A Computerized Family Planning Counseling Aid: A Pilot Study Evaluation of Smart Choices

CONTEXT: *Resource constraints may make it challenging for family planning clinics to provide comprehensive contraceptive counseling; technological tools that help providers follow recommended practices without straining resources merit evaluation.*

METHODS: *A pilot study using a two-group, posttest-only experimental design evaluated Smart Choices, a computer-based tool designed to help providers offer more patient-centered counseling and enable patients to participate proactively in the counseling session. In two North Carolina family planning clinics, 214 women received usual counseling in March–May 2013, and 126 women used Smart Choices in May–July 2013. Exit interviews provided data for the evaluation. Multivariate Poisson and multinomial logistic regression analyses were performed to examine group differences in counseling outcomes.*

RESULTS: *Three of 12 hypotheses tested were supported: Compared with controls, women in the intervention group knew more contraceptive methods (adjusted mean, 11.1 vs. 10.7); discussed more topics related to sexual health during counseling (1.2 vs. 0.9 among those reporting any discussion); and rated counseling as more patient-centered, an indication of how well they felt providers understood their family planning circumstances and ideas (3.9 vs. 3.7 on a scale of 1–4). Contrary to another hypothesis, controls were more likely than women in the intervention group to choose IUDs and implants.*

CONCLUSIONS: *Computerized counseling aids like Smart Choices are in an early stage of development. Future research is warranted to develop tools that lead to more productive and individualized clinic visits and, ultimately, to more effective contraceptive use and reduced levels of unintended pregnancy.*

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Forty-five percent of pregnancies in the United States are unintended,[1] and more than half of women at risk for unintended pregnancies either do not use contraceptives or use them inconsistently or incorrectly.[2] Patient counseling provides an opportunity to support women's effective use of contraceptives,[2–4] although evidence for the effectiveness of contraceptive counseling interventions is limited.[5–7] Several authors have discussed principles and best practices for contraceptive counseling,[3–5,8] and the U.S. Office of Population Affairs (OPA) and the Centers for Disease Control and Prevention (CDC) have issued recommendations.[9,10] To comply with the recommendations, providers need to obtain information from patients on multiple topics (including medical history, pregnancy intentions, contraceptive experiences and preferences, sexual health, and social and behavioral factors that could affect their contraceptive use); they also need to provide patients with comprehensive information about birth control methods they can safely use (including information on effectiveness, side effects, noncontraceptive benefits, ability to protect against STDs and correct use).[10] Resource constraints on family planning clinics may, however, make it challenging to provide such comprehensive contraceptive counseling.[11] Technological tools that support contraceptive counseling are one possible means to help providers follow recommended counseling practices without straining clinic resources. In this article, we report on a pilot test of one such tool, Smart Choices.

SMART CHOICES

We developed Smart Choices, a computer-based contraceptive counseling aid for family planning patients to use in the clinic, before they see their provider. Smart Choices has two parts. The first part is a questionnaire about factors that may affect contraceptive practice, such as childbearing attitudes and plans, contraceptive experience (reflecting past method choices and correctness and consistency of use), partner attitudes and sexual risk behaviors. The questionnaire also asks patients if they have questions or concerns about contraceptives and sexual health issues, listing several topic areas, and encourages them to write any specific questions they may want to ask on a sheet of paper that they can take with them and refer to when they see the provider. Patients' responses to the questionnaire are printed on an easy-to-read, 1–2-page form that can help providers identify issues that would be important to discuss during counseling (e.g., risk factors for unintended pregnancy).

The second part of Smart Choices is an interactive audiovisual birth control guide that patients can use to explore method options to their desired depth. The guide includes various filters to help users decide which methods they

may be most interested in exploring (e.g., "does not contain hormones" or "protects against STD"), and for each method, it provides the information suggested by the OPA and CDC recommendations. A more detailed description of Smart Choices, along with a report on the feasibility of integrating it into the clinic flow and its acceptability to providers and patients, can be found elsewhere.[12]

Smart Choices was designed to be easily disseminated and used by a broad variety of clinics with minimal need for provider training. To use it, a clinic merely has to download it and have a computer on which to operate it and a printer on which to print the summary of questionnaire responses. For purposes of the pilot study, we did not include provider training beyond an overview of what information would appear on the printouts. We asked providers to review the printouts and encouraged them to use the information to help guide their counseling sessions, but we did not ask providers to change their approach to counseling. In practice, as we learned from qualitative interviews with providers at the end of the intervention period, providers varied in the extent to which they made use of the printouts.[12]

We designed Smart Choices with the aim of improving contraceptive counseling, and we expected several features of the tool to help achieve that goal. Because the tool presents providers with in-depth, standardized information about patients, we expected it to enhance the comprehensiveness of counseling without increasing providers' workload; promote patient-centered counseling (i.e., counseling that is responsive to individuals' particular needs and priorities, and that encourages patients to assume an active role in decision making about their care); and reduce provider bias that can lead to disparities in the content and quality of patient-provider communications.[13] By providing patients with detailed information about birth control methods, asking them questions about their contraceptive plans and experiences, and asking them if they have questions to discuss with the provider, we expected it to encourage patients to be proactive during counseling and to further promote comprehensiveness of counseling. Furthermore, computer-based questionnaires may have advantages over other approaches to gathering information from patients. Some studies have suggested that for people who are uncomfortable answering sensitive questions, they elicit more honest responses than face-to-face interviews;[14–16] others have shown that they are preferred by patients over paper-based ones and that they reduce the amount of missing data.[17,18] In our earlier study, some providers noted that responses to the Smart Choices questionnaire were more accurate than the information patients provided on patient history forms.[12]

Several other computer- or Web-based tools have features similar to those of Smart Choices. My Method[19] (an online program) and Best Method for Me[20,21] (a computer program for use in a clinic) both ask the user to complete a questionnaire and, on the basis of her responses, use algorithms to recommend methods that may be most appropriate for her. Bedsider[22–24] and Method Match[25] are Web-based tools that, like the birth control guide component of Smart Choices, provide comprehensive information about birth control methods and have filters regarding method characteristics to help users find methods of most interest. In addition, Bedsider provides online support for setting up birth control or appointment reminders and allows users to view videos of women discussing their experiences with various methods, as well as animated features that address myths about contraception. Gilliam and colleagues developed an interactive computer application to be used in clinic waiting rooms, focused on increasing patients' interest in an IUD or contraceptive implant.[26] Schwarz and colleagues developed a computer program for use in acute care settings that provides information about birth control methods and offers patients an opportunity to request a prescription for a method.[27] In contrast to some of these other tools, Smart Choices neither recommends nor encourages patients to use specific methods. Smart Choices also differs from these tools in its focus on improving contraceptive counseling, and in engaging both the patient and the provider in the counseling session.

CONCEPTUAL FRAMEWORK

We adapted the chronic care model as the conceptual framework to guide the development of Smart Choices and its evaluation.[28] Although the vast literature on the model deals mostly with care of chronic illnesses, such as asthma, diabetes and hypertension,[29–32] the model is also relevant to family planning care. A chronic condition is "any condition that requires ongoing adjustments by the affected person and interactions with the health care system."[28] This definition encompasses the needs of most family planning patients, who require ongoing interactions with their providers to adjust contraceptive methods (e.g., by obtaining different formulations of oral contraceptives or different types of methods) as they experience side effects or changes in sexual relationships and life circumstances. Furthermore, many discussions of optimal family planning counseling incorporate the tenets of the model.[3–5,10,33]

The chronic care model posits that improvements in health system design that make patients more informed and "activated" (i.e., proactively involved in their care),[28–32] and make clinicians more prepared and proactive, lead to more productive patient-provider interactions and, thereby, to improved outcomes.[34] Smart Choices is designed to effect the types of improvements that underlie the model: It aims to increase patients' knowledge about contraceptive methods and enable their proactive participation in counseling sessions, and to increase providers' knowledge of patients' needs and circumstances, thus preparing them to provide more patient-centered counseling. As a result, according to the model, the quality of family planning counseling should improve with use of the tool. The model further posits that when patients are well informed and activated, they are more likely to choose the most effective methods and to be satisfied with their plan to use whichever method they choose.

METHODS

Study Design and Setting

We pilot-tested Smart Choices using a posttest-only experimental design in two family planning clinics in North Carolina: a rural county health department and an urban Planned Parenthood health center. To be eligible for the study, women had to be 15–44 years old, attending the clinic for a birth control appointment or annual exam, and fluent in English. They also had to believe they could become pregnant in the coming year.* Because using the intervention could affect providers' counseling of both intervention and control patients, we tried to avoid contamination by conducting the control condition first (in March–May 2013) and then implementing the intervention (in May–July 2013). Control participants received the clinics' usual counseling. Usual counseling varied across providers, but in the county health department, all counseling was conducted by a clinician, and in the Planned Parenthood center, patients received counseling first from a health educator and then from a clinician. Intervention participants used Smart Choices, and providers (both health educators and clinicians) received the printout before counseling. The evaluation was based on comparing intervention and control groups' perceptions of their counseling experience and their reports of counseling content.

Procedures in the two clinics differed. In the health department clinic, patients went directly to the exam room after checking in, and there, nurses asked them if they would be interested in learning about the study. If so, the interviewer entered the exam room, determined eligibility and obtained informed consent. Intervention patients used Smart Choices in the exam room before seeing the clinician. In the Planned Parenthood health center, staff asked patients when they checked in if they would be interested in learning about the study. If so, they went to a private room, where the interviewer determined eligibility and obtained informed consent. Eligible patients used Smart Choices there before proceeding to the exam room. To minimize disruption to the clinic flow, a patient was required to stop using the tool after 20 minutes if the provider was ready to see her. Most patients had finished, however, before the provider was ready to see them; the average time patients spent using Smart Choices was 14 minutes.[12]

In both clinics, the interviewer gave the printout of women's responses to the Smart Choices questionnaire to the provider before the counseling session. Providers were encouraged to use the information on the printout during the counseling process in whatever way they found most useful.

At the end of the clinic visit, study interviewers conducted structured, face-to-face exit interviews with all participants to obtain information on intervention outcomes; social and demographic characteristics; number of times the respondent had attended the clinic; and birth control methods the respondent had been using before the visit, had planned to get at the visit and had chosen during the visit. Intervention participants were also asked their reactions to Smart Choices.

Each participant received a $20 gift card. All procedures and instruments were approved by the institutional review board of RTI International.

Outcomes and Hypotheses

We examined evidence for the tool's promise as a counseling aid in four domains: patients' contraceptive knowledge, discussions during the counseling session of topics relevant to effective family planning practice, patients' ratings of the quality of the counseling and interactions with the clinicians, and contraceptive method choice. For each domain, we measured multiple dimensions, for a total of 12 outcomes. We selected these dimensions on the basis of the key constructs of the chronic care model and literature related to the characteristics of optimal family planning counseling.[2–5,7,8,10,35]

Three outcomes made up the contraceptive knowledge domain: the number of contraceptive methods women knew (with a possible range of 0–12), the extent to which they felt they knew enough about methods to choose the right method for themselves (1–4) and how confident they were that they would be able to use their method correctly (1–4).

Another three outcomes constituted the domain related to discussions of topics during the counseling session. One assessed the number of birth control topics discussed out of seven that were presented (e.g., how to use their chosen method and side effects). Another assessed the number of topics related to childbearing attitudes and plans discussed out of six possibilities that were presented (e.g., how the patient would feel if she got pregnant in the next few months and how her partner would feel). The third assessed the number of sexual health topics discussed; this outcome had four possible discussion items (e.g., STD risk factors and low sex drive).

Four outcomes represented the domain regarding the quality of the counseling and interactions with clinicians. One of these measured the extent to which patients who had questions or concerns asked their questions (possible range, 1–3), and another examined the extent to which the choice of the patient's contraceptive method was a shared decision between the patient and provider (1–5). The third reflected the general quality of care, as determined by factor analysis based on the degree (on a scale of 1–4) to which women agreed with five statements (e.g., "the provider did not judge you" and "the provider showed care and concern about you as a person"). The last measure in this domain, patient-centered family planning counseling, was the mean of responses to two questions: the extent to which women agreed that the provider "showed genuine interest in your ideas about family planning and sexual health" and "really understood your individual needs and circumstances that affect what you do about family planning" (each with possible scores of 1–4).

Finally, the contraceptive method choice domain had two outcomes: the method the woman had decided to use and

*Specifically, women were asked: "Do you think you could become pregnant in the next year? That is, you are fertile and you might have sexual intercourse with a man."

the extent to which she was satisfied with the plan to use her chosen method (possible range, 1–4).

We hypothesized that after the clinic visits, women in the intervention group would have greater knowledge about contraceptive methods than women in the control group—specifically, they would know more methods, would be more likely to feel that they knew enough to choose a method that is right for themselves and would be more confident about their ability to use the method correctly. We also hypothesized that women in the intervention group would have discussed with their providers more topics related to birth control, childbearing attitudes and plans, and sexual health. We further hypothesized that they would have had more shared decision making in choosing their contraceptive, that they would rate their providers' general quality of care more highly and their counseling as more patient-centered, and that they would be more likely to have asked their providers any questions they had regarding their chosen contraceptive. Finally, we hypothesized that women who used Smart Choices would be more likely than women in the control group to have chosen effective methods and to be satisfied with the plan for using their method.

Analysis

First, we explored bivariate relationships between treatment (intervention vs. control) and each outcome, using chi-square tests for categorical variables and t tests of differences of means for count variables. For quality of care, we added treatment to the confirmatory factor analysis to determine whether treatment was related to the factor.

Next, we conducted multivariate analysis of the five outcomes with which treatment had significant bivariate associations (number of methods known, patient-centeredness of counseling, discussion of pregnancy attitudes, discussion of sexual health and contraceptive method chosen). For outcomes measured as counts, we used Poisson regression to assess associations with treatment and to estimate the adjusted means for the intervention and control groups.[36] For number of methods known and patient-centeredness of counseling, the estimated Poisson regression models were adjusted for underdispersion (the true variance is smaller than the mean). For discussion of pregnancy attitudes and discussion of sexual health, large proportions of women (59% and 47%, respectively) reported zero counts. Therefore, we estimated zero-inflated Poisson regression models, in which a logit model predicts the intervention's association with having a discussion of at least one topic, and a Poisson count model predicts characteristics associated with the number of topics discussed among women reporting discussion of at least one topic.[37] In estimating zero-inflated Poisson regression models, we adjusted for overdispersion (the true variance is larger than the mean). For contraceptive method chosen, we used a multinomial logistic regression model[38] to estimate associations of treatment group with use of three types of methods (IUD or implant; injectable, ring or patch; and pill)* and to calculate predicted probabilities of using each type according to treatment group. For ease of interpretation, for all the multivariate models, we present only the adjusted means and predicted probabilities.

For the multivariate models, we included characteristics that differed by treatment group (insurance, number of clinic visits and site)† and some that did not differ, but that were theoretically expected to be related to the outcomes (race and ethnicity, age, receipt of public assistance, employment and religious attendance). In addition, for the model of number of methods known, we included the number of methods previously used; for the model of the method chosen, we included the method women had planned to get when they came to the clinic.‡

In both bivariate and multivariate analyses, we used $p<.10$ as the criterion for significance because this was a pilot study with a relatively small sample that was unbalanced (i.e., not equally divided between the intervention and control groups).

Our a priori power calculations indicated a sample size of 200 for each treatment group, to detect with 80% power a one-point mean difference on a 10-point rating scale or in a count measure, such as the number of sexual health topics discussed (alpha, .05). These sample sizes also ensured 80% power to detect differences of 15% for outcomes treated as proportions (e.g., choice of most effective methods), across a range of distributions (25–50%) in the control group. Power was higher to detect these and smaller differences for outcomes where the proportion was lower than 25–50% in the control group.

RESULTS

Sample Characteristics

We enrolled 214 women in the control group and 126 in the intervention group. We were unable to reach the target of 200 women in the intervention group because recruitment was significantly slower during the intervention period than it had been during the control period, particularly at the county health department. Of 432 potentially eligible women in the control group, 165 refused before screening, 18 were excluded during screening, 34 were lost to follow-up (i.e., did not have time to complete the exit interview and could not be reached afterward by telephone), and one was excluded from analysis because she

*Small numbers of women reported other methods; we categorized them with users of the methods most similar in effectiveness to the ones reported. Thus, the IUD or implant category includes one woman in the control group who chose sterilization. The pill category includes two women in the intervention group and six in the control group who chose male condoms, and two women in the control group who chose the diaphragm.

†Although the treatment groups differed in educational level, we did not include this variable in the final models because of multicollinearity with other characteristics (e.g., age, insurance, employment). Substituting education for these covariates did not change the magnitude or significance of the relationships between intervention exposure and the outcomes.

‡We also assessed method used before the clinic visit, but did not include it as a control in the multivariate analysis because it overlapped substantially with planned method.

TABLE 1. Percentage distribution of participants in a pilot study evaluating the Smart Choices computer-based family planning counseling aid, by selected characteristics, according to treatment group, North Carolina, 2013

Characteristic	Total (N=340)	Intervention (N=126)	Control (N=214)
Race/ethnicity			
Hispanic	9	9	10
Non-Hispanic black	33	37	31
Non-Hispanic white‡	57	54	59
Age			
15–19	16	15	16
20–24	33	30	34
25–29	24	24	24
≥30	28	31	26
Highest level of education†			
<college	36	33	37
Some college	35	32	37
≥four-year college	29	34	25
No. of pregnancies			
0	48	47	49
1	21	20	21
2	14	16	12
≥3	18	18	18
Feeling about getting pregnant			
Very much do not want to	65	72	60
Mostly do not want to	20	18	22
Half want and half do not want to	10	7	12
Mostly or very much want to/ does not matter	4	3	5
Living with a male partner			
Yes	37	33	40
No	63	67	60
Health insurance*			
None	33	35	32
Public and possibly private	29	21	34
Private only	38	44	34
Public assistance in past 12 months			
Any	45	41	47
None	55	59	53
Employment in past 12 months			
Full-time	50	56	46
Part-time	32	29	33
No steady job/no work at all	18	14	21
Attendance at religious services or activities			
≥weekly	23	21	24
Sometimes, but not weekly	39	40	38
Never	38	38	38
No. of prior visits to the clinic*			
0	35	45	29
1–2	27	25	28
≥3	38	30	43
Site†			
County health department	44	38	48
Planned Parenthood	56	62	52
Method used at time of clinic visit†,§			
None	21	14	25
IUD/implant	7	9	7
Injectable/ring/patch	18	20	16
Pill	30	28	32
Male condoms/withdrawal/abstinence	23	29	20
Method planned to use at time of clinic visit†,§			
None/no specific one/not thinking about using	10	4	13
IUD/implant	16	18	15
Injectable/ring/patch	26	27	26
Pill	45	48	43
Male condoms/abstinence	3	3	3
Method chosen at clinic visit†,§			
None/no decision	2	0	3
IUD/implant	16	11	18
Injectable/ring/patch	26	25	26
Pill	55	61	51
Male condoms/diaphragm	2	2	2
Total	100	100	100

*p<.05.†p<.10.‡Includes groups that were too small to be analyzed separately: Asian (4% of the sample), Native American (2%) and other (3%). §Participants who reported more than one method were categorized on the basis of the most effective one. *Note*: Percentages may not add to 100 because of rounding.

stated in the exit interview that she was pregnant. Of 266 potentially eligible women in the intervention group, 112 refused before screening, five were excluded during screening and 23 were lost to follow-up.

Fifty-seven percent of women were non-Hispanic white, 33% non-Hispanic black and 9% Hispanic (Table 1)*. Half were aged 24 or younger. Thirty-six percent had no college education, 35% had some college education and 29% had four years of college education or more. Nearly half had never been pregnant, and most did not want to get pregnant soon ("now or in the next few months"). More than one-third were living with a male sexual partner. Some 33% had no insurance, 29% had Medicaid and 38% had private insurance only. Nearly half had received public assistance in the past 12 months. Thirty-five percent were visiting the clinic for the first time; 56% were enrolled from the Planned Parenthood health center.

Before coming to the clinic, 30% of participants had been using oral contraceptives; 23% male condoms; 18% the injectable, ring or patch; 7% an IUD or implant; and 21% no method. When they came to the clinic, 45% planned to use oral contraceptives; 26% the injectable, ring or patch; 16% an IUD or implant; and 3% condoms or abstinence. Ten percent planned to use no method or planned no specific method. The method women had planned to get was not always the one they chose during their visit. Notably, 55% ended up choosing oral contraceptives, whereas 45% had planned to.

Most social and demographic characteristics did not differ between the two treatment groups. However, the intervention group was significantly more educated than the control group and was more likely to have private insurance, as well as to be visiting the clinic for the first time and to have been recruited from the Planned Parenthood health center. The treatment groups also differed in the methods

*Four percent of women were Asian, 2% were Native American and 3% identified with other ethnicities. As these groups were too small to analyze separately, they were grouped with whites.

TABLE 2. Results of bivariate analyses assessing relationships between various outcomes and treatment group in Smart Choices pilot study

Outcome	Intervention	Control
No. of birth control methods known		
Mean (SD)***	11.6 (0.7)	11.2 (1.1)
Range	7–12	6–12
No. of topics discussed related to childbearing attitudes and plans		
Mean (SD)**	1.1 (1.6)	0.8 (1.3)
Range	0–6	0–6
No. of topics discussed related to sexual health		
Mean (SD)†	1.1 (1.3)	0.9 (1.1)
Range	0–4	0–4
Patient-centeredness of counseling		
Mean (SD)*	3.8 (0.4)	3.7 (0.5)
Range	2–4	2–4
Method chosen (%)†,§		
IUD/implant	11	19
Injectable/ring/patch	26	26
Pill	63	53
None/no decision	0	3
Total	100	100

*p<.05. **p<.01. ***p<.001. †p<.10. §Participants who reported more than one method were categorized on the basis of the most effective one. *Notes*: SD=standard deviation. Differences in chosen method were assessed in chi-square tests; differences in all other outcomes shown were assessed in t tests Only outcomes that differed by treatment group are shown

they had used before the clinic visit, the methods they had planned to get when they came to the clinic and the methods they actually chose to use. (They did not, however, differ in the number of methods they had previously used; the average was 3.3 in the intervention group and 3.5 in the control group—not shown.)

Bivariate Relationships

In the bivariate analyses, five of the 12 outcomes were significantly related to treatment (Table 2), four of them in the hypothesized directions.

One knowledge outcome differed between treatment groups: On average, women receiving the intervention knew 11.6 methods, and controls knew 11.2. Although the difference between the means is modest, differences in the percentage distributions of women by the number of methods known are sizable. For example, 69% of the intervention group knew all 12 methods, compared with only 50% of controls (not shown).

In the discussion domain, two outcomes differed between groups. Women in the intervention group discussed with their provider more topics related to childbearing attitudes and plans than did controls (means, 1.1 and 0.8), as well as more topics related to sexual health (1.1 and 0.9). Again, although the differences in means are small, the percentage distributions show sizable differences. For example, 30% of women in the intervention group discussed two or more childbearing-related topics, compared with 19% in the control group.

One outcome reflecting the quality of counseling interactions also differed between groups: Compared with controls, women in the intervention group considered their care more patient-centered (mean, 3.8 vs. 3.7). Once again, although the difference between means is small, percentage distributions show marked variation. Some 12% of control women chose the lowest ratings for this measure, compared with 19% of the intervention group; 62% and 74%, respectively, selected the highest rating.

One outcome was significantly related to treatment in the opposite of the hypothesized direction. Women in the intervention group were less likely than controls to choose IUDs or implants (11% vs. 19%), and were more likely to choose oral contraceptives (63% vs. 53%). Similar results were found at each site (not shown).

Four other outcomes were related to treatment in the hypothesized directions, but narrowly missed being statistically significant: women's feeling that they had enough knowledge to choose the most appropriate method; their confidence in their ability to use the method correctly; discussion of birth control topics; and the extent to which women who had questions or concerns asked their questions. These findings, alongside the four significant results in the hypothesized direction, augment the overall pattern of support for the hypotheses.

Multivariate Results

Four of the five significant bivariate relationships remained statistically significant with multivariate adjustment (Table 3). The mean number of birth control methods that women knew, adjusted for covariates hypothesized to be potential confounders, was 11.1 for the intervention group and 10.7 for the control group. Although the two groups did not differ with respect to whether they discussed any sexual health topics with their provider, the mean number of topics if any such discussion occurred was higher among women in the intervention group than among controls (1.2 vs. 0.9). Women's mean rating of the providers' patient-centeredness also was greater in the intervention group than among controls (3.9 vs. 3.7).

Finally, results of the multinomial logistic regression model indicate that the intervention group was significantly less likely than the control group to choose IUDs or implants (predicted probabilities of 0.1 and 0.2, respectively) and significantly more likely to choose the pill (0.6 vs. 0.5). There was no difference between groups in the predicted probability of choosing the injectable, ring or patch (0.3 for both).

DISCUSSION

A computerized tool like Smart Choices may be valuable for providers striving to follow recommended best practices in family planning counseling. It collects from patients much of the social and medical information recommended by the OPA and CDC, and provides comprehensive information about all contraceptive methods.[10] It also encourages patients to ask questions;[3,10] supports shared decision making by helping patients think through their values and preferences related to contraception and presenting this

TABLE 3. Adjusted means and probabilities from Poisson regression models, and predicted probabilities from multinomial logistic regression model, assessing associations between various outcomes and treatment group in Smart Choices pilot study

Outcome	Intervention	Control
ADJUSTED MEANS AND PROBABILITIES		
Mean no. of birth control methods known* **	11.1	10.7
Discussions related to childbearing attitudes and plans		
Probability of no discussion	0.5	0.6
Mean no. of topics discussed (if any)	2.1	1.8
Discussions related to sexual health		
Probability of no discussion	0.06	0.05
Mean no. of topics discussed (if any)†	1.2	0.9
Mean rating of patient-centeredness of counseling*	3.9	3.7
PREDICTED PROBABILITIES		
Method chosen‡		
IUD/implant **	0.09	0.20
Injectable/ring/patch	0.27	0.26
Pill*	0.64	0.54

*p<.05. **p<.01. ***p<.001. †p<.10. ‡Participants who reported more than one method were categorized on the basis of the most effective one. Six women chose not to use a method or made no choice, and were excluded from the analysis. *Notes:* All models included the following covariates: race and ethnicity, age, insurance, public assistance, employment, religious attendance, number of prior visits to the clinic and site. The model for number of methods known also included the number of methods previously used; the model for chosen birth control method also included the method the client had planned to get when she visited the clinic.

information to providers;[4] and reduces opportunities for disparities in counseling by presenting the same information to and asking the same questions of all clients.

Use of Smart Choices was positively associated with three outcomes that reflect comprehensive and patient-centered counseling: the number of contraceptive methods known by patients, the number of topics related to sexual health and STD risks discussed during counseling, and patients' perceptions that providers individualized counseling to their specific concerns and needs. Although differences between groups in means of these three outcomes were small, considerably larger proportions of the control than of the intervention group were at the least favorable end of the ratings, and considerably higher proportions of the intervention group than of controls were at the most favorable end. These results may reflect clinically meaningful differences in the contraceptive knowledge and family planning counseling experience of the groups.

Several related measures were in the expected direction in bivariate analyses, but were not statistically significant. An evaluation with a larger sample, balanced in size between intervention and control groups to afford more statistical power, might find these relationships to be significant. Furthermore, the consistency of findings across the range of outcomes examined suggests that Smart Choices offers promise as an intervention to improve the comprehensiveness, patient-centeredness and quality of family planning counseling.

One result was unexpected: Women who used Smart Choices were significantly less likely than controls to choose one of the most effective methods. We analyzed the survey data and discussed this finding with clinic staff in an attempt to identify participant or clinic characteristics that could have contributed to this result; we found no clear explanation. We had expected that women in the intervention group would be more likely than controls to choose a highly effective method because Smart Choices presented the differences in effectiveness across methods (which we believed would be a compelling consideration for many women), and it addressed two important barriers to implant and IUD use (lack of awareness and misconceptions). However, it did not address other barriers (e.g., provider attitudes and high cost), and it presented some information (e.g., on side effects and insertion procedures) that might not have appealed to women and might have discouraged use of these methods. Modifying the tool to highlight effectiveness may help women make decisions about what method attributes are most acceptable to them. At the same time, method options must be framed in a way that ensures women's opportunity to choose the methods that best meet their needs and circumstances, even if these are not the most effective products available.[33]

Providers' inconsistent use of the printout may have reduced the associations we found between treatment group and outcomes. As noted earlier, we aimed to develop a tool that could be easily disseminated and that a clinic could use with little need for equipment or staff training. In retrospect, this may not have been a realistic goal in a short-term pilot study, in which the printouts did not replace existing patient history forms, but were layered on top of them. In addition, providers had established ways of approaching counseling that may have been difficult to change without more training. Providers might make fuller use of the tool if it were better integrated with clinics' data collection systems and if they received more training and support.

Our pilot study was the first we are aware of to assess the association between use of a computer-based tool and the comprehensiveness and patient-centeredness of family planning counseling. Evaluations of three other computer- or Web-based tools have assessed associations with increased choice or use of the most effective methods, and results differed from ours. Two of those tools (Best Method for Me and Bedsider) were found to have positive associations;[18–20] the third (the app developed by Gilliam and colleagues) was not associated with method choice, but was associated with women's likelihood of saying they were interested in discussing the implant.[24] The fact that Smart Choices did not show similar associations may have to do with differences in the design of the tools. As noted earlier, the other three tools explicitly encourage use of the most effective methods (some more strongly than others). Bedsider also differs from both Smart Choices and the other tools in two key ways: It is an online birth control support network that can be accessed repeatedly over time, and in addition to providing

contraceptive information, it provides supports such as birth control and appointment reminders. Thus, it may be that explicitly encouraging family planning patients to consider using the most effective methods or offering more extensive services online over time can be effective in helping women to choose and use the most effective methods and, ultimately, avoid unintended pregnancy.

Limitations

Limitations of this evaluation include the nonrandomized, posttest-only design necessitated by our having conducted the study at only two clinics, each with a relatively small staff of providers. Also, because the design was not longitudinal, we were able to study the choice of methods, but not use over time. Furthermore, the intervention and control groups were unbalanced in size, primarily because the enrollment rate during the intervention period was lower than anticipated, particularly at the county health department. Attendance at both clinics was substantially lower during the intervention period than during the control period, and the proportion of women at the county health department who refused to participate before screening was substantially higher during the former period than during the latter. We could not extend recruitment during the intervention period to achieve our target sample size because of constraints on clinics' participation in the study beyond the designated intervention period. The smaller-than-intended sample size (and unbalanced sizes between treatment groups) reduced the study's power to detect differences between groups. Although the lower enrollment during the intervention period could reflect differences in patient and provider behavior due to secular patterns, the fact that there were almost no significant social or demographic differences between the control and intervention groups at the two sites suggests that this was not the case. Because this was a pilot study, we considered differences to be significant at $p<.10$. Four of the five multivariate results that were significant, however, were significant at $p<.05$. The survey data were subject to recall error and social desirability bias, but we attempted to minimize recall error by interviewing nearly all patients immediately after their counseling sessions or later the same day. As discussed earlier, not all health care providers made full use of the information in the Smart Choices printout;[12] this would affect associations between treatment group and outcomes.

Conclusion

Results of this study suggest several directions for future research. First, given the relatively limited use of the computer printouts by providers, further studies should explore strategies for increasing provider engagement and the extent to which full participation would be possible, given system constraints. Alternatively, the tool could be redesigned to focus only on patients, with the goal of activating them to such a degree that they could identify their own issues and risk factors for unintended pregnancy and have providers address them during the counseling session. Given the negative associations we found between Smart Choices and use of IUDs and implants, future research could also explore what modifications could be made to the intervention to increase women's interest in these methods.

Computerized counseling aids like Smart Choices are in an early stage of development. Lessons learned from the evaluation of Smart Choices and similar tools can help to inform the development of improved tools that help providers and patients make the counseling session more productive, individualized and satisfying experiences. Such improvements could ultimately lead to more effective contraceptive use and reduced levels of unintended pregnancies.

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