Impact of an Online Birth Control Support Network on Unintended Pregnancy

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Abstract

We evaluated the effects of Bedsider.org—an online birth control support network—on unintended pregnancies among young women aged 18–29. Bedsider is the centerpiece of a comprehensive digital effort to encourage women to use birth control more consistently and effectively and consider using more effective forms of birth control over time. A sample of 2,284 women was randomly assigned to be exposed to Bedsider or to a control group (no exposure) condition. Women were surveyed throughout a 12-month period. Women in the Bedsider exposure group were less likely to have a pregnancy scare, an unintended pregnancy, or unprotected sex compared to the control group. Additionally, women in the Bedsider exposure group were more likely to use a more effective method of contraception over time compared to the control group. Future studies are needed to examine the dose–response relationship for exposure to Bedsider.org and for whom the intervention is most effective.

Keywords

unplanned pregnancy, birth control, health, research, best practices

Introduction

Teen pregnancy has steadily declined in the United States since the early 1990s. Teen pregnancy and birth rates are now at historic lows, and there has been significant progress in all 50 states and among all racial/ethnic groups. Among young women in their 20s, however, there has been no similar progress. In fact, for some groups, rates of unplanned pregnancy have increased. At present, fully 7 in 10 pregnancies among unmarried women in their 20s are described by women themselves as unplanned (The National Campaign to Prevent Teen and Unplanned Pregnancy, 2012).

Pregnancy planning in general and the use of birth control in particular are directly linked to a wide array of benefits to women, men, children, and society, including fewer unplanned pregnancies, more educational and economic opportunities for young women, improved maternal and infant health, and

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greater family well-being. For example, compared to women with a planned pregnancy, women who have an unplanned pregnancy are more than twice as likely to lack prenatal care—only 8% of women lacked prenatal care during the first trimester if their pregnancy was planned, compared to almost 20% of the women whose pregnancy was unplanned (Mosher, Jones, & Abma, 2012). Research has demonstrated that pregnancy intentions play a significant role in whether women get prenatal care, even after controlling for demographic and background characteristics (Gibson, Koenig, & Hindin, 2008). Women who have an unplanned pregnancy are one and a half times more likely to smoke during pregnancy, nearly twice as likely to experience postpartum depression, and two thirds more likely to have a baby with low birth weight (D'Angelo et al., 2007; Mosher et al., 2012). Unintended pregnancy also has implications for women's economic status in the United States. Researchers have found a 3% increase in weekly wages and a 9% increase in career earnings for each year of delayed childbearing, even after accounting for differences in other background characteristics that could affect women's earnings (Miller, 2011).

Unintended pregnancy also has significant costs to taxpayers in the United States. Researchers estimate that unintended pregnancy costs federal and state taxpayers between US$9.6 and US$12.6 billion annually in medical costs (Monea & Thomas, 2011) and that almost half of all births paid for through Medicaid and the Children's Health Insurance Program (CHIP) are the result of unintended pregnancy (Sonfield & Kost, 2013).

Despite the fact that many young women say they do not want to get pregnant at this point in their lives, and despite the costs and the health risks to women, there continues to be uneven use of contraception and high rates of unintended pregnancy in the United States. Approximately half of all pregnancies in the United States are reported by women themselves as unintended—that is, a pregnancy that a woman herself said she was not intending or actively trying to achieve (Finer & Zolna, 2014). Young women provide a number of reasons for not using contraception. For example, 44% of the unmarried women aged 18–29 agree with the statement, "It doesn't matter whether you use birth control or not, when it is your time to get pregnant, it will happen" (Kaye, Suellentrop, & Sloup, 2009). Among those who have had sex but were not using contraception and who had an unintended pregnancy, 44% did not believe they could get pregnant (Trussell, 2011). Although women using birth control effectively account for only 5% of the unintended pregnancies (Frost, Darroch, & Remez, 2008), about half of the sexually active young adults who are not trying to get pregnant either use no contraception at all or use it inconsistently. Additionally, young women are not always confident that birth control will be effective. For example, despite research that the pill is 92% effective, 40% of the women do not believe it will be effective (Kaye et al., 2009).

Background

Bedsider.org is an online birth control support network developed by The National Campaign to Prevent Teen and Unplanned Pregnancy, with design expertise and guidance of IDEO. Bedsider was designed as an online program to help reduce the proportion of unplanned pregnancies in the United States among women aged 18–29. The goals of Bedsider are to help women find the method of birth control that's right for them, to learn how to use birth control consistently and effectively, and to gradually encourage women to consider using more effective forms of birth control over time. Bedsider is designed to be a tool for women to learn about their birth control options, better manage their birth control, and in the process avoid getting pregnant until they are ready. The centerpiece of the Bedsider program is information about birth control methods as well as online tools on where to get birth control. This site allows users to explore and compare all available methods of contraception, set up birth control or appointment reminders, view videos of their peers discussing personal experiences with various methods of contraception, and be entertained and informed by humorous animated shorts that debunk myths about birth control. This site also provides a comprehensive list of locations to get

birth control. Visitors to Bedsider.org can type in their zip code to find the closest clinic or place to get contraception over the counter.

Formative research conducted by The National Campaign to Prevent Teen and Unplanned Pregnancy suggested that any social marketing effort would need to be both approachable (many efforts to provide young people with contraceptive information were dense and medical) *and* trustworthy (other efforts were seen by young people as providing unreliable information). The effort would also have to take into account the heat of the moment, thinking that often results in unplanned pregnancy, along with poor adherence, low confidence in birth control, negative attitudes toward contraceptive use, and barriers to accessing contraceptive services (Kaye et al., 2009). Bedsider was designed keeping in mind the four ''Ps'' of social marketing campaigns—product, place, promotion, and price (Andreasen, 1995; Grier & Bryant, 2005). The ''product'' is the free birth control support network. The ''place'' is through the Internet, mobile devices, and marketing information provided through health care providers and college campuses. ''promotion'' has been conducted through a national public service announcement campaign with the Ad Council as well as other mass media, digital media advertising, and marketing. Bedsider.org also includes a provider portal that allows clinics and doctor's offices to use Bedsider tools and content. Although Bedsider's ''price'' is free to users, it was designed with an exchange in mind—enhanced quality of sexual relationships and knowledge, along with confidence in using birth control. Incentives, such as gifts and gamification, are also part of the exchange.

Most discussions of sex and contraception often focus on the risk, while ignoring the benefits (Gupta, 2011). As such, Bedsider is framed with a carefully crafted ''sex-positive'' brand designed to compete with the heat-of-the-moment decision making that often accompanies risky behaviors that can be a precursor to unintended pregnancy. Additionally, young adults often place the social ramifications of behaviors (such as the ''cool'' factor) above health considerations (Glassman, Dodd, Miller, & Braun, 2010). Rather than appealing to logic—the more common approach to educating women about unintended pregnancy prevention—Bedsider acknowledges that sex can be fun, complicated, and emotional. Bedsider messaging also focuses on rewarding and reinforcing positive behaviors related to unintended pregnancy prevention.

Results from the Campaign's initial formative evaluation efforts were promising—a pilot study conducted by researchers at Philliber Research Associates and the University of California at San Francisco (2012) found that 12 months after being introduced to Bedsider at a local Planned Parenthood clinic, women who reported using the site were more knowledgeable about contraception compared to nonusers, and almost 90% of the users reported that Bedsider helped them to use contraception more accurately and/or helped them to avoid gaps in contraceptive use. Although this research was helpful in examining engagement in the website and trust among the clinic users, a random assignment evaluation was needed to compare whether or not exposure to Bedsider changed contraceptive behaviors.

Primary research questions. In this study, we conducted an outcome evaluation based on the random assignment to treatment and control groups to assess whether Bedsider improves contraceptive use, decreases unprotected sex, and helps prevent unplanned pregnancy. For outcomes related to unplanned pregnancy, we considered both actual incidence of unplanned pregnancy and the incidence of pregnancy scares, because we recognized that the incidence of pregnancy (regardless of assigned condition) may be too low to detect significant differences. Regarding contraception, we considered whether or not women exposed to Bedsider would use a more effective method of contraception, use their method of contraception more consistently, and have less unprotected sex.

Secondary research questions. We were also interested in understanding whether Bedsider influenced outcomes related to knowledge and attitudes. Specifically, we examined whether women in the

Bedsider group would be more familiar with and knowledgeable about different methods of birth control as a result of their exposure compared to those in the control group.

Method

Data and Experimental Design

Participants were selected from the GfK Group's KnowledgePanel, a probability-based web panel designed to be representative of the United States. The KnowledgePanel is recruited through an address-based sampling (ABS) methodology and is weighted to match census demographic benchmarks.

For this study, all women between the ages of 18 and 29 in the KnowledgePanel were invited to participate ($N = 6,780$). A total of 4,152 (61%) responded to the survey invitation. The baseline survey included an initial screening to eliminate respondents who were married, currently pregnant, planning to get pregnant within the next 6 months, those who currently used an IUD or implant, or were sterilized. A total of 2,284 qualified for the study and completed the baseline survey in November 2012. Women who completed the baseline survey were invited to complete follow-up surveys at 4-month intervals. At each interval, participants completed an online survey that included questions on their attitudes, knowledge, and behaviors related to pregnancy planning. Results presented here represent the data from the baseline and 12-month follow-up survey.

Before taking the baseline survey, respondents were randomly assigned to either a control group or a Bedsider exposure group. Participants were not aware of their condition assignment or that other participants were or were not being exposed to Bedsider. There was no contamination of the control group—during the 12-month follow-up survey, participants in both groups were asked whether they had visited Bedsider, and only one participant in the control group reported visiting the site.

Women in the Bedsider group were shown a short video introducing Bedsider.org and were encouraged to use the website. Additionally, women in the Bedsider group were sent a quarterly e-mail in between data collection periods that provided Bedsider.org content (e.g., one e-mail provided information on Bedsider's features). Finally, at the end of each survey, participants in the Bedsider group were directed to a section of Bedsider and asked how likely they would be to visit the site again. Beyond that, this study does not account for how much independent contact the women had with Bedsider. Consequently, the results presented subsequently more accurately represent the effects of exposure to Bedsider, rather than how much women may have used Bedsider's tools or features.

The Bedsider program is, in essence, a collection of tools that is designed to shape attitudes, social norms, and behavior. Rather than assigning women to visit specific parts of the website, which may or may not be what they would have sought out on their own, women were allowed to use the site as they wanted. Testing particular components of Bedsider in isolation—for example, the daily contraceptive reminders or the clinic lookup tool—could underestimate the true impact of the overall Bedsider program. We focused primarily on the impact of Bedsider as a suite of services because the total value of Bedsider may be more than the sum of its parts and much of its impact may be in letting each woman choose what elements of Bedsider she needs most. In addition, the study allows us to assess the value of Bedsider's brand and its role in attracting people to its suite of services on its own and without direction.

Baseline Characteristics

As expected given the randomization, there were no significant observable differences between the Bedsider and the control group at Baseline on sociodemographic variables, sexual history, or our outcome variables of interest (see Table 1). We do note, however, that there were significantly fewer Latinas in the Bedsider group, who returned for the 12-month follow-up compared to the control group.

Table 1. Baseline Characteristics of All Participants, Those Lost to Follow-up and Those Who Returned for 12-Month Follow-Up.

Characteristic	All Participants		Participants Lost to Follow-Up		Remaining Participants	
	Control	Bedsider	Control	Bedsider	Control	Bedsider
% of Baseline, N	NA, $n = 1,166$	NA, $n = 1,118$	30.3%, $n = 353$	29.8%, $n = 333$	69.7%, $n = 813$	70.2%, $n = 785$
Mean age	22.3	22.4	22.7	22.4	22.1	22.3
Race/ethnicity						
Caucasian	55.4	55.8	39.5	46.3	55.8	55.0
African American	16.6	16.6	22.8	24.1	15.2	15.6
Latina	19.4	19.2	30.1[a]	20.7[a]	20.2	20.3
Other	8.7	8.4	7.6	8.9	8.8	9.1
Education						
Less than high school degree	7.0	5.9	11.5	9.7	5.5	4.7
High school graduate	29.8	30.9	27.6	32.2	32.0	32.9
Some college/associate degree	43.7	43.8	44.6	44.7	43.5	32.9
Bachelor's degree or higher	19.5	19.4	16.3	13.4	19.0	19.0
Ever had sex (yes)	69.8	69.5	80.0	75.8	64.0	66.5
Had a previous unintended pregnancy	16.3	18.2	26.5	28.1	12.6	14.2

Note. Values are in percentages unless otherwise noted. NA = not applicable.
[a]Significant difference between Bedsider and control groups.

The analysis subsequently is based on 70% of the original sample that provided data at baseline and the 12-month follow-up ($n = 1,598$). Thirty percent of the original sample was lost to the study due to attrition (24%), because they got married (5%) or because they were trying to get pregnant at the 12-month follow-up (1%). Women who did not return for the 12-month follow-up were more likely to have an unintended pregnancy before the study and lower educational attainment, although this was equally the case for women in the Bedsider and the control group. Compared to the control group, women in the Bedsider group were slightly more likely to be dropped from the 12-month follow-up because they reported they were trying to get pregnant ($\chi^2 = 5.93$, $p = .02$).

Analytic Strategy

For continuous dependent variables, we conducted repeated measures analysis of covariance (ANCOVA), which allows us to account for individual differences at the baseline. We tested the effects of condition, with race/ethnicity, education, and age included in the model. We also calculated the differences in rates of change among the groups by subtracting postintervention scores from the preintervention scores and performing ANCOVA of these difference scores. The two procedures yielded very similar results, and we report the repeated measures ANCOVA to test for intervention effects. For analyses of categorical outcomes, we utilized stepwise logistic regression, accounting for race/ethnicity, education, and age and behavior at baseline.

Primary Findings

Consistent with prior research, women's demographic characteristics were linked to our key outcomes of interest. Specifically, we found that African American women were more likely than Latina and Caucasian women to have a previous unplanned pregnancy at baseline ($\chi^2 = 48.5$, $p = .000$). Being

Table 2. Odds Ratios for the Association Between Condition and Report of Pregnancy Scares, Including Demographic Factors and Report of Pregnancy Scares at Baseline.

Independent Variable	Odds Ratio	95% CI for OR	Significance
Race (reference group:)			
Caucasian	Reference		
African American	1.48	[0.89, 2.43]	.13
Latina	1.22	[0.56, 1.44]	.64
Other	0.89	[0.58, 2.54]	.60
Age	0.93	[0.87, 0.99]	.02
Education	0.82	[0.64, 1.04]	.10
Baseline report of pregnancy scare			
No	Reference		
Yes	4.41	[2.96, 6.57]	.00
Condition			
Bedsider	Reference		
Control	1.51	[1.04, 2.18]	.03

Note. n = 941. CI = confidence interval; OR = odds ratio. Addition of condition: $\chi^2 = 4.75$, $p = .29$; model $\chi^2 = 75.34$, $p = .00$.

older was also related to previous unplanned pregnancies at baseline, so both variables were entered as covariates in all analyses of program outcomes, and the specific effects of each variable are reported with the analyses subsequently.

Unplanned Pregnancy Outcomes

Pregnancy scares. Participants were asked to respond yes/no to the following question at baseline and at the 12-month follow-up, "Have you had a pregnancy scare in the past 4 months (i.e., you weren't trying to get pregnant and were worried that you were because your period was late or you were worried enough about being pregnant that you took a pregnancy test)?"

For participants who had ever had sex, we conducted logistic regression analyses related to pregnancy scares. The odds ratios provide an estimate of the relative risk of pregnancy scare for the control group compared to the Bedsider group, controlling for demographic factors of race/ethnicity, education, and age, and whether or not women reported a pregnancy scare in the previous 4 months at baseline. Women in the control group were 1.51 times more likely to have a pregnancy scare than women exposed to Bedsider (Table 2 and Figure 1).

Unintended pregnancy. Among women who had ever had sex, we also examined whether or not women in the control group were more likely to become pregnant over the 12-month period, although we were concerned the incidence of pregnancy (regardless of assigned condition) may be too low to detect significant differences. At the baseline survey, we asked women whether they had ever gotten pregnant without wanting to. At the final wave of data collection, we asked women whether they had an unintended pregnancy within the previous year. There was a significant difference between the women in the control group and the Bedsider group—women in the control group were 3.79 times more likely to report an unintended pregnancy (see Figure 2 and Table 3).

Improved Contraception

Using a more effective method of birth control. We hypothesized that women in the Bedsider group would be more likely to shift to a more effective method of birth control than the control group over the 12-month period. Participants were asked about the methods of contraception they've used in the
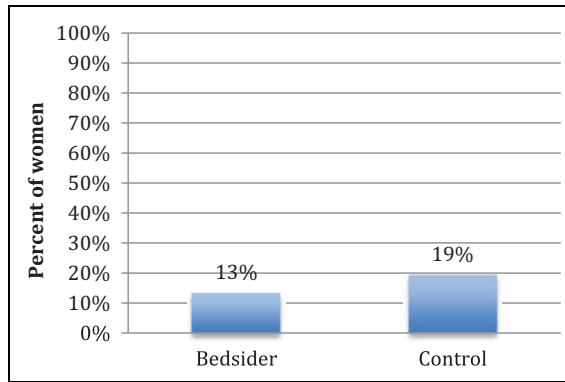
Figure 1. Percentage of women reporting a pregnancy scare: Bedsider exposure compared to control group.
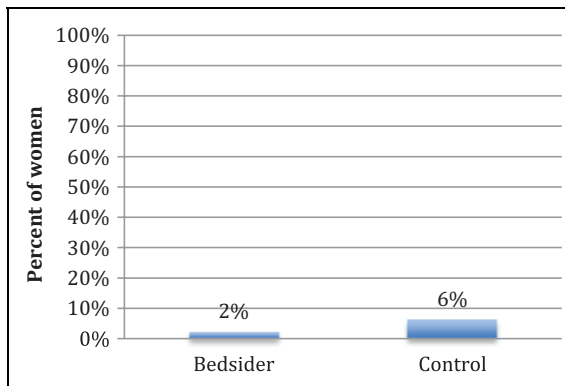

Figure 2. Percentage of women reporting an unintended pregnancy: Bedsider exposure compared to control group.
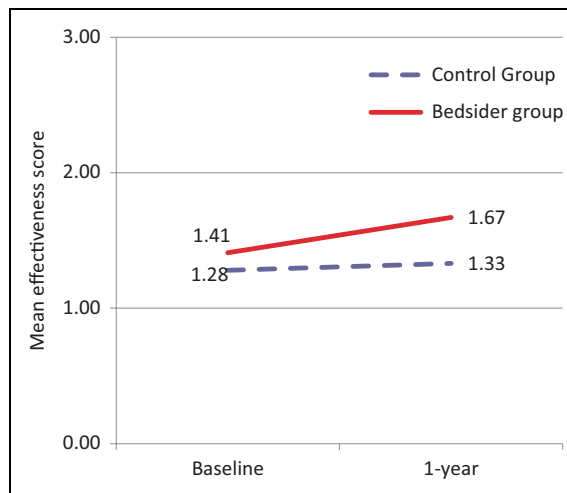
Table 3. Odds Ratios for the Association Between Condition and Reports of Unintended Pregnancy, Including Demographic Factors and Report of Previous Unintended Pregnancy at Baseline.

Independent Variable	Odds Ratio	95% CI for OR	Significance
Race (reference group:)			
Caucasian	Reference		
African American	3.33	[1.36, 8.16]	.01
Latina	1.48	[0.53, 4.11]	.45
Other	0.42	[0.02, 7.36]	.55
Age	0.93	[0.82, 1.01]	.26
Education	1.11	[0.68, 1.81]	.69
Baseline report of unintended pregnancy			
No	Reference		
Yes	19.68	[7.71, 50.26]	.00
Condition			
Bedsider	Reference		
Control	3.79	[1.72, 8.31]	.00

Note. $n = 938$. CI = confidence interval; OR = odds ratio. Addition of condition: $\chi^2 = 12.31$, $p = .00$; full model; model $\chi^2 = 91.63$, $p = .00$.

Table 4. Coding of Birth Control Method Effectiveness.

Code	0 (*Not Effective*)	1	2	3 (*Very Effective*)
Methods of contraception	Nothing	Emergency Contraception Condom Rhythm method Withdrawal Diaphragm Spermicide Sponge	Pill Patch Ring Shot	IUD Implant Abstinence Sterilization

Figure 3. Mean scores for effectiveness of contraception at baseline and 12-months, by condition.

previous 4 weeks and could select as many methods as they had used from a list of 14 methods. Participants' responses were transformed, such that the *most effective method they used* was coded on a scale from 0 to 3, based on the method categorizations in Table 4. For example, if a participant reported they used a condom and the Pill, their method effectiveness was coded as a 2 because the pill was their most effective form of birth control.

Figure 3 shows the average contraception effectiveness score for the control and Bedsider groups at baseline and the 12-month follow-up for participants who had ever had sex. There were no significant differences in the use of a more effective method of birth control between the Bedsider and the control group *at baseline* (see Figure 3), but repeated measures ANCOVA was conducted to assess the impact of the intervention condition on participants' use of effective contraception over time. The model included intervention condition, along with covariates for age, race/ethnicity, and education. There was a significant, but small, main effect of time, $F(1, 635) = 7.00$, $p = .01$, partial $\eta^2 = .01$, meaning that women were using a more effective birth control method at 12 months compared to baseline. There was a small but significant interaction between intervention condition and time, $F(1, 635) = 4.65$, $p = .03$, partial $\eta^2 = .01$, such that women in the Bedsider group increased their effectiveness from 1.41, 95% confidence interval (CI) [1.31, 1.51] to 1.64, 95% CI [1.54, 1.75], while the control group only increased from 1.28, 95% CI [1.17, 1.38] to 1.33, 95% CI [1.22, 1.44]. There was also a significant interaction between age and time, $F(1, 635) = 12.09$, $p = .00$, partial $\eta^2 = .02$, such that older participants were more likely to use a more effective method over time.

Table 5. Inconsistent Use of Birth Control Method, by Condition, at Baseline and 12-Month Follow-Up.

	Control		Bedsider	
	Baseline	12-Month	Baseline	12-Month
Percentage of inconsistent users (n)	50.2% (161)	42.6% (123)	50.1% (173)	45.5% (149)

Using their method of contraception more consistently. We hypothesized that women in the Bedsider group would be more likely to use birth control consistently than women in the control group at the 12-month follow-up. We asked participants about their consistent use of different forms of contraception within the previous 4 weeks. The most popular methods of contraception were the pill, condoms, and withdrawal, so we focused on those methods to examine whether Bedsider influenced consistent use. For pill users, we asked them "For the last pack of pills that you finished, were there any days that you missed taking a pill (i.e., you did not take a hormone pill that day, regardless of whether you took extra pills the next day)?" We also asked them to think about the last time they needed to start a pack of pills, and whether they started taking it before, after, or exactly when the last pill pack was empty. Women who said they had either missed a pill or started a pack more than 2 days after taking their last pill were counted as inconsistent pill users.

Similarly, we asked women who reported that they relied on condoms to prevent pregnancy, how often they used a condom when they had sex. For women who reported relying on withdrawal to prevent pregnancy, we asked how often their partner actually pulled out on time. For both questions, participants were presented with the scale:

- Hardly at all (1–19% of the time),
- A small part of the time (20–39% of the time),
- About half of the time (40–59% of the time),
- Most of the time (60–79% of the time),
- Almost all the time (80–99% of the time), and
- All the time (100%).

Participants who reported using a condom or withdrawing on time less than 100% were counted as inconsistent condom or withdrawal users.

Table 5 shows the percentage of participants who reported being inconsistent users of the pill, condom, or withdrawal during the previous 4 weeks by condition. Although baseline inconsistency did predict inconsistency at 12 months, a full model to predict whether or not condition predicted inconsistency (accounting for baseline and the demographic covariates) did not yield a significant difference between the Bedsider and the control groups, suggesting that Bedsider did not influence women to use the pill, condoms, or withdrawal on a more consistent basis. This analysis does not account for women who may have moved to a more effective method (such as Long-acting reversible contraception (LARCs)), which may improve their consistency of use.

Frequency of unprotected sex. We hypothesized that women in the control group would be more likely than women in the Bedsider group to have sex without using any form of birth control. For women who were sexually active, we asked them if there was any time they had sex in the past 4 weeks but did not use any form of birth control. Table 6 includes logistic regression for participants' report of using no method of birth control in the previous 4 weeks (for participants who had sex during that period). Women in the control group were 2.54 times more likely to have unprotected sex than the Bedsider group (see Table 6 and Figure 4).

Table 6. Odds Ratios for the Association Between Condition and Reports of Unprotected Sex, Including Demographic Factors and Report of Unprotected Sex at Baseline.

Independent Variable	Odds Ratio	95% CI for *OR*	Significance
Race			
Caucasian	Reference		
African American	1.75	[0.98, 3.14]	.06
Latina	1.82	[1.06, 3.12]	.03
Other	0.99	[0.37, 2.66]	.99
Age	1.12	[1.05, 1.20]	.00
Education	0.82	[0.64, 1.04]	.16
Baseline unprotected sex			
No	Reference		
Yes	2.22	[1.96, 3.67]	.00
Condition			
Bedsider	Reference		
Control	2.54	[1.60, 4.04]	.00

Note. n = 948. CI = confidence interval; OR = odds ratio. Addition of condition: $\chi^2 = 4.75$, $p = .29$; model $\chi^2 = 75.34$, $p = .00$.
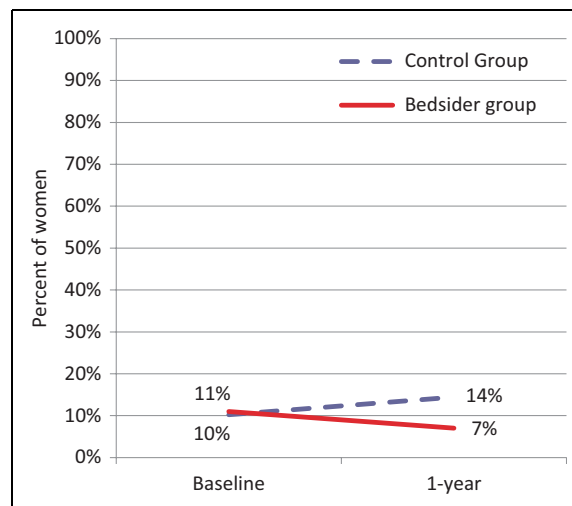

Figure 4. Percentage of women having unprotected sex in the previous month at baseline and 1-year follow-up, by condition.

Secondary Findings

Analysis of Bedsider Effects on Knowledge

We were also interested in understanding whether Bedsider influenced knowledge and attitudes about contraception. Specifically, we examined whether women in the Bedsider group would be more familiar with and knowledgeable about different methods of birth control as a result of their exposure to the online program compared to those in the control group. Our primary analytic strategy was to examine the effects of 12-month exposure to Bedsider on knowledge and attitudes after covarying baseline behavior and demographic factors described earlier. Analyses of variance were conducted to test the effects of Bedsider exposure to the participants' knowledge and attitudes.
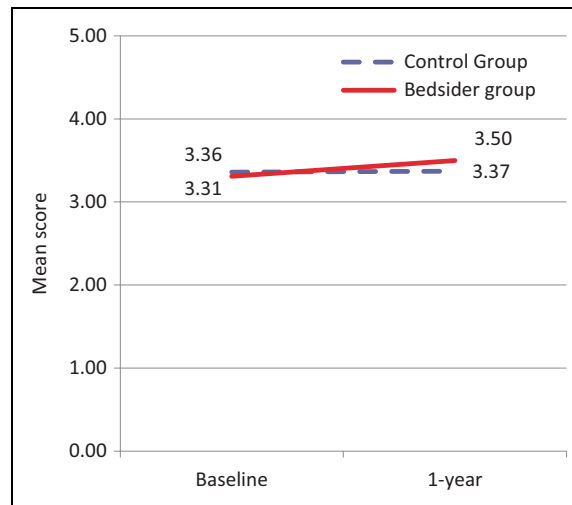
Figure 5. Mean scores for familiarity of different methods of contraception at baseline and 12 months, by condition.

Familiarity with different methods. All participants were asked how familiar they were with eight different methods of birth control on a scale from 1 to 5 (1 = *not at all familiar* and 5 = *very familiar*). These scores were summed and averaged for an overall birth control familiarity score. A repeated measures ANCOVA was conducted to assess the impact of the intervention condition on participants' familiarity with different methods of contraception over time. The model included effects for intervention condition, along with covariates for participants' familiarity at baseline, age, race/ethnicity, and education. See Figure 5 for means for each group at baseline and the 12-month follow-up. There was a small but statistically significant effect of time on familiarity, $F(1, 1305) = 12.42$, $p = .00$, partial $\eta^2 = .01$. There was a small, but statistically significant, difference between familiarity with different methods of birth control between the control and the Bedsider group, $F(1, 1305) = 9.48$, $p = .00$, partial $\eta^2 = .01$. There was also a statistically significant interaction between age and time, $F(1, 1305) = 9.84$, $p = .00$, partial $\eta^2 = .01$, such that older women were more likely to become familiar with different methods over time. Education and ethnicity were unrelated to changes in familiarity over time.

Knowledge of relative effectiveness. Participants were presented with 7 items that compared the effectiveness of two birth control options. For each item, women were asked to select which method was most effective; they were also given the option of selecting "equally effective" (e.g., pill, IUD, or both are equally effective). Correct answers were summed and averaged for their knowledge of relative effectiveness. Repeated measures ANCOVA yielded no statistically significant improvements in women's knowledge over time. Although baseline relative knowledge and age both predicted knowledge at the 12-month follow-up, women in the Bedsider group were no more likely to experience gains in knowledge than the control group.

Discussion

The purpose of this study was to examine the effectiveness of Bedsider.org, an online program designed to improve contraceptive behavior with the goal of reducing unplanned pregnancy. We found that exposure to Bedsider significantly reduced rates of pregnancy scares, pregnancies, and unprotected sex. Even after accounting for the effects of differences among women at baseline, the risk of all

three outcomes declined. Compared to the control group at the 12-month follow-up, women in the Bedsider group were 1.51 times less likely to have a pregnancy scare, 3.79 times less likely to have an unintended pregnancy, and 2.54 times less likely to have unprotected sex.

We also found a small but significant effect of Bedsider on improving women's use of a more effective method of contraception. We did not find any significant effect on their consistency of using their method of birth control, but it may be that some women using a method inconsistently switched to a different method, such as a low-maintenance method like an LARC.

We were also interested in understanding whether Bedsider influenced women's knowledge of contraception. Although exposure to Bedsider seemed to increase women's familiarity with different methods of birth control, it did not increase women's knowledge about the relative effectiveness of different methods of birth control. Our evaluation efforts suggest that while Bedsider may have a more limited influence on knowledge and attitudes, exposure to Bedsider does result in behavioral changes that prevent unintended pregnancy.

Limitations

This study had several limitations, and most notably, these findings do not account for how much contact participants had with Bedsider.org. It may be that there is a critical dose needed to affect contraceptive behavior, or there may be an interaction between participant characteristics and the dose of Bedsider needed to affect change. Additionally, we believed that Bedsider may be more useful if women are able to tailor their use to their specific needs. Although we introduced women to specific parts of the Bedsider website, they were not required to spend a specific amount of time on any given section (or on the website at all). Given this aspect of the evaluation design, it is not clear if there are specific aspects of the Bedsider program that may be more or less effective, and future research would be helpful to examine how particular components of Bedsider influence behavior.

Second, significantly more Latinas in the control group did not return for the 12-month follow-up, compared to Latinas in the Bedsider exposure group, suggesting that generalizability for the Latinas in the sample may be limited. Additionally, compared to the control group, women in the Bedsider group were slightly more likely to report they were trying to get pregnant at the 12-month follow-up. Research has suggested that some women in this age-group express ambivalence toward pregnancy (Kaye et al., 2009), and it may be that exposure to Bedsider encourages women to be more aware of their pregnancy desires. However, this is an issue that warrants further research.

Finally, while we did not find any significant effect on women's consistency in using their method of birth control, it may be that some women using a method inconsistently switched to a different method, such as a low-maintenance method like an LARC. Assessing changes in whether a woman uses contraception, the method she uses, and how consistently she uses it is complex and can be measured in a variety of ways. We did not account for whether or not women may have switched their method of birth control in the current analyses, but it is an area for additional exploration.

Despite these limitations, findings from this study have important implications for efforts designed to improve women's contraceptive behaviors. Our results suggest that Bedsider's framework to encourage healthy behaviors, embedded in an entertaining, but informative, context may more likely influence behavior than content designed from an health consequences perspective. Additionally, Bedsider provides a range of choices for the user—it introduces them to a range of birth control options and tools to make it less of an inconvenience to use.

Conclusion

This study found that exposure to Bedsider.org reduced pregnancy scares, unintended pregnancy, and unprotected sex. There were also improvements in the use of a more effective method of birth control.

Future studies based on this RCT will examine whether there is a dose–response relationship (i.e., spending more time on Bedsider.org is related to outcomes), and for whom the intervention is most effective (i.e., are women's attitudes related to their current method of birth control linked to outcomes). Future studies are also needed to examine the potential for mediation effects (such as whether participant characteristics mediate the relationship between exposure to Bedsider.org and attitudes or behavioral outcomes).

References

Andreasen, A. R. (1995). *Marketing social change: Changing behavior to promote health, social development, and the environment*. San Francisco, CA: Jossey-Bass.

D'Angelo, D., Williams, L., Morrow, B., Cox, S., Harris, N., Harrison, L., . . . Zapata, L. (2007). Preconception and interconception health status of women who recently gave birth to a live-born infant—Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 reporting areas, 2004. *MMWR: Surveillance Summaries, 56*, 1–35.

Finer, L. B., & Zolna, M. R. (2014). *Shifts in unintended pregnancies in the United States, 2001-2008*. Washington, DC: Guttmacher Institute. Retrieved from https://www.guttmacher.org/pubs/journals/ajph.2013.301416.pdf

Frost, J. J., Darroch, J. E., & Remez, L. (2008). Improving contraceptive use in the United States. In Brief, 2008, 1–8. Retrieved from http://www.guttmacher.org/pubs/2008/05/09/ImprovingContraceptiveUse.pdf

Gibson, J. D., Koenig, M. A., & Hindin, M. J. (2008). The effects of unintended pregnancy on infant, child, and prenatal health: A review of the literature. *Studies in Family Planning*, *39*, 18–38.

Glassman, T. J., Dodd, V., Miller, E. M., & Braun, R. E. (2010). Preventing high-risk drinking among students: A social marketing case study. *Social Marketing Quarterly*, *16*, 92–110.

Grier, S., & Bryant, C. A. (2005). Social marketing in public health. *Annual Review of Public Health*, *26*, 319–339.

Gupta, K. (2011). "Screw health": Representations of sex as a health-promoting activity in medical and popular literature. *Journal of Medical Humanities*, *32*, 127–140.

Kaye, K., Suellentrop, K., & Sloup, C. (2009). *The fog zone: How misperceptions, magical thinking, and ambivalence put young adults at risk for unplanned pregnancy*. Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy. Retrieved from http://thenationalcampaign.org/sites/default/files/resource-primary-download/FogZone.pdf

Miller, A. (2011). The effects of motherhood timing on career path. *Journal of Population Economics*, *24*, 1071–1100.

Monea, E., & Thomas, A. (2011). Unintended pregnancy and taxpayer spending. *Perspectives on Sexual and Reproductive Health*, *43*, 88–93.

Mosher, W. D., Jones, J., & Abma, J. C. (2012). Intended and unintended births in the United States: 1982-2010. *National Health Statistics Reports*, *55*, 1–28.

Philliber Research Associates & University of California at San Francisco. (March 2012). *The Evaluation of Bedsider: One Year after Enrollment*. Unpublished report.

Sonfield, A., & Kost, K. (2013). *Public costs from unintended pregnancies and the role of public insurance programs in paying for pregnancy and infant care: Estimates for 2008*. New York, NY: Guttmacher Institute. Retrieved from http://www.guttmacher.org/pubs/public-costs-of-UP.pdf

The National Campaign to Prevent Teen and Unplanned Pregnancy. (2012). *Briefly: Unplanned pregnancy among unmarried young women*. Washington, DC: Author. Retrieved from http://thenationalcampaign.org/resource/briefly-unplanned-pregnancy-among-unmarried-young-women

Trussell, J. (2011). Contraceptive failure in the United States. *Contraception*, *83*, 397–404.

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