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Midlife Women Online: Evaluation of an Internet-Based Program to Prevent Unintended Pregnancy & STIs

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Midlife Women Online: Evaluation of an Internet-Based Program to Prevent Unintended Pregnancy & STIs

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Background: Midlife women are an underserved population in the areas of unintended pregnancy and STI prevention yet remain at risk for both health conditions. Methods: A randomized controlled trial of an Internet-based multimedia program to reduce risk of unintended pregnancy and STIs among midlife women was conducted with 164 women ages 40–55 years of age. Results: Women in the treatment condition compared to the control condition reported significant gains in attitudes, self-efficacy, and behavioral intentions at posttest. Conclusion: Interventions specifically targeted to midlife women can impact constructs known to reduce risk. Implications for future research and intervention development are presented.

KEYWORDS women, internet, midlife, STI, unintended pregnancy

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INTRODUCTION

Midlife women, aged 40 and older, are currently an understudied and underserved population in the areas of unintended pregnancy and STI prevention interventions. A common perception is that women in this age range are less at risk for these problems because they are believed to no longer be sexually active and/or past the menopause transition. Despite these assumptions, women in midlife remain at risk for unintended pregnancy (Sherman, Harvey, & Noell, 2005) and STIs (CDC, 2008; Duberstein & Singh, 2008; Idso, 2009; Sherman et al., 2005; Xu, Schillinger, Aubin, St. Louis, & Markowitz, 2001). Additionally, physiological (e.g., irregular menstrual cycle, vaginal dryness; Bachmann & Leiblum, 2004; Kessel et al., 2003; Senanayake, 2000) and relationship status changes (e.g., divorce or death of a partner) (Brisson, Boily, Masse, Adrien, & Leaune, 1999; Kreider & Fields, 2001; Rich, 2001) put these women at increased risk for both unintended pregnancy and STI's.

Unintended pregnancy in midlife women has many of the same potential consequences as it does for younger women: elective abortion, lower levels of prenatal care, higher rates of smoking and alcohol use during pregnancy, low birth weight, and increased risks for postpartum depression (Chandra, Martínez, Mosher, Abma, & Jones, 2005; Institute of Medicine, 1995; Sherman et al., 2005; Ventura, Mosher, Curtin, Abma, & Henshaw, 2001). In addition, midlife women are at increased risk of pregnancy-related morbidity and mortality, including maternal mortality (Berg, Chang, Callaghan, & Whitehead, 2003). The number of pregnancy-related deaths per 100,000 live births was 14.5 for women 40 and older compared to 5.0 for women aged 20–24 (CDC, 2010). Midlife women are also more likely to experience spontaneous abortion and chromosomal abnormalities compared to younger women (Cleary-Goldman et al., 2005), and abortion rates, while low, have still slowly increased for women over 35 years of age (Pazol et al., 2011).

As for STIs, one recent large study found that the increase in rate of cases of chlamydia among midlife adults was nearly double compared to young adults; for gonorrhea the rate increase was 1.6 times the rate among young adults (Fang, Oliver, Jayaraman & Wong, 2010). STIs (e.g., chlamydia) can have very serious health outcomes for midlife women, including chronic pelvic pain, cancers of the reproductive tract (Eng & Butler, 1997; Hatcher et al., 1998), and increased risk of contracting HIV (Shah & Mildvan, 2006). In 2007, the last year for which data are available, the largest number of new HIV/AIDS cases was among adults aged 40–44 (CDC, 2007). Physicians sometimes fail to question or screen midlife women for sexual risk behaviors or attribute symptoms to menopause, which may delay diagnosis and treatment. Treatment regimens are also less tolerated by older women, due to comorbidities and other health issues (Drew & Sherrard, 2008). Given the recent discovery that women and men both underreport

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their HSV-2 seroprevalence, and that significant numbers of adults over 40 have HSV-2 infection, the need for prevention of STIs in midlife women cannot be overstated (Bauer, Khobzi, & Coleman, 2010).

Lastly, midlife women who are making the transition from a long-term relationship to a new relationship may lack the assertiveness and negotiation skills to engage in risk-reduction behaviors with their partners. In order to reduce risk among this growing population of women, empirically validated intervention programs addressing the specific needs of midlife women in relationship transitions are greatly needed.

Internet-based intervention efforts for midlife women show promise. According to the Pew Research Center's Internet and American Life project, health information is the third most popular online activity for adults, after e-mail and searching activities (Zickuhr, 2010). Women are more likely than men to search for health information, and midlife women use the Internet for this purpose at the same rate as younger women (Burst Research, 2007). Thus, providing prevention information for midlife women online appears to be an efficacious route for reaching this population.

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OVERVIEW OF PROJECT DESIGN

Program Development

To address this need, the authors developed a theoretically based Internet multimedia pregnancy and STI prevention program specifically targeted to midlife women. An extensive program development process was undertaken, including conducting focus groups, convening a panel of reproductive health experts, and a usability study.

Focus groups

Focus groups were conducted with 121 women from the four largest racial categories in the U.S. (African American, Euro-American, Asian American, and Hispanic/Latina American). Focus group discussion topics included knowledge and preferences about contraceptive and STI prevention methods, perceptions regarding their partner's preferences, and normative expectations regarding unintended pregnancy and STI.

National Advisory Panel

A National Advisory Panel was convened consisting of behavioral scientists, medical anthropologists, physicians, and experts in the field of women's contraceptive behavior and partner communication skills. The Panel made recommendations related to program content (e.g., include skills around talking with your health-care provider) and presentation/interactivity (e.g., interactive STI symptom checklist).

Usability Testing

A beta version of the program was created and usability testing performed using a market research company to evaluate program functionality, user impressions and observations regarding program animation vignettes, interactive elements, overall programmatic content, and site navigation. Twenty-two women from six race/ethnicity groups participated in the usability testing. Iterations to content and navigation of the site were made based on these findings.

Theoretical Foundations

The program is based on several theoretical models of behavior change: the Expanded Theory of Reasoned Action (Ajzen & Fishbein, 1973, 1979; Fishbein, 1996, 1999), the Theory of Gender and Power (Wingood & DiClemente, 2000), the Information-Motivation-Behavior Theory (Misovich, Fisher, & Fisher, 1997) and Social Learning Theory (Bandura, 1997). The Expanded Theory of Reasoned Action (Ajzen & Fishbein, 1973, 1979; Fishbein 1996, 1999) posits that behaviors begin with the intention to engage in prevention behaviors. The intention comes from the combination of three factors: a positive attitude (or set of attitudes) toward the behavior, the belief that one can successfully carry out the behavior (i.e., has sufficient self-efficacy), and the expectation of such behaviors by one's peers. According to the integrative model for HIV prevention (Fishbein, 2000), the most proximal predictor of an individual's behavior is the individual's behavioral intention. Any given behavior is most likely to occur if one has a strong intention to perform the behavior, if one has the necessary skills and abilities required to perform the behavior, and if there are no environmental constraints preventing behavioral performance.

The Theory of Gender and Power (Wingood & DiClemente, 2000) contends that skills in assertiveness, communication, and negotiation are necessary for the implementation of behavioral change. The Information-Motivation-Behavior Skills Theory (Misovich et al., 1997) further underscores the critical role of negotiation skills. Finally, one of the most powerful techniques for accomplishing changes in the constructs of beliefs, attitudes, and perceptions of peer norms is the use of modeling (Bandura, 1997). In particular, modeling using video is a technique used extensively and effectively for behavior change (e.g., Duncan, Duncan, Beauchamp, Wells, & Ary, 2000; Irvine, Ary, Grove, & Gilfillan-Morton, 2004; Irvine, Bourgeois, & Ary, 2003; Noell, Ary, & Duncan, 1997).

These theories were integrated to create carefully constructed video examples, models, and messaging to influence midlife women's knowledge, beliefs, attitudes, intentions, and ultimately behaviors to engage in effective contraceptive and preventative behaviors.

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Program Description

Results from the focus groups, input from the National Advisory Panel, and usability testing informed the development of content and navigation for the *Women's Reproductive Health: A Guide to Staying Healthy* program. Overall features of the program include video, interactive tools, animations, text information pages, and various links both across and within specific modules to make it easy to find related information. A feature entitled "My Notes" allows the user to save content from the program into an easily retrievable repository. The program also has a search feature that allows the user to type in a keyword to locate specific information within the Web site.

Motivational videos featuring friendly midlife hosts can be viewed in each module. These videos not only provide specific information about the content, they also provide message framing and set the tone of the program segment. Other videos include testimonials on topics such as contraceptive methods, sexually transmitted infections, and other health information. Interactive materials include an assessment checklist for STI risk, a quiz to help the user identify the types of birth control methods that best fit her lifestyle and preferences, as well as several checklists for working with a health-care provider and the aforementioned "My Notes" feature.

The final program resulted in five program segments. "About the Body" provides users with motivational videos and animated descriptions of the female and male reproductive anatomy, information about the physiological changes related to the menopause transition, and menstrual cycle. Also addressed are fertility changes in men caused by aging, such as libido changes, erectile dysfunction, and prostate and vasectomy information.

"Pregnancy Prevention" provides users with information on the different types of contraceptive choices (as well as video testimonials for each choice) including (a) those that prevent both unintended pregnancy and STIs (e.g., condoms), and (b) those that prevent pregnancy but not STIs (e.g., oral hormonal contraceptives). Information is presented on the benefits and limits of commonly used prevention strategies (e.g., condoms) in preventing specific STIs (e.g., HSV). Information regarding emergency contraception and options for an unplanned pregnancy are included.

"Reduce Your Risk for STDs" covers risks of STIs in women, including: (a) increased risk for STIs in midlife, (b) prevalence of STIs among women and men, and (c) the disproportionate impact of STIs for women compared to men. Features include descriptions of types of STIs and symptoms, prevention information, issues regarding living with an STI, and skills to navigate STI risk within relationships.

"Talking to Your Partner" presents information and skill-building techniques for talking with sexual partners regarding how best to initiate and conduct discussions regarding risk-reduction behaviors (e.g., changing contraceptive methods, using condoms, or being tested for STIs) and techniques to redirect and overcome possible resistance of a partner.

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Lastly, "You and your Healthcare Provider" features the PACE© system developed by Donald Cegala (Cegala, McClure, Marinelli, & Post, 2000) to increase effective communication between client and health-care provider. Tip sheets and video modeling are presented to help build communication skills, and include (a) effective communication with your health-care provider, (b) helpful information to bring to an appointment, and (c) sample questions to ask your health-care provider.

PROGRAM EVALUATION

Participants

Efficacy of the *Women's Reproductive Health: A Guide to Staying Healthy* program consisted of a randomized trial. Participants were recruited through online recruitment sites and Craigslist postings, as well as posters, newsletters, and fliers. Recruitment materials directed potential participants to the evaluation Web site for information about the study and were screened for study eligibility via online questions. Inclusion criteria consisted of: (a) having had intercourse with a male partner in the last 3 months, (b) no desire to become pregnant in the next year, (c) not currently pregnant, (d) fluent in English, (e) in a heterosexual relationship of 6 months duration or less, and (f) having a valid e-mail address.

A total of 1,597 individuals responded to recruitment efforts (see Figure 1). Of those, 422 met screening criteria and were randomized into

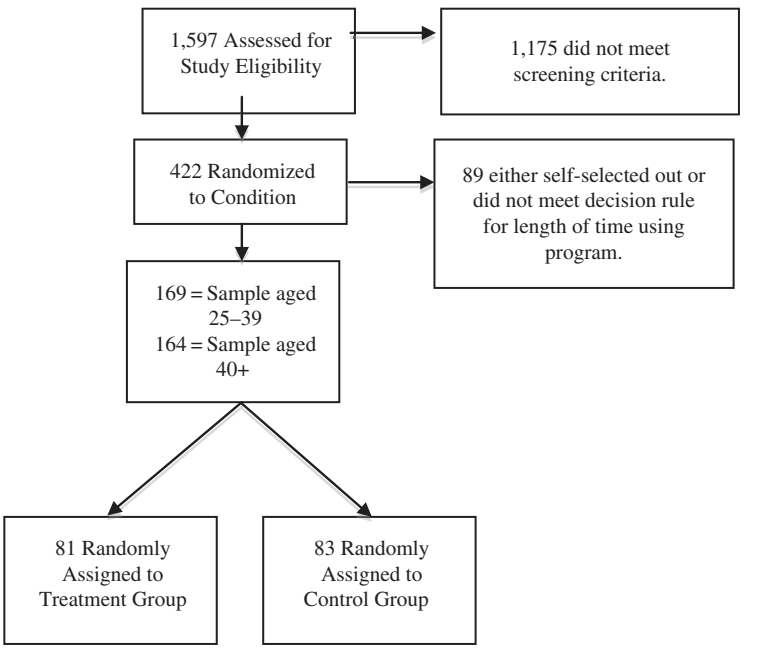

FIGURE 1 Consort diagram.

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treatment or control groups. Of the 422 qualified participants, 89 either self-selected out of participation or were determined to be fraudulent; a total of 333 participants completed the clinical trial.

Of the 333 women who participated, 50.8% ($n = 169$) were aged 25–39, and 49.2% ($n = 164$) were aged 40–55. Only data from the midlife subsample (ages 40–55) are reported here. Demographic characteristics are presented in Table 1. Of the reference sample, 147 participants (89.6%) completed the T2 survey, 148 participants (90.2%) completed the T3 survey, and 145 participants (88.4%) completed all surveys.

Treatment and Standard of Care Control Condition

Qualified participants were randomly assigned to the treatment or control condition. Treatment condition participants were directed to the *Women's Reproductive Health: A Guide to Staying Healthy* Internet-based program described above. Control condition participants were directed to a text-based Web site developed specifically for the study consisting of reproductive health content available on the Internet and compiled from the World Health Organization, National Institute of Child Health and Human Development, Centers for Disease Control and Prevention, Canadian Federation for Sexual Health, Medline Plus, National Eye Institute, and the U.S. Food and Drug Administration. Content in the Control program included information on: (a) contraceptive methods, (b) sexually transmitted infections, (c) communicating with sexual partners about prevention of pregnancy and sexually transmitted infections, (d) communicating with health-care providers about prevention of pregnancy and sexually transmitted infections, and (e) basic male and female reproductive anatomy.

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Data Collection

All participants were assessed on measures of knowledge, attitudes, behavioral intentions, and self-efficacy in the domains of prevention of unintended pregnancy, STI prevention, partner communication, health-care provider communication, and reproductive anatomy and physiology and satisfaction with the program sites. Participants completed all assessments via an online survey site. Evaluation assessments were conducted at baseline (T1), 7 days after baseline (T2), and 30 days after baseline (T3). Participants were sent e-mails, with a link to the survey site, directing them to complete the assessments. If, after 3 days, a participant had not completed an assessment, they were sent a reminder e-mail and then final reminder e-mail 4 days postassessment.

TABLE 1 Study Demographic Characteristics

	Treatment ($n = 81$)		Control ($n = 83$)	
	n	%	*n*	%
Age in years				
40–44	38	46.9	38	45.8
45–49	22	27.2	34	41.0
50–55	21	25.9	11	13.3
Hispanic	8	9.9	7	8.4
Race				
American Indian or Alaskan Native	2	2.5	3	3.6
Asian	2	2.5	1	1.2
Black or African American	6	7.4	14	16.9
White, Caucasian	64	79.0	60	72.3
Multiracial	6	7.4	3	3.6
Other	1	1.2	2	2.4
Marital status				
Married	14	17.3	9	10.8
Divorced	35	43.2	40	48.2
Widowed	0	0.0	3	3.6
Separated	10	12.3	5	6.0
Never been married	22	27.2	26	31.3
Years of school completed				
0–8	2	3.3	3	4.8
9–12	10	16.4	12	19.4
13–16	41	67.2	38	61.3
17 or more	8	13.1	9	14.5
Employment Status				
Not currently employed	10	12.3	11	13.4
Part-time	16	19.8	13	5.9
Full-time	55	67.9	58	70.7
Annual family income				
$0–$5,000	0	0.0	1	1.2
$5,001–$10,000	2	2.5	3	3.7
$10,001–$25,000	9	11.1	9	11.0
$25,001–$50,000	31	38.3	30	36.6
More than $50,000	39	48.1	39	47.6
Sexual relationship history				
Number of sexual partners in past 3 months				
0	1	1.3	0	0.0
1	60	75.0	61	75.3
2	13	16.3	17	21.0
3 or more	6	7.4	3	3.7
Length of current relationship				
Less than 3 months	9	11.1	13	15.7
3 to 6 months	8	9.9	8	9.6
6 months to 1 year	6	7.4	6	7.2
1 year or more	58	71.6	56	67.5
Contraceptive method use (% yes)				

(*Continued*)

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TABLE 1 (Continued)

	Treatment ($n = 81$)		Control ($n = 83$)	
	n	%	*n*	%
Abstinence	1	3.7	2	2.4
Female condom	3	3.7	6	7.2
Male condom	37	45.7	41	49.4
Diaphragm	1	1.2	1	1.2
Female sterilization	5	6.2	7	8.4
Hormonal method (e.g., oral contraceptive, patch, vaginal ring)	21	25.9	25	30.1
Intrauterine device (IUD)	5	6.2	3	3.6
Male sterilization	2	2.5	3	3.6
Spermicide	3	3.7	5	6.0
Withdrawal/rhythm	10	12.3	7	8.4
None	14	17.3	11	13.3
Reproductive health history (% yes)				
Have you ever tested for a sexually transmitted disease?	52	65.0	60	73.2
Have you ever been diagnosed with a sexually transmitted disease	17	21.3	21	25.6
Have you had a HIV test in the past 3-months?	9	11.3	16	19.5

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Measures

Measures were adapted from existing instruments (Posner, Bull, Ortiz, & Evans, 2004) to assess knowledge, attitudes, intentions, and self-efficacy regarding the issues presented in the program (unintended pregnancy, STI prevention, partner communication, and health-care provider communication.) Additional measures were created based on the specific content of the program. All items were assessed using a 5-point Likert scale. The measures were tested for face validity with a sample of seven women between the ages of 30 and 55. Final measures were revised based on the results of the measures testing sample.

Program *knowledge* was measured with a scale score indicating percent of 22 items correctly endorsed. The knowledge items assessed content areas of the program (e.g., three items on anatomy and physiology, 16 items on pregnancy prevention, and four items on STI prevention). For example, users were asked to answer the question "A women is most likely to become pregnant (no matter how long or short her menstrual cycle) if she has sexual intercourse about . . . " with choices being (a) 1 week before menstruation begins, (b) 2 weeks after menstruation begins, (c) 2 weeks before menstruation begins, (d) 1 week after menstruation begins, or (e) Do not know.

Participant *attitudes* were measured with 12 items that assessed the perceived importance of using a contraceptive method to prevent pregnancy (six items), the perceived importance of talking with your partner about contraception (four items), the perceived importance of using a contraceptive method to prevent STIs (one item), and the perceived importance of talking with your health-care provider (one item). A mean composite score across all items was computed for program evaluation and showed good internal consistency ($\alpha = .74$) and test–retest reliability in the control condition ($r = .73$).

Participant *self-efficacy* was measured using eight items that assessed confidence in preventing pregnancy (six items), and talking with their partner (two items). A mean composite score across all items was computed for program evaluation and showed good internal consistency ($\alpha = 84$) and test–retest reliability in the control condition ($r = .68$).

Participant *behavioral intentions* were measured using scales that assessed intention of using a contraceptive method (two items), preventing an STI (four items), and talking with a sexual partner (four items). A mean composite score across all items was computed for program evaluation and showed good internal consistency ($\alpha = .74$) and test–retest reliability in the control condition ($r = .69$).

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Data Analysis

Univariate analysis of covariance (ANCOVA) models adjusting for pretest scores were used to evaluate between subject effects in each of the outcome measures at posttest and at the follow-up assessment. Study condition was a two-level (treatment vs. control) between-subjects factor. Cohen's d statistic (1988) was used to estimate study effect sizes and was calculated by dividing the difference between the intervention and control mean adjusted post- and follow-up assessment scores by the pooled standard deviation. Cohen's criteria for small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$) effects were used. The missing at random (MAR) assumption was tenable so we employed an intent-to-treat analysis by using maximum likelihood estimates to impute missing data with the NORM software program (Schafer, 1999), as it produces more accurate and efficient parameter estimates than listwise deletion or last-observation-carried-forward (Schafer & Graham, 2002).

RESULTS

Preliminary Analysis

Study treatment condition was compared on the demographic characteristics shown in Table 1 and all pretest outcome measures. No significant (at $p < .05$) differences were found, indicating that randomization created initially equivalent groups. The number of participants who completed all

three assessments ($N = 145$, 88%) was compared to those who completed less than three ($N = 19$, 12%), and rates did not differ significantly differ (at $p < .05$) by study condition. Participants who completed all three assessments were compared to those who did not on study demographic characteristics and pretest outcome measures, and no significant differences (at $p < .05$) were found, suggesting the missing at random assumption was tenable.

Between-Subjects Main Effects

(ANCOVA) models were used to test differential effects between midlife control ($n = 83$) and treatment women ($n = 81$) on study outcomes at the 7-day posttest and 30-day follow-up assessments with baseline scores entered as covariates. Results for the baseline to posttest and the baseline to follow-up assessments are shown in Tables 2 and 3 respectively.

Treatment participants performed significantly better at posttest, after adjusting for baseline scores, on the attitudes and beliefs ($p = .027$) and intentions measures ($p = .015$). Marginal effects were found for self-efficacy ($p = .056$) with treatment women performing better at posttest compared to women in the control condition. The average effect size ($d = .35$) for significant and marginal differences at posttest was moderate.

At the 30-day follow-up assessment only the behavioral intention score remained significantly higher for the treatment participants and, like the posttest, the significant difference corresponds to a small–medium effect size.

Within-Subjects Effects

The midlife women in the treatment group ($n = 81$) spent on average 66.8 minutes ($SD = 69.5$) using the program, and the time ranged from

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TABLE 2 Baseline to Posttest Descriptive and ANCOVA Statistics

	Control ($n = 83$)			Treatment ($n = 81$)			Test Statistics		
Measure	Baseline *M* (*SD*)	Post *M* (*SD*)	M_{adj}	Baseline *M* (*SD*)	Post *M* (*SD*)	M_{adj}	*F*	*p*	*D*
Attitudes & Beliefs	4.00 (0.67)	4.07 (0.61)	4.08	4.04 (0.56)	4.23 (0.43)	4.22	4.99	**.027**	0.35
Intentions	3.78 (1.01)	3.83 (1.07)	3.85	3.81 (0.93)	4.13 (0.88)	4.12	6.01	**.015**	0.39
Self-Efficacy	4.31 (0.65)	4.36 (0.67)	4.32	4.20 (0.72)	4.45 (0.55)	4.48	3.72	.056	0.30
Knowledge	0.45 (0.13)	0.50 (0.13)	0.49	0.42 (0.13)	0.50 (0.13)	0.51	0.56	.455	0.12

M = mean, *SD* = standard deviation, M_{adj} = adjusted mean, *F* = *f*-value, *p* = *p*-value, *d* = Cohen's *d* statistic. Bolded entries statistically differ at $p < .05$.

TABLE 3 Baseline to Follow-up Descriptive and ANCOVA Statistics

	Control ($n = 83$)			Treatment ($n = 81$)			Test Statistics		
Measure	Baseline *M* (*SD*)	Post *M* (*SD*)	M_{adj}	Baseline *M* (*SD*)	Post *M* (*SD*)	M_{adj}	*F*	*p*	*D*
Attitudes & Beliefs	4.00 (0.67)	4.11 (0.62)	4.12	4.04 (0.56)	4.17 (0.54)	4.17	0.38	.537	0.10
Intentions	3.77 (1.01)	3.93 (1.04)	3.94	3.81 (0.94)	4.17 (0.76)	4.16	4.43	**.039**	0.33
Self-Efficacy	4.31 (0.65)	4.43 (0.60)	4.41	4.20 (0.72)	4.47 (0.62)	4.49	0.81	.370	0.14
Knowledge	0.45 (0.13)	0.49 (0.13)	0.49	0.42 (0.13)	0.50 (0.12)	0.51	1.08	.299	0.16

M = mean, *SD* = standard deviation, M_{adj} = adjusted mean, *F* = *f*-value, *p* = *p*-value, *d* = Cohen's *d* statistic. Bolded entries statistically differ at $p < .05$.

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0 minutes to 340 minutes. Change scores were computed for each of the outcome measures (posttest scores minus baseline scores and follow-up scores minus baseline scores) and correlated with time spent using the program. Significant correlations were found for the knowledge items at posttest ($r = .28$, $p = .012$) and follow-up ($r = .22$, $p = .054$), indicating that women who spent more time on the site showed greater improvement in the knowledge items. The significant correlations correspond to a small effect size. Time spent using the program was not significantly correlated with attitudes and beliefs, intentions, or self-efficacy at posttest or the follow-up assessment.

DISCUSSION

The purpose of this evaluation was to determine if use of the program led to increased knowledge regarding preventing unintended pregnancy and STIs, more positive attitudes regarding partner and health-care provider communication, and increased self-efficacy and behavioral intentions to engage in risk reduction.

The findings indicate that a Web-based educational and skill-building intervention can be effective in improving attitudes and beliefs, at least in the short term, and increasing behavioral intentions regarding risk behaviors. Changes in some behavioral intentions were sustained at follow-up, suggesting the program may have a longer-term effect on women's intentions to speak with their partners about risk, and engage in STI and unintended pregnancy prevention behaviors.

More specifically, the findings from this trial demonstrate change on important constructs of the Expanded Theory of Reasoned Action (Fishbein, 2000), Theory of Gender and Power (Wingood & DiClemente, 2000), the Information-Motivation-Behavior Theory (Misovich et al., 1997), and Social

Learning Theory (Bandura, 1997), constructs shown in multiple studies to influence sexual risk behavior change (e.g., Belcher et al., 1998; Fishbein, 1999; Fisher, 1984; Fisher, Fisher, & Rye, 1995; Jaccard & Davidson, 1972; Jaworski & Carey, 2001; Kalichman et al., 2005; Ross & McLaws, 1992; Van Devanter et al., 2000). Improvement in attitudes and beliefs and increased intention to talk with sexual partners about risk reduction and prevention of STIs and unintended pregnancy are important outcomes.

Sexual risk does not occur in isolation, but in the context of a sexual dyad. The ability to talk about risk reduction and prevention of STIs with a sexual partner has been examined in several studies (e.g., Catania et al., 1992; Catania, Kegeles, & Coates, 1990; Dolcini, Coates, Catania, Kegeles, & Hauck, 1995; Harvey & Henderson, 2006; Harvey, Henderson, & Casillas, 2006; Sheeran, Abraham, & Orbell, 1999). The intention to engage in conversations with partners about risk and prevention is a prerequisite for negotiating actual use of preventive measures (e.g., STI testing, use of male condom). A meta-analysis of psychosocial correlates of condom use derived from 121 empirical studies (Sheeran et al., 1999) provides strong evidence for the link between sexual communication with sexual partners and condom use during sexual intercourse. Notably, the authors found that condom use was strongly associated with prior discussion about or agreement to use condoms. Additional support for this link can be found in models of HIV-risk reduction such as the AIDS Risk Reduction Model (ARRM), which consider sexual communication to be a key factor in health-related negotiations between partners (Catania et al., 1990, 1992). Moreover, Harvey and Henderson (2006) found that Latina women were more than twice as likely to use an effective method if they had discussed contraception with their partner.

Having positive beliefs and attitudes about prevention behaviors has been demonstrated empirically to support behavioral intentions (Fishbein, 1999; Fisher, 1984; Fisher et al., 1995; Jaccard & Davidson, 1972; Ross & McLaws, 1992) as well as a wide range of protective behaviors (e.g., Ajzen & Fishbein, 1973, 1979; Godin & Kok, 1996; Heeren, Jemmott, Mandeya, & Tyler, 2009).

Although these findings are encouraging to those interested in creating age-appropriate intervention programs for midlife women, they are not without limitations. First, the study sample size is small ($n = 164$), increasing the probability of Type I error. In addition, generalizing the study findings to the larger population of midlife women ages 40–55 years in the U.S. requires caution. Participants in this study were in new, short-term sexual relationships of 6 months or less. The study addressed only the prevention issues related to the beginning phase of sexual relationships, during which risk must be assessed and risk-reduction strategies employed until both partners have been evaluated through STI testing. The needs of women in later phases of new relationships were not addressed.

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In addition, the study population was limited to only those with Internet access. Women with low Internet bandwidth may have self-selected out of participating due to longer download times for the video-based content. Program participation may also be skewed somewhat toward those women who are comfortable using Internet-based information sources for health-related topics. Although great strides have been made in saturation of broadband among the general U.S. population (Horrigan, 2009), and half of the study sample had low-to-moderate annual household incomes ($\geq$\$50,000), this still limits the generalizability of these results to those without Internet access. However, since this program was created for Internet audiences, limiting the sample to Internet users is appropriate to test the efficacy of such a program.

Finally, we chose to focus on intentions to use condoms in the future rather than condom use behavior because our timeline did not allow for actual behavior change over time. Nevertheless, much evidence suggests that intentions to use condoms in the future are associated with actual condom use behavior (Sheeran et al., 1999). The extent to which these intentions translate to actual condom use or behavior change and persistence over time remains a question for future research.

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FUTURE DIRECTIONS

Although the reproductive health of midlife women has been the subject of increased attention in recent years, the move to create age-appropriate intervention programs for these women is still lacking. The current study contributes to this burgeoning area of prevention work. Given the general aging of U.S. populations, it is essential that the reproductive health needs of midlife and older women be addressed through the development of empirically validated education and intervention programs. Future research is needed that examines the needs of mature women across different phases of relationship development, across different relationship types (e.g., "friends with benefits," same-sex couples), and across different settings (e.g., retirement communities). Other related areas in need of examination include the impact of delaying childbearing on the parenting practices and social structures of both single and partnered mothering. While childbearing at age 30 or more is not a new phenomenon, women who give birth later in life have a greater chance of raising their children alone, due to divorce or death of a partner. The same can be said for those women in their forties and fifties who are raising grandchildren. How parenting in these decades of life may impact a woman's relationship context and sexual risk over her remaining lifespan is largely unexamined. Lastly, research is greatly needed that addresses ways to translate and evaluate short-term program effects into sustained long-term behavior change.

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