Decision counseling for men considering prostate cancer screening

Matthew J. Liberatorea,*, Ronald E. Myersb, Robert L. Nydicka, Michael Steinbergc, Earl R. Brownd, Roy Gaye, Thomas Powellf, Roberta Lee Powellf

a Department of Decision and Information Technologies, Villanova University, 800 Lancaster Avenue, Villanova, PA 19085, USA
b Department of Medicine, Division of Genetic and Preventive Medicine, Behavioral Epidemiology Section, Thomas Jefferson University, 1100 Walnut Street, Suite 400, Philadelphia, PA 19107, USA
c School of Public Health, University of Medicine and Dentistry of New Jersey., 317 George Street, Suite 210, New Brunswick, NJ 08901, USA
d 1335 W. Tabor Road, Philadelphia, PA 19141, USA
e 5301 Cedar Avenue, Philadelphia, PA 19143, USA
f 6013 Green Street, Philadelphia, PA 19144, USA

Abstract

One in six men will develop prostate cancer in their lifetimes; and the risk of dying from the disease is elevated by a factor of at least two among African-American men. Many asymptomatic men who are diagnosed with prostate cancer have their disease detected through a prostate cancer screening examination. The examination often includes both a digital rectal examination and prostate-specific antigen testing. Although annual screening is recommended by several organizations, others urge caution since no randomized trials have demonstrated that screening can reduce mortality from prostate cancer. Concern about prostate cancer screening is also based on the fact that diagnosis and treatment of early-stage prostate cancer can cause substantial adverse outcomes. To facilitate shared decision making between the patient and medical practitioner, it is important to provide information that is needed to make an informed decision. In this paper, we discuss the development and implementation of a decision-counseling protocol for prostate cancer screening. This protocol, which incorporates the analytic hierarchy process (AHP), is designed as a decision aid for use in facilitating decision making about whether or not to have a screening examination. We discuss several modifications to the standard AHP that were required to fit the needs of the target population. The counseling protocol has been applied in randomized trials involving diverse populations. While health educators required some training to administer the decision-counseling protocol, none was needed for the patients. The results have demonstrated...
that a well-designed decision-counseling protocol administered by a trained facilitator can be successfully implemented in a primary care patient population.

Scope and purpose

In this paper, we discuss the development and implementation of a decision-counseling protocol for prostate cancer screening. The protocol was developed by a multidisciplinary research team of which the authors are members. It consists of two components: an information booklet on prostate cancer and screening; and an AHP-based counseling session. Modifications to the standard AHP that were required to fit the needs of the target population are described. This decision-counseling protocol was successfully applied in four primary care settings, with preliminary findings reported for one of these.

1. Introduction

In 2002, there will be more than 189,000 new cases of prostate cancer and an estimated 30,200 prostate cancer-related deaths in the United States [1]. Prostate cancer incidence and mortality increase with age and are substantially elevated in high-risk groups (e.g., African-American men and men who have a family history of prostate cancer) [2]. One in six men will develop prostate cancer in his lifetime; and the risk of dying from the disease is elevated by a factor of at least two among African-American men. From 1986 to 1993, the overall 5-year prostate cancer survival rate for African-American men was 75% and for white men it was 90% [3,4].

Many asymptomatic men who are diagnosed with prostate cancer have their disease detected through a prostate cancer screening examination. The examination often includes both a digital rectal examination (DRE) and prostate-specific antigen (PSA) testing. Proponents of prostate cancer screening believe that routine DRE and PSA testing is justified for men who have a reasonable life expectancy and is especially important for men who are at increased risk on the basis of race and family history [5,6]. They argue that combined DRE and PSA testing is effective in identifying men with early prostate cancer and that men who are diagnosed with and treated aggressively for localized prostate cancer have higher survival rates as compared to men diagnosed with late-stage disease [7,8]. The American Cancer Society and the American Urological Association recommend annual DRE and PSA testing for men who are 50 or more years of age [1,9]. The American Cancer Society also recommends that screening begin at age 45 for African-American men and those who have a family history of prostate cancer [9].

Caution has been urged regarding prostate cancer screening, however, because no randomized trials have demonstrated that screening can reduce mortality from prostate cancer [10,11]. Results of trials that are now underway will not be available for a decade or more [12–14]. Concern about prostate cancer screening is also based on the fact that diagnosis and treatment of early-stage prostate cancer can cause substantial adverse outcomes (e.g., impotence, incontinence, bowel injury, and mortality) [15,16]. Guidelines put forward by the United States Preventive Services Taskforce and the Canadian Taskforce on the Periodic Health Examination recommend that DRE and PSA testing should not be performed to screen for early prostate cancer [17,18]. Most recently, the American College of Physicians has advised against the routine use of screening examinations for asymptomatic older adult
men, irrespective of risk status. Rather, the delivery of information concerning the potential benefits and harms of screening, follow-up, treatment and the provision of assistance in decision making are both encouraged [19]. Unfortunately, few tools are available to help practitioners implement these guidelines.

Today, individuals are being asked to assume an increasing level of responsibility for decision making about personal health care [20]. Patients are now expected to act as partners with health care professionals to engage in shared decision making [21] about health-related issues. This shared decision-making paradigm is ideal, that is supplanting the more traditional model in which the medical practitioner assumes responsibility for choosing a health care strategy that is in the best interests of the patient. To facilitate shared decision making, it is important to provide information that is needed to make informed decisions, enable patients to recognize the importance and legitimacy of their role in medical decision making, understand the implications of choosing from among different health care alternatives, and consider their personal values and preferences related to the choices at hand.

In this paper, we discuss the development and implementation of a decision-counseling protocol for prostate cancer screening. This protocol, which incorporates the analytic hierarchy process (AHP), is designed as a decision aid for use in facilitating decision making about whether or not to have a screening examination.

2. Decision aids and prostate cancer screening

Information to help people make decisions about preventive health care and treatment of disease has been delivered using a variety of modes that have been described as decision aids. Patients have used informational brochures, educational videotapes, interactive videodiscs, and sites on the Internet in the absence of direct interaction with a health care practitioner. Other modes facilitate immediate, personal interactions between practitioners and patients (e.g., formatted print and verbal descriptions, and decision boards, which are charts showing the likelihood of different events).

The literature on decision aids suggests that, in general, the aids are well accepted by patients when they can be accessed easily. In addition, they tend to increase patient knowledge, provoke little or no patient anxiety, reduce decisional conflict, and foster interactions between practitioners and patients relative to decision making. It also appears that exposure to decision aids may improve patient outcomes (e.g., side effects, role functioning, physical functioning, and general health) [22]. Recent reviews of research into decision aids have called for the use of rigorous research designs that are based on theory, include meaningful process and outcome measures, and serve to identify interventions that can facilitate practitioner–patient interaction [23,24]. With respect to prostate cancer screening, Coley et al. [25] observed that there are no published data that indicate the best way to enable individuals to consider systematically available information about screening decision making, weigh the pros and cons of behavioral alternatives, and make informed decisions about preventive care on the basis of personal values. Similarly, Ubel [26] observed that, while several methods have been used to make information about prostate cancer screening available (e.g., brochures, videos, decision boards), little is known about their impact on knowledge, attitudes, and behavior. Research in this area is increasing, however.
Wolf et al. [27] published results of a study involving older adult men who presented at a primary care physician office for an outpatient appointment. Men who were exposed to a detailed description of the pros and cons of prostate cancer screening were less likely to be interested in having an exam than those who were exposed to a brief statement that the exam was available. In another study reported in the same article, older adult men who visited a general internal medicine clinic were randomly assigned either to an intervention group that viewed a videotape, which described prostate cancer screening in cautionary terms, or to a control group. Intervention group men were much less likely to have a prostate cancer screening examination than control group men. It is likely that the equivocal nature of the more intensive educational messages discouraged men from having an exam.

Flood et al. [28] investigated the prostate cancer knowledge and screening likelihood for men who attended a free PSA screening clinic and those who were seen for a routine outpatient appointment. They found that an educational videotape regarding prostate cancer screening improved patient knowledge about prostate cancer and screening. Men who saw the videotape in the routine appointment setting also were less likely to have PSA screening than men who did not. This result did not hold for the men attending the free PSA screening clinic.

In an urban community study conducted in Michigan, media announcements were used to recruit men to undergo prostate cancer screening with DRE and PSA testing [29]. Men completed a baseline survey questionnaire at the screening site, viewed an educational videotape, and filled out an exit survey. At baseline, African-American men were significantly less knowledgeable about prostate cancer and screening than men who were not African-American. At the exit survey, there was no longer a race-related knowledge difference.

Volk et al. [30] reported on a study concerning the prostate cancer knowledge of 160 men who were 45–70 years of age and who presented at a university-based family medicine clinic for scheduled office visits. Men who completed a baseline survey were assigned to either a control group or an intervention group. Those men in the intervention group were shown a 20-min videotape that presented information on the pros and cons of PSA testing. Two weeks after the office visit, an endpoint survey was administered. Intervention group men provided more accurate responses to survey items that concerned early prostate cancer mortality rates, performance characteristics of PSA testing, and treatment-related complications as compared to control group men. The authors concluded that exposure to the videotape decision aid enhanced the capacity of study participants to make an informed decision about having a prostate cancer screening exam.

Frosch et al. [31] used the same videotape described above in Volk et al. [30]. The authors compared the effectiveness of three interventions to promote shared decision making about prostate cancer screening among men seen in a preventive health program. The three interventions were: a videotape alone, an oral presentation and discussion, and a videotape with a question and answer session. These interventions were compared with men who received no intervention (usual care). All three interventions improved knowledge regarding prostate cancer screening, reduced enthusiasm for screening, and increased interest in participating in screening decisions. All three interventions also significantly decreased the proportion of men who chose to have PSA screening; the magnitude of the reduction was significantly greater in the two groups who saw the videotape than in the discussion only group.

In a randomized controlled trial involving 257 men seen at a Department of Veterans’ Affairs Hospital in Milwaukee, Schapira and VanRuiswyk [32] found that an illustrated pamphlet
describing the possible outcomes of prostate cancer screening increased knowledge about prostate cancer screening but had no effect on whether or not the men had the test.

Myers et al. [33] randomly assigned 413 African-American men who were 40–70 years of age either to a minimal or enhanced intervention group. The former group received an introductory letter that invited them to visit a urology clinic to receive information about prostate cancer screening and to decide whether to have a screening exam (DRE and PSA testing). The latter group received the same contact plus a personally tailored informational booklet and a follow-up telephone contact related to prostate cancer screening. At the clinic, men from both groups were provided print materials that described the pros and cons associated with prostate cancer screening. If the participant chose to have an exam, he was asked to sign a written consent for testing. Results from the study showed that men in the enhanced intervention group were significantly more likely than men in the minimal intervention group to make a clinic visit and have a screening exam (51% and 29%, respectively).

Findings from the studies described above show that there are a number of different ways to convey information to patients about screening. These studies do not shed light on what practitioners can do, beyond simply providing information, to help patients make informed decisions about their health care.

3. Decision support methods for patient decision making

In selecting from available alternative courses of action, individuals are influenced by the extent to which they believe that a given alternative will serve to achieve one or more criteria. Further, the overall perceived value of a given alternative is often based on the perceived likelihood of achieving multiple and sometimes conflicting criteria. The actual process of deciding on a given course of action usually includes the following steps: (1) identifying the alternatives available and the personal criteria on which they will be evaluated; (2) determining how well the alternatives achieve personally meaningful criteria, based on an assessment of available data and personal preferences; (3) determining the importance of each criterion in the decision-making process; and (4) making a choice among the alternatives after processing the information obtained in the previous steps [34].

There are a number of models that have been developed to aid decision making. These models include goal programming, multiobjective programming, scoring methods, multiattribute utility theory (MAUT), and the AHP [35,36]. Of these, we considered only the two most widely used approaches, namely MAUT and AHP. Both of these approaches have been successfully applied to medical decision making [37–44].

After a review of both methods, AHP was selected since the use of pairwise comparisons was thought to be a decision-making approach that simplifies the process of making judgments. In addition, another important practical advantage of AHP is that it allows and measures inconsistency of judgments. These advantages make AHP a decision-making approach that is more natural and accessible to individuals with diverse educational and social backgrounds.

4. Developing the decision-counseling protocol

In 1999, we assembled a multidisciplinary research team representing health education, social psychology, psychiatry, epidemiology, biostatistics, decision science, primary care, radiology, and
urology. The research team began developing a decision-counseling protocol that included two components: an informational booklet on prostate cancer and screening; and an AHP-based decision-counseling session. Both intervention components addressed pros and cons associated with prostate cancer screening.

4.1. Informational booklet

Specific items addressed by the booklet include: the differences of opinion relating to the value of a routine prostate checkup, the function of the prostate gland, risk factors for prostate cancer, prostate problems, the process for checking for prostate cancer, treatment options, and the value of making a personalized decision.

The informational booklet was field-tested in face-to-face interviews. A literacy expert from the Health Promotion Council of Greater Philadelphia conducted interviews with 20 local men between the ages of 40 and 69. The goal of the interviews was to determine if the men could recognize the purpose of the booklet and to learn if they understood the language, terminology, and concepts contained therein. Most men reported that the text was easy to read and interesting. However, it was suggested that the medical terminology be simplified and more pictures should be included. Interestingly, many men said that they thought the purpose of the booklet was simply to encourage prostate cancer screening. Many overlooked the central message in the booklet, that is, there is a decision to be made about screening. The interviewees also indicated that they would be likely to read the booklet and consider the issue of screening more carefully if they were encouraged to do so by their physician.

We modified the informational booklet by simplifying the text, making the issue of decision making more prominent, and including a page that makes physician support explicit. These and other changes were incorporated into a final version. This version highlights the screening controversy, provides information about prostate cancer and screening, clarifies steps involved in screening and diagnostic evaluation of abnormal findings, explains treatment options, and encourages shared decision making.

4.2. AHP-based, decision-counseling session

The research team also developed an AHP-based decision-counseling protocol that was designed for use by a health educator in a primary care setting. The team considered different modes for collecting and processing decision-making information. AHP-based decision support software is available but was not selected for this study for several reasons. First, the research team decided against using a personal computer in order to maintain the focus on the interaction between the health educator and the patient. We were concerned about positive and negative reactions to the presence of computer hardware. Second, errors in data entry could lead to additional time required to complete the session. Third, a general purpose AHP software package provides unneeded and potentially distracting functionality. As a result, tables were created that list all possible combinations of judgments along with their corresponding AHP weights. (The number of possible judgments was limited as discussed below.) These weights are then combined using a weighted-averaging approach to determine the patient’s overall strength of preference toward having or not having an exam.

Initially, a paper and pencil system was devised and tested first with focus group participants and later with individual patients. Based on direct observation and patient feedback, it was apparent that
this approach required too much time to complete. A calculator-based approach was developed and demonstrated. It was decided that this approach was unobtrusive and easy to use.

Information provided by the focus groups indicated that it was necessary to modify and simplify several aspects of the standard AHP. Four areas required modifications.

(1) Placing limits on the number of criteria and the number of alternatives to be evaluated.

The purpose of this modification is to minimize the required number of judgments that the patient must provide and to help reduce the likelihood of unacceptable levels of inconsistency. After extensive discussion, we decided to limit the number of criteria to three and the number of alternatives to two (have PSA/DRE exam versus do not have PSA/DRE exam). Having the patient rank the criteria as most important, second most important, and third most important also simplifies the process of eliciting the necessary judgments. For the same reason, the patient is asked to indicate which alternative favors each criterion. For example, suppose the patient indicated that maintaining his health state is an important decision criterion. He would then be asked: Would maintaining your health state lead you to have or not have the exam?

(2) Truncating the AHP scale to better reflect the patient’s strength of preference and to reduce the likelihood of inconsistency.

The standard AHP measurement scale is limited to one order of magnitude for expressing preferences of one item over another. Specifically, 1, 3, 5, 7, and 9 represent equal, moderate, strong, very strong, and extreme importance, respectively. A 9.9 can be used to indicate that one item completely dominates another.

When the number of criteria is limited to three and the number of alternatives to two (as mentioned in point 1 above), the alternative favoring the most important criterion will generally be the preferred alternative. Specifically, this situation will occur if the most important criterion is at least three times more important than the second most important criterion. Therefore, in these circumstances, we can effectively replace the 3, 5, 7, and 9 judgments with 9.9 to indicate complete dominance of one item over another.

However, based on the results of the focus groups, we found that it is necessary to allow the patient to clearly discriminate between alternatives that are close and somewhat indistinguishable. For this reason, we allow the use of judgments of 1.3, 1.5, 1.7, and 1.9. For example, a judgment of 1.5 indicates that, for items that are close and somewhat indistinguishable, one item is strongly (i.e., 50%) more important than the other. Therefore, to make the scale as simple as possible without sacrificing meaningful choices, the truncated AHP scale used for this study is: 1, 1.3, 1.5, 1.7, 1.9, and 9.9. As part of the decision-counseling protocol, appropriately sized bars, as well as words, are used to illustrate these differences in strength of preference.

(3) Minimizing the need to review and revise the patient’s pairwise comparisons.

During the standard AHP, several revision cycles are possible, especially if some sets of judgments are inconsistent. Given the desire to control the time required for, and the patient’s interest in, the decision phase, revision cycles should be eliminated if possible.

Using the truncated AHP scale mentioned in point 2 minimizes the number of inconsistent cases that can result. Specifically, since there are six possible pairwise comparison values and three required pairwise comparisons for the criteria (most important compared to second, second to third, and most important to third), we have $6 \times 6 \times 6 = 216$ distinct sets of judgments. For each of the 216 cases, we computed the inconsistency ratio and found that only six of these exceed the generally
accepted level of 0.10 [36]. Therefore, in our study, judgment revision cycles were substantially limited.

(4) Use appropriate language to express strength of preference and the results of the decision process.

After extensive discussion, the words used to describe the truncated AHP scale preferences and the results of the AHP analysis were modified as follows:

<table>
<thead>
<tr>
<th>Judgment</th>
<th>Verbal description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>About the same importance</td>
</tr>
<tr>
<td>1.3</td>
<td>A little bit more important</td>
</tr>
<tr>
<td>1.5</td>
<td>Somewhat more important</td>
</tr>
<tr>
<td>1.7</td>
<td>A lot more important</td>
</tr>
<tr>
<td>1.9</td>
<td>A whole lot more important</td>
</tr>
<tr>
<td>9.9</td>
<td>Overwhelmingly important</td>
</tr>
</tbody>
</table>

Based on these modifications and simplifications, a counseling protocol was designed for use by a trained health educator. Steps involved in the protocol are summarized below:

1. The health educator meets the patient, reviews the informational booklet, and responds to questions related to its content. Responses are recorded on a hard copy form.
2. The health educator prompts the patient to identify criteria by asking him to complete the following sentences, “I want to have a prostate screening examination because . . .” and “I don't want to have a prostate cancer screening examination because . . .” For each sentence, the patient is encouraged to provide up to three responses. All responses are recorded on a hard copy form.
3. The patient is asked to identify and rank (first, second, third) the three most important responses given in point 2 above. These responses are the criteria used in the process. The rankings of the criteria are recorded on a hard copy form.
4. With respect to the most important criterion, the patient indicates whether this criterion leads him toward having the exam or not having the exam (to establish the direction of preference). Next, the patient indicates the strength of preference of the selected option (having or not having the exam) using the truncated AHP scale. This process is repeated for the second most and third most important criteria and recorded on a hard copy form.
5. The patient is guided through a process of pairwise comparisons of the three criteria (i.e., first to second, second to third, and first to third). The truncated AHP scale is used to capture these judgments. The responses are recorded on a hard copy form.
6. The health educator enters all of the judgments from steps 4 and 5 into a programmable hand-held calculator that executes an algorithm to compute the final priorities of the decision alternatives. The alternative with the highest priority is identified, and this priority is called the decision preference score. The health educator validates the score with the patient.
7. The results are transferred to a hard copy form that displays the patient’s preferred option and score, a bar graph that represents the strength of preference for the exam and no exam alternatives (using the truncated AHP-based scale as mentioned above), and explanatory text.
The decision preference score reflects the strength and direction of the individual’s preference in favor of one decision alternative (e.g., have a screening exam) as compared to another alternative (e.g., not have a screening exam). As will be shown in the discussion of the results, the decision preference score may indicate that the alternatives are equally preferred or it may signal the degree to which one alternative is preferred over the other.

5. Testing the decision-counseling protocol in primary care settings

The decision-counseling protocol was tested in four primary care practices in Philadelphia. We report preliminary findings from one of those settings, a large university-based practice. A total of 329 men were identified who were 50–69 years of age; had no history of prostate cancer, prostate ultrasound or biopsy, or benign prostatic hyperplasia (enlargement of the prostate); had been seen at the practice in the past 2 years; had a current address in the Philadelphia area; and for whom race/ethnicity was indicated in the database. Each man was mailed an advance letter that described the study and indicated that he would be contacted to complete a baseline telephone survey. We completed a baseline telephone survey for 103 men. We sent a mailed version of the survey instrument to non-respondents and received completed surveys from an additional 96 men. Thus, a total of 199 (63%) men completed a baseline survey.

Upon completion of the baseline survey, men were randomly assigned to either a control group (N = 99) or an intervention group (N = 100). The men in the control group received a mailed copy of the informational booklet. The men in the intervention group were mailed a copy of the booklet and received a telephone call to arrange an office visit with a health educator for a face-to-face informational session on prostate cancer screening. We completed a decision-counseling session with 60 men in the intervention group. Reasons for not completing the session included unavailable during study period (N = 20), refused (N = 9), no longer a patient in the practice (N = 5), serious illness (N = 4), and deceased (N = 2).

6. Characteristics of the patient population

Inspection of baseline survey data (199 men) showed that 70% of the men were 50–59 years old. Twenty-one percent of the men were African-American, 75% were white, 3% were Asian or Pacific Islanders, and 1% were Hispanic. Almost three-quarters of the men were married. Seventy percent had less than 12 years of education, 23% were high school graduates, and 7% had some post-secondary education. Nine percent of the men reported a family history of prostate cancer. Less than half (44%) had had both a DRE and PSA test in the previous year.

7. Results for the intervention group

As mentioned, men in the intervention group were asked to identify the three most important criteria that they thought were likely to influence whether or not to have a screening exam. Responses were recorded and assessed using content analysis techniques. The principle investigator and two
health educators from the research team reviewed the responses and independently established unique content categories. Using these categories, consensus was reached regarding a final set of criteria that relate to wanting or not wanting a screening examination. For example, criteria leading some men toward having a screening examination, called positive criteria, include:

1. perception of a positive effect on their current health,
2. perception of a positive effect on their long-term well-being,
3. encouragement by health care providers, and
4. encouragement by family members or friends.

For example, criteria leading some men toward not having a screening examination, called negative criteria, include:

1. perception of a negative effect on their current health,
2. perception of a negative effect on long-term well-being,
3. discouragement by health care providers,
4. discouragement by family members or friends,
5. feeling uncomfortable or embarrassed about having the test, and
6. belief that the test is inconvenient or expensive.

The 60 men in the intervention group could identify any combination of positive and negative criteria. We found that 40 men (67%) identified three positive criteria, while the remaining 20 men (33%) identified one or more negative criteria. The most frequently cited positive criterion was the one related to the perceived effect of screening on current health. Alternatively, the most frequently mentioned negative criterion was related to the perceived effect of screening on long-term well-being. For each of the men, AHP priorities for having and not having the examination were computed. Since these priorities sum to one, the results are expressed in terms of the AHP priority for having the examination, called the decision preference score. The resulting distribution of scores and associated decision preference and strength of preference are displayed in Table 1. Of the 60 respondents, only five did not have a preference toward having the examination. We note that the purpose of our study is not necessarily to increase the percentage of men taking the test, but to provide decision support to help men reach a decision that provides them with a high level of satisfaction.

The decision preference score ranges and their corresponding verbal descriptions directly relate to the modified AHP scale that was used to elicit judgments as described in the previous section. The research team believed that it was important to attribute verbal descriptions to the resulting weights in order to express strength as well as directionality of preference. The decision preference score ranges were developed as follows. A decision preference score of 0.500 corresponds to “no preference” about having or not having the examination, and so this value is set at the center of the “no preference” range. As previously discussed, a pairwise comparison of 1.3 corresponds to “a little bit more preferred.” Therefore, since a pairwise comparison of 1.3 in favor of having the examination over not having the examination results in a decision preference score of 0.565, this value was placed at the center of the “a little bit more preferred” range. Since we did not distinguish between a pairwise comparison of 1.1 and 1.0, we set the “equally preferred” range to encompass the range associated with the 1.1 comparison or a decision preference score of 0.524. Therefore, the
Table 1
Screening decision preference score, direction, and strength (N = 60)

<table>
<thead>
<tr>
<th>Preference score</th>
<th>Direction and strength</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do not have an exam</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.000–0.332</td>
<td>Overwhelmingly preferred</td>
<td>1</td>
<td>(1.7)</td>
</tr>
<tr>
<td>0.333–0.356</td>
<td>Very much more preferred</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0.357–0.383</td>
<td>Much more preferred</td>
<td>2</td>
<td>(3.3)</td>
</tr>
<tr>
<td>0.384–0.416</td>
<td>Somewhat more preferred</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>0.417–0.454</td>
<td>A little bit more preferred</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Unsure about having an exam</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.455–0.544</td>
<td>No preference</td>
<td>2</td>
<td>(3.3)</td>
</tr>
<tr>
<td><strong>Have an exam</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.545–0.582</td>
<td>A little bit more preferred</td>
<td>3</td>
<td>(5.0)</td>
</tr>
<tr>
<td>0.583–0.615</td>
<td>Somewhat more preferred</td>
<td>2</td>
<td>(3.3)</td>
</tr>
<tr>
<td>0.616–0.643</td>
<td>Much more preferred</td>
<td>4</td>
<td>(6.7)</td>
</tr>
<tr>
<td>0.644–0.666</td>
<td>Very much more preferred</td>
<td>4</td>
<td>(6.7)</td>
</tr>
<tr>
<td>0.667–1.000</td>
<td>Overwhelmingly preferred</td>
<td>42</td>
<td>(70.0)</td>
</tr>
</tbody>
</table>

lower end of the range for “a little bit more preferred” is 0.565 – 0.500x(0.565 – 0.524) or 0.545, while the upper end is 0.565 + 0.500x(0.600 – 0.565) or 0.583. The other ranges are computed in a similar fashion. The only exception is the lower end for the “overwhelmingly preferred” range. This endpoint was set using the pairwise comparison of 2, which corresponds to a decision preference score of 0.667. Although a pairwise comparison of 2 was not used in this study, it was selected since it is the first pairwise comparison greater than 1.9 and therefore outside of the “very much more preferred” range.

Using the results in Table 1, we see that about 92% of the men had a decision preference score indicating that they preferred having the exam. Most of these scores indicated an overwhelming preference towards having the exam. Approximately 3% of the men had a score that indicated that they had no preference about having the exam; while 5% of the men had a score that indicated that they preferred to not have the exam.

We have moved forward on this investigation by administering an endpoint survey questionnaire and by conducting an endpoint chart audit. The questionnaire and chart audit were used to collect information for each study participant at a point that was at least 6 months after the prostate cancer informational booklet was provided. A total of 137 of 199 study participants (69%) completed the endpoint survey, providing measures for the control group and intervention group of cognitive, affective, social influence, and intention factors related to prostate cancer screening. We also assessed whether or not the respondent discussed prostate cancer screening with his primary care physician subsequent to informational booklet mailing. By comparing these measures for the two study groups, we will be able to ascertain long-term intervention effects.

Endpoint chart audits were completed for all 199 men who were enrolled in the study. Data collected via this chart audit will be used to determine if there were differences between the study groups relative to prostate cancer screening behavior. These analyses are currently underway.
8. Conclusions

In this study, a multidisciplinary research team developed and implemented a decision-counseling protocol based on the AHP. Of the 100 men asked to participate in this study, 60 completed the process. Further refinement of the methods used may lead to higher levels of participation. Also, increased participation might occur if the protocol were linked to a patient’s appointment at the physician’s office.

While health educators involved in the study required some training, none was needed for the patients. It is important to note that regardless of educational or social background, the patients were capable of identifying the criteria and making the necessary judgments. This finding supports the notion that AHP offers a natural means for eliciting preferences.

The results of this study have demonstrated that a well-designed decision-counseling protocol administered by a trained facilitator can be successfully implemented in a primary care patient population. Future research should focus on refining decision-counseling methods and on testing this type of decision aid in other areas of medical decision making (e.g., utilization of screening tests for other chronic diseases, selection of treatment options, participation in clinical trials). Equally as important, this study also offers the promise of expanding the application of the AHP into new personal decision-making areas.

References


Matthew J. Liberatore, Ph.D., is the John F. Connelly Chair in Management and Professor of Decision and Information Technologies at Villanova University. Dr. Liberatore has published over 50 journal articles in management science, information systems, project management, and R&D management, and has led or participated in grants funded by organizations such as the National Science Foundation and the National Institutes of Health. His current research focuses on project selection and scheduling and medical decision making.

Dr. Ronald E. Myers is Professor of Medicine, Department of Medicine, Division of Genetic and Preventive Medicine, Jefferson Medical College, Thomas Jefferson University. He has been principal investigator on a number of National Institutes of Health-funded research grants and has numerous peer-reviewed publications in the field. His areas of expertise include patient adherence to cancer screening, physician follow-up of abnormal cancer screening test results, informed decision making in cancer susceptibility testing and clinical trials participation.

Robert Nydick, Ph.D., is Associate Professor and Chair of the Department of Decision and Information Technologies at Villanova University. Dr. Nydick has published numerous articles in the decision support and education of management science areas and has participated in grants funded by the National Institutes of Health, the Department of Defense, and Aetna U.S. Healthcare. Most recently his research has focused on the application of the analytic hierarchy process in medical decision making settings.

Dr. Michael Steinberg is assistant professor in the Department of Medicine, Division of General Internal Medicine at UMDNJ-Robert Wood Johnson Medical School with a dual appointment at the UMDNJ-School of Public Health. His clinical and research interests include clinical preventive services and tobacco dependence treatment in primary care and hospital settings. He has published and presented on several topics related to preventive medicine and tobacco issues.

Earl R. Brown, M.D., Roy Gay, M.D., Thomas Powell, M.D., and Roberta Lee Powell, M.D. are physicians engaged in primary care practices in Philadelphia, PA.