in our review improved both subjective and objective knowledge. In addition, it is important that DAs also provide guidance and assistance to patients with regard to clarifying their values and preferences for treatment, because knowledge by itself may be insuf-
| SOURCE                  | KNOWLEDGE                      | INVOLVEMENT IN DECISION-MAKING | ANXIETY AND DISTRESS | TREATMENT CHOICE | SATISFACTION WITH TREATMENT CHOICE | OTHER |
|------------------------|--------------------------------|-------------------------------|-----------------------|------------------|------------------------------------|-------|
| Davison & Degner 1997  | Not evaluated                  | No difference between groups; | Lower anxiety in intervention group \(P < .05\)!; no difference noted in depression† | Not evaluated    | Not evaluated                      | None  |
| Auvinen 2004           | Not evaluated                  | Not evaluated                 | 20% fewer men chose surgery in the intervention group vs the control group \(63\% \text{ vs } 85\%\); \(P < .001\) | Not evaluated    | None                               | None  |
| Davison 2007           | Not evaluated                  | No difference between groups; | No difference noted in Decisional Conflict scale scores§ | No difference    | No difference in satisfaction       | None  |
| Holms-Rovner 2005      | Trend toward improved knowledge in decision aid group, especially with regard to side effects | Increase in discussion of surgery with physician \(P = .02\); 72% would take more active role in decision | Not evaluated    | Not evaluated                      | None  |
| van Tol-Geerdink 2008  | Improved subjective and objective knowledge \(P < .001\) and accurate risk perception \(P = .001\) | Patients took active decision-making role \(P < .001\)! | No difference    | Not evaluated                      | Greater satisfaction with quality of information \(P = .002\); no difference noted in quality of life or health status¶ | None  |
| Onel 1998              | Increase in subjective knowledge | High level of participation in decision-making | Not evaluated        | Majority of patients would choose same treatment again | High level of satisfaction with choice | None  |
| Brink 2000             | Increase in knowledge in both men and overall \(P < .001\) | Not evaluated                | Not evaluated        | Not evaluated                      | Increase in self-efficacy measure in both men \(P = .02\) and overall \(P = .018\) | None  |
| Kim 2001               | Average 74% correct on post-test; knowledge scores correlated with literacy \(P < .001\) | 90% somewhat or very likely to follow treatment preference | Not evaluated        | 66.7% of patients received treatments that differed from preference | Not evaluated                      | High satisfaction with decision aid program |
| Davison 2003           | Not evaluated                  | Higher percentage of men assumed more active role than originally intended \(P < .001\) | Lower anxiety \(P < .001\)! and depression \(P = .018\)! | Not evaluated    | Not evaluated                      | Partners also had lower anxiety \(P < .001\)! and depression \(P = .002\)! |
| Flynn 2004             | Increased knowledge after decision aid \(P < .001\) | No difference noted except in patients who were married or viewed the decision aid with a partner (increased active participation)* | Decreased distress \(P < .05\) | Not evaluated                      | Not evaluated                      | Decrease in information needs after decision aid |
sufficient to ensure a high-quality decision. However, of concern is that many currently available patient education materials for prostate cancer treatment, including some DAs, do not contain comprehensive information regarding the risks and benefits of each treatment, do not contain exercises to assist patients in clarifying their values and/or preferences, and may be outdated. With the publication of international standards for DAs and the evolution of treatments for patients with low-risk prostate cancer, a new generation of DAs that conform to international standards, as well as trials testing the efficacy of those DAs, are urgently needed. In addition, the RCTs in our review measured various outcomes, most likely because, to the best of our knowledge, there is no consensus to date on the appropriate instruments with which to measure outcomes after the use of DAs. Research is therefore needed to identify the best outcome measures for DA use.

Previous surveys have documented that many patients prefer either active participation in the decision-making process or a collaborative or shared decision-making process with their physician. Our review found that DAs assist patients in assuming a more active role in the decision-making process, as well as increasing patients’ confidence in understanding and discussing treatment options with their physician as well as family. In addition, we found that DAs appear to improve patient satisfaction with their treatment decision, perhaps by giving patients more realistic expectations about treatment outcomes. Schroeck et al found that patients undergoing robot-assisted surgery were less satisfied and had greater regrets about their decision than patients who underwent open prostatectomy due to higher expectations regarding the procedure. Continued therapeutic advances may heighten patients’ expectations about treatment outcomes, thereby making the availability of unbiased, balanced information crucial for managing these expectations.

The evidence regarding the effect of DAs on treatment choice is less certain. Only a few trials to date have measured this outcome, and in the studies reviewed herein there was substantial variation.

**TABLE 2. (Continued)**

| SOURCE                | KNOWLEDGE                        | INVOLVEMENT IN DECISION-MAKING | ANXIETY AND DISTRESS | TREATMENT CHOICE | SATISFACTION WITH TREATMENT CHOICE | OTHER                                           |
|-----------------------|----------------------------------|--------------------------------|-----------------------|------------------|------------------------------------|------------------------------------------------|
| Schostak 200442       | 92.4% felt completely informed   | Not evaluated                   | No difference noted with regard to fear of surgery or radiation therapy | Patients had equal rates of surgery (43.4%) and radiation therapy (42.5%) | Not evaluated | 66% found consultation helpful                                           |
| van Tol-Geerdink 200628,31# | Evaluated, not reported        | 79% accepted greater involvement in decision-making | Hopelessness affects desire to choose | 75% chose lower radiation dose | Not evaluated | Fear of tumor recurrence and survival associated with choosing higher dose; fear of side effects associated with choosing lower dose |
| Isebaert 200835       | Not evaluated                    | Use of decision aid resulted in more active involvement in decision-making | 46% found decision aid reassuring | 38% chose surgery, 48% chose radiation therapy, and 12% chose watchful waiting | Not evaluated | 73% felt decision aid helped clarify personal preferences; 88% would use again |

*Control Preferences scale.
†Spielberger State-Trait Anxiety scale.
‡Center for Epidemiologic Studies Depression (CES-D) scale.
§Decisional Conflict scale.
¶Problem-Solving Decision-Making scale.
¶European Organization for Research and Treatment of Cancer (EORTC) QLQ-PR 25 quality-of-life prostate cancer module.
#Counted as 1 study.
in the treatments chosen, reflecting in part variations in local practices. In addition, it is concerning that some DAs did not present all available treatment options. Because DAs were, for the most part, either a part of the physician consultation or used as an adjunct to the consultation, there was likely a strong physician influence on treatment choice, as has been documented in previous studies.\(^5\) For example, the interdisciplinary consultation studied by Schostak et al included a formal treatment recommendation by physicians\(^3\) and in the study by Kim et al, approximately two-thirds of patients received treatments that differed from their stated preferences after viewing the DA.\(^3\) Although it is unclear why patients received a treatment that was different from their stated preference, the DA was completed prior to the physician visit and therefore patients may have changed their minds after discussing their options with the physician or, more troubling, physicians may not have taken patient preferences fully into consideration. These studies provide further evidence that patients may not be receiving treatments that are in line with their preferences, and future research should seek to determine how the use of DAs, and what type of DAs, could affect this outcome.

If the weight of the evidence suggests that DAs can improve several important dimensions of decision-making, why are they not used routinely in practice? One possibility is that physicians do not yet believe there are sufficient data to confirm the utility of DAs. Larger trials, especially those that are randomized and address outcomes that have received less attention (such as whether DAs change treatment choices or the resulting quality of life), may be more convincing. However, many clinical activities have become routine with far less available data. A more likely explanation is that physicians are concerned about the feasibility of implementing DAs. The volume and complexity of information concerning prostate cancer, the decreasing amount of time spent per office visit in some practices, and the large discrepancy in reimbursement between time spent counseling and procedures may create the impression among physicians that they simply do not have the time or resources to engage in shared decision-making.\(^5\) The trials in our review presented limited data regarding the feasibility of implementing DAs into routine practice, and the data reported did not address important dimensions such as staff training and time, patient completion rates of DAs, usability for diverse patient populations, methods for incorporating the DAs into office workflows, DA timing (eg, should it be viewed or used before, during, or after a visit) and delivery, and cost-effectiveness and reimbursement issues.\(^5\) Thus, there is a need for more research on identifying barriers to implementing DAs, methods of reducing those barriers, and best practices for implementation. For example, it may be feasible to incorporate DAs into shared medical appointments in which providers could refer patients considering prostate cancer treatment to a session in which the DA is viewed by multiple patients, followed by a question/answer session with a physician. Such appointments are usually billable and
may decrease the perception that shared decision-making is an unfunded activity with high opportunity costs. Future studies should examine the feasibility of these types of implementation models and their impact on DA use and subsequent outcomes.

There are limitations to this review. First, there were very few high-quality studies. In particular, we found only 3 randomized, controlled trials of moderate quality comparing different DAs with varying outcomes. Therefore, we could not determine the comparative effectiveness of different types of DAs. In addition, we did not assess the quality of the information provided in the DAs themselves, and therefore we were unable to determine whether the DAs met the quality standards set by the International Patient Decision Aids Standards (IPDAS) Collaboration.27 Previous reviews by Fagerlin et al and O’Connor et al of the content of prostate cancer DAs suggest that many do not.28,29 Our conclusions, particularly with regard to the effect of DAs on treatment choice, should be considered within that context. In addition, our data synthesis was limited by the heterogeneity of the outcome measures used in the trials. Knowledge, patient involvement in decision-making, and treatment choice were the outcomes most commonly measured; however, even within these categories, measures varied (and not every trial measured all outcomes in all categories), and therefore meta-analysis was not possible for most outcomes.

The various options for the treatment of localized prostate cancer present a complex decision-making scenario for both patients and physicians, too often leading to uninformed choices that are inconsistent with patient values and preferences. DAs have demonstrated promise in improving many parts of the decision-making process, particularly with regard to assisting patients in understanding treatment options and encouraging active participation in decision-making, and have been shown to be useful both during and as an adjunct to physician visits. Thus, effective DAs could play an important role in ensuring that patients with low-risk prostate cancer are making high-quality decisions regarding treatment in collaboration with their physicians. The use of effective DAs, which should include both balanced, evidenced-based, unbiased information regarding all available treatment options as well as assistance with values clarification, should be encouraged, particularly through changes in clinical practice guidelines and/or reimbursement. Given recent data indicating a low rate of prostate cancer mortality and a risk of overdiagnosis in patients undergoing PSA screening,56,57 ensuring that patients are making informed decisions is crucial to providing appropriate, patient-centered care. Further empiric work is necessary to solidify the evidence base concerning the impact of DAs on treatment choice and quality of life and to find feasible models of DA implementation. ■

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