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Do Bedsider Family Planning Mobile Text Message and E-mail Reminders Increase Kept Appointments and Contraceptive Coverage?



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ABSTRACT

Objective: To determine whether Bedsider text message and e-mail reminders increase family planning contraceptive continuation and appointment rates.

Material and Methods: We trained staff at three high-volume Family Planning, Access, Care, and Treatment (Family PACT) clinics to enroll women through a special portal to receive text message or e-mail reminders for contraceptive refills and clinic appointments. Women were matched by contraceptive method, time frame of index visit, age group, and language preference to Family PACT clients at comparison sites that did not use the Bedsider program. Family PACT claims data was used to assess the contraceptive coverage of Bedsider and comparison women over 12 months. We assessed differences in contraceptive coverage between the two groups using McNemar's test of matched comparisons. Clinic records from one clinic were available to assess impact on kept appointment rates.

Results: Of the 488 women enrolled, 370 had a claim for a hormonal method (oral contraceptive, patch, ring, contraceptive injection) in the Family PACT database. Matching resulted in 365 matched pairs. The median length of enrollment in the reminder system was 115 days (16 weeks). A greater percentage of Bedsider women returned on time for contraceptive injections than women in the comparison group. However, McNemar's test showed no differences in contraceptive coverage between the intervention and comparison groups. Kept appointment rates showed a statistically significant increase after the intervention at the clinic providing data.

Conclusion: Contraceptive injection users showed a positive impact from receiving reminders, but overall there was no impact of the Bedsider reminders on return on time for contraceptive refills and injections. We were able to measure a significant increase in kept appointment rates at one clinic using the Bedsider text message and e-mail reminder system.

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Nationwide, nearly one-half of pregnancies are unintended (Finer & Zolna, 2016). The consistent use of contraceptive methods has the potential to reduce this high unintended

pregnancy rate. However, inconsistent use, such as forgetting to take pills and delays in getting the next injection or contraceptive refill before the current supply ends, leads to failure rates of 9% among users of oral contraceptives (OC), the patch, and the ring, and 6% for contraceptive injections (Jaccard, 2009).

Technological advances and the widespread adoption of mobile devices and the Internet among women of reproductive age to seek and share information can be leveraged to complement counseling on contraceptive choice and encourage method continuation. Messages delivered by mobile phone were found to be effective in improving kept appointments in health areas such as diabetes, asthma management, and childhood immunizations (Dick, Nundy, Solomon, Bishop, Chin, & Peek, 2011; Perry,

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2011; Prasad & Anand, 2012; Sims et al., 2012; Zurovac et al., 2011), although for pediatric dental appointments voicemail reminders were more effective than text message reminders (Nelson, Berg, Bell, Leggott, & Seminario, 2011). A personalized text message with specific contact information was found to significantly increase return rates for retesting of clients at risk of sexually transmitted infections/human immunodeficiency virus compared with clients who received generic messages (Nyatsanza, McSorley, Murphy, & Brook, 2016).

In recent years, several initiatives have piloted the use of technology in family planning clinic settings (Fox, Creinin, Murthy, Harwood, & Reid, 2003; National Campaign to Prevent Teen and Unintended Pregnancy, 2012). However, the evidence that mobile phone-based interventions improve contraceptive use among users or potential users of contraception is mixed. Castaño, Bynum, Andrés, Lara, and Westhoff (2012) found that the use of daily educational text messages improves OC continuation at 6 months over routine care alone. In a randomized trial of adolescents and young women using contraceptive injections, the authors reported text message reminders leading to better adherence to the first contraceptive injection appointment without an effect on timely follow-up injections (Smith, Gold, Ngo, Sumpter, & Free, 2015). One other study, in contrast, found no effect on adherence to OC intake (Hou, Hurwitz, Kavanagh, Fortin, & Goldberg, 2010).

The Bedsider program, developed by the National Campaign to Prevent Teen and Unintended Pregnancy (the National Campaign), consists of an interactive website that informs women at risk of pregnancy about contraceptive methods, dispels myths, and provides user testimonials. In 2015, the website engaged 144,000 women through app use, social media, or special groups (National Campaign to Prevent Teen and Unintended Pregnancy, 2016). Women can sign up to receive free, automated, method-specific text and/or e-mail reminders to take contraception, refill a prescription, or go to a clinic appointment, thus reducing the possibility of a gap in contraceptive use. The Bedsider program targets its messaging to women ages 20 to 29 years with creative reminder messages that appeal to adolescents and young adults but women of any age can sign up for the reminders (Gressel et al., 2014; National Campaign to Prevent Teen and Unintended Pregnancy, 2016).

We hypothesized that women enrolled in Bedsider reminders would have higher “on-time” return rates for their next contraceptive refill or injection or receipt of another contraceptive method than a matched group of women seen at nonparticipating provider sites in California. We selected clinics that are part of the Family Planning, Access, Care, and Treatment (Family PACT) program, California’s fee-for-service Medicaid family planning program, to participate in this study. The purpose of this study was to document the use of the Bedsider program at the clinics and measure the impact of the Bedsider reminder system on family planning appointment rates and contraceptive coverage.

Material and Methods

Site Selection

We obtained institutional review board approval from the University of California, San Francisco; the State of California’s Committee for the Protection of Human Subjects; and the Department of Health Care Services’ Data Research Committee. We recruited three clinics that saw at least 1,500 Family PACT

clients per year, had a no-show rate of at least 10%, did not have an electronic appointment reminder system as of January 1, 2013, and were interested in using the Bedsider program at their clinic. These clinics were located in the San Francisco Bay Area (Tri-City Health Center), Central Valley (Fresno EOC Health Services Clinic), and Los Angeles (Westside Community Health Center).

Client Enrollment

All clinics used computers to show Bedsider videos and testimonials in the waiting or examination rooms. For this study, the National Campaign created a special enrollment portal that allowed clinic staff and researchers to track women’s use of the reminders. Clinic health educators received an online webinar training from the National Campaign staff on how to enroll women through the special clinic portal. The special portal, like the publicly available Bedsider website, only requires women to create a login name and enter an e-mail address or phone number.

Staff identified women in need of a return family planning appointment or who were using OC, patch, ring, or contraceptive injection and, upon verbal consent, helped women to enroll in the Bedsider reminder system before they left the clinic. Clients were educated on the use of the Bedsider website and instructed on how to access their account and make changes. Both the enrolled women and clinic staff could make changes to the reminders as necessary. Women who were not interested in text message reminders or did not want to enroll through the clinic portal could access the other Bedsider features that are available to the general public. Client recruitment lasted from March 2013 until June 2014.

Process and Outcome Data Collection

The Bedsider system sent a brief text or e-mail message to the client reminding her at method-specific intervals about her method, refill, or appointment. Appointment reminders had clinic-specific information and were available in English, Spanish, and Portuguese. Reminders for contraceptive method use and refills were available in English, Spanish (as of October 2013), and Portuguese. Because only 10 women signed up for the Portuguese language option, their numbers were combined with the women selecting Spanish reminders in the analysis. Women could also opt to receive confidential reminders with a discreet message. Family PACT client enrollment and clinic reimbursement claims provided demographic and contraceptive use information. If the method reported at Bedsider enrollment was different from the method found in the claims record, the method found in claims was used. The claim closest to the Bedsider enrollment, occurring between 28 days before and 90 days after, was designated as the contraceptive index visit and the date of service for the following contraceptive claim was used to calculate whether the refill occurred on time. The Family PACT claims show the frequency of refills for pills, patch, and ring, which allowed estimation of the weeks of contraceptive coverage a woman had. Claims also show receipt of contraceptive injection and if it occurred within 105 days (14 weeks) of the previous injection. We analyzed whether women returned before their contraceptive supply ran out or had another contraceptive claim, regardless of whether the claim was for the same contraceptive method or not.

One year after the end of client recruitment, we conducted interviews with the clinic managers at each of the intervention clinics to assess the ongoing use of the Bedsider reminder system, its perceived feasibility and effectiveness, and to elicit observations that could help interpret the data.

Comparison Cohort

Family PACT claims data from more than 180 clinics located in the same or adjacent counties was used to select four to six comparison clinics for each intervention site. Comparison clinics were matched to intervention sites on clinic organizational structure (community clinic, Federally Qualified Health Center), geographic region (same or neighboring counties), and client volume (at least 1,500 female Family PACT clients served in 2012).

For each woman participating in Bedsider reminders, we identified another woman from within the pool of matched comparison sites who had a hormonal method claim within 28 days before or up to 90 days after an office visit occurring within the same 3-month timeframe as the matched Bedsider participant. Women were matched based on time frame of index appointment (served within 3 months of Bedsider participant), age group (≤ 19 , 20–29, and ≥ 30), contraceptive method (OC, patch, ring, or contraceptive injection), and language preference (English or Spanish). Random selection was used if more than one potential match was identified.

Kept Appointments

Only one clinic was able to provide kept appointment information for female reproductive health visits separate from the overall kept appointment count of the clinic. Appointments were categorized as kept appointments, rescheduled appointments, appointment cancellations (without immediate rescheduling), and appointment no shows (no communication between clinic and client).

Statistical Analyses

For all clinics, we conducted descriptive statistics for women who had signed up for Bedsider reminders (Bedsider group) and compared the refill on time variable with and without women who returned but switched their contraceptive method. After matching, we conducted the McNemar test for matched pairs to identify any difference in the return on time for contraception.

For the clinic that provided kept appointment information, we calculated a baseline average for the year before enrollment and compared it with the year after the end of study recruitment. We conducted z-tests to assess differences in the kept and rescheduled appointment rates before and after implementation of the Bedsider reminder system. All analyses were performed using SAS 9.4 (SAS Institute Inc, Cary, NC).

Results

Use of the Bedsider System

A total of 517 women enrolled in the Bedsider reminder system. We found enrollment information for 488 of these women in the Family PACT client database. We confirmed that these women were contraceptive users by searching paid and

denied Family PACT claims for contraceptive method and identified 370 women who had a contraceptive claim for OC, patch, ring, or injection in the stipulated timeframe (28 days before and 90 days after Bedsider enrollment). Of the original 488 women, 20 had no claim, 10 had only non-method-related claims, and 80 had either a hormonal method claim outside of the stipulated timeframe or used a method that is not part of this study (intrauterine contraception, implant, or condoms). Eight additional women were excluded from the analysis because they enrolled and unenrolled on the same day (Figure 1).

For the 370 women included in the final dataset, we analyzed use of the three types of Bedsider reminders for the 12 months after their Bedsider enrollment. Because the data are not normally distributed, we calculated median and percentile values. One-half of the women were enrolled in the program for 115 days (16 weeks) or longer. Most women received only one or two appointment reminders. One-half of the women continued to receive method reminders after 12 months (median, 455 days) and received nine or more refill reminders (Table 1).

Kept Appointment Rates

At the clinic that provided appointment outcome data, kept and rescheduled appointments significantly increased from 81% in the baseline year to 85% in the follow-up year ($z = -5.47$; $p < .001$). The result remained significant ($z = -5.16$; $p < .001$) when we included all women who communicated with the clinic about their upcoming appointment (canceled, rescheduled, and kept; $z = -5.16$; $p < .001$). Concomitantly, the no-show rate decreased significantly from 12% to 9% from the before and after the intervention periods ($z = 5.16$; $p < .001$; Table 2).

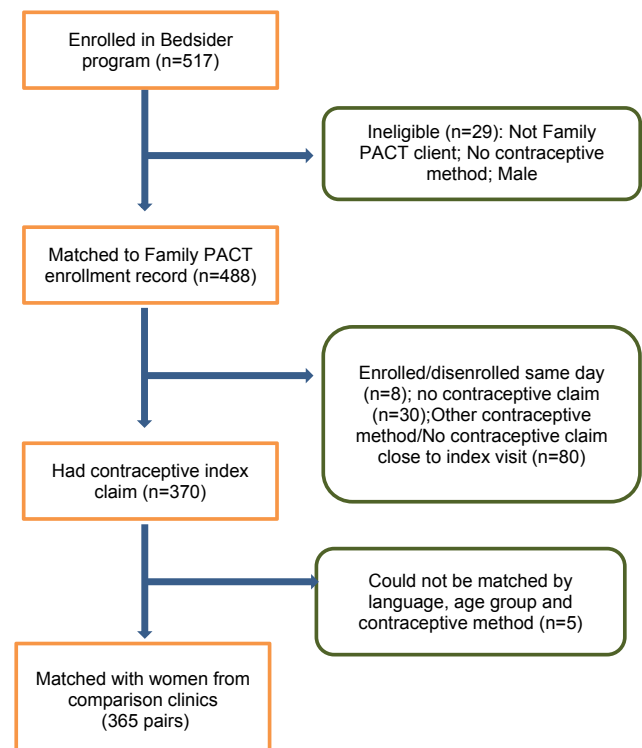


Figure 1. Bedsider client cohort.

Table 1
Average Use of Clinic-Specific Bedsider Portal

| Variable | n | Median | 25th Percentile | 75th Percentile | 95th Percentile |
|------------------------------|-----|--------|-----------------|-----------------|-----------------|
| Length of enrollment (d) | 370 | 115 | 58 | 594 | 828 |
| No. of appointment reminders | 269 | 1 | 1 | 2 | 3 |
| No. of method reminders | 132 | 455 | 60 | 782 | 840 |
| No. of refill reminders | 50 | 9 | 5 | 64 | 101 |

Demographics of the Bedsider Cohort

Women ages 20 to 29 made up the largest group in the study (39%) followed by adolescents (35%). More than one-half of the sample (59%) were Latina women; the proportion of White, African American, and Asian/Pacific Islander women ranged from 10% to 15%. The majority of the women (72%) selected to receive their messages in English, 26% selected Spanish, and 3% selected Portuguese (Table 3).

Return on Time for Contraceptive Refills

Matching between Bedsider women and comparison women resulted in 365 matched pairs. Five Portuguese-speaking women could not be matched by age group and contraceptive method. Using these matched pairs, we analyzed whether women returned on time before their contraceptive supply ran out or within 105 days (14 weeks) after their contraceptive injection.

Women who signed up for Bedsider text or e-mail reminders usually received a 3-month supply of contraception or were expected to return for their next contraceptive injection within 105 days (14 weeks). We analyzed whether women returned on time before their contraceptive supply ran out. Of the 370 Bedsider clients included in the analysis, 308 women (83%) had another claim after their index claim date in the Family PACT program.

Overall, 43% of women returned on time for their next refill. However, OCs, patch, and ring users had a different pattern than injection users. Only 34% of the 268 women using OC, patch, or ring returned on time before their contraceptive supply ran out compared with 33% in the comparison group; whereas 67% of the 97 injection users returned on time before the next injection was due compared with 57% in the comparison group (Table 4).

Women in the 20- to 29-year age group had the highest on-time return rate for injections (82%), followed by women 30 years and over (59%) and adolescents (56%). Women ages 20 to 29 also had the highest on-time return rate for OC, patch, or

ring (42%) compared with the other two age groups (34% for adolescents and 20% for women 30 years and over; Table 4).

Return on time differed by racial/ethnic group. One-half (53%) of White women returned on time for OC/patch/ring compared with 36% in the comparison group. Only 28% of African-American women returned on time for OC/patch/ring compared with 52% in the comparison group.

Women who spoke Spanish were more likely to return on time for the next contraceptive injection (80%) than Spanish-speaking women in the comparison group (49%). However, there was no difference for return on time rates for Spanish-speaking women using OC/patch/ring (35% vs. 37% in the comparison group). There were no differences in return on time rates for English-speaking women between the intervention and comparison groups for injections and OC/patch/ring.

The McNemar test on paired proportions found no difference in the Bedsider group and comparison group in who returned on time for their refill (365 pairs, 43% vs. 39%; $p = .27$). There were similar return percentages for women using OC, patch, and ring (268 pairs; 34% Bedsider vs. 33% comparison; $p = .78$). Among women using injections (97 pairs), a greater percentage of the Bedsider group (67%) returned on time compared with the comparison group (56%; $p = .08$; Table 5).

One-Year Follow-up Interviews

Clinic managers at all three intervention sites commented in the 1-year post-intervention interviews that they continued to use the Bedsider website for client education and contraceptive counseling either in the waiting room or during the counseling session. However, the perceived value of text message reminders varied by client age at each site. Clinic managers reported that young adult women were at times not that interested in enrolling in Bedsider for two main reasons: 1) they can use their smartphones for reminders and 2) they have been using their methods for some time and seemed to be less in need of reminders. Although adolescents were perceived to be more at ease using text messages, clinic managers felt that adolescents were also more likely to change phone plans or ignore the messages. At one intervention clinic, the staff reverted in the year after the intervention to calling adolescents 14 to 18 years old on the day of the appointment. Another clinic implemented reminder calls for all clients after the end of the intervention period when they changed to electronic health records and instituted a policy that clients have to confirm their appointment or they lose their spot.

Discussion

Although the Bedsider website is widely used and popular, there have been few data on its impact on client behavior. In this study, we assessed the impact of the Bedsider text message

Table 2
Kept Appointments for All Women with Reproductive Health Visits at Tri-City Health Center Regardless of Bedsider Enrollment

| Timeframe | Appointments Baseline Year | % Appointments Baseline | Appointments Post Enrollment Year | % Appointments Post-Enrollment |
|--------------------|----------------------------|-------------------------|-----------------------------------|--------------------------------|
| Total appointments | 3,969 | 100 | 5,421 | 100 |
| Kept/rescheduled* | 3,214 | 81 | 4,620 | 85 |
| Cancelled | 263 | 7 | 308 | 6 |
| No show* | 492 | 12 | 493 | 9 |

* Significant at $p < .001$.

Table 3
Bedsider Clients, by Demographics (n = 370)

| Total | Bedsider Clients | |
|------------------------|------------------|-----|
| | n | % |
| Age (y) | | |
| 13–19 | 131 | 35 |
| 20–29 | 146 | 39 |
| ≥30 | 93 | 25 |
| Race/ethnicity | | |
| White | 38 | 10 |
| Asian/Pacific Islander | 50 | 14 |
| Black | 56 | 15 |
| Latina | 217 | 59 |
| Other | 9 | 2 |
| Language* | | |
| English | 265 | 72 |
| Spanish | 95 | 26 |
| Portuguese | 10 | 3 |
| Total | 370 | 100 |

* Selected languages of text messages.

feature on contraceptive coverage in three high-volume family planning clinics and kept appointment rates in one of the clinics. One year after the end of the recruitment phase, clinics continued using the Bedsider program for reproductive health education in the waiting room and contraceptive counseling and found the option of a reminder function a valuable tool to help women manage their consistent use of contraceptive methods. Google analytics of Bedsider user patterns confirmed that women used the contraceptive reminders for several weeks after enrollment. Only one clinic could provide kept appointment rates for women's reproductive health visits, whereas the other two clinics could not separate appointments for reproductive health visits from other types of appointments. To monitor the impact of interventions designed to improve adherence to family planning visits, clinics need to be able to generate reports on female reproductive health visits excluding non-reproductive health visits and males that might confound any finding.

These findings are consistent with those of a randomized, controlled study evaluating the Bedsider support network, where the educational components improved women's use of a more effective method of contraception and reduced rates of

pregnancy scares, pregnancies, and unprotected sex. However, the authors did not find a significant effect on consistency of using oral contraception or condoms (Antonishak, Kaye, & Swiader, 2015). Like the study by Antonishak et al, this study also did not find an effect from the Bedsider reminder system on consistency of using OC. The, albeit nonsignificant, trend among injection users to return on time for the next injection suggests a differential impact of text message by contraceptive method. Because women do not have a visual reminder of an empty pill pack or need to exchange the ring or patch, they may benefit from the scheduled reminders to a greater extent. However, the long-term impact of text message reminders on return for contraceptive injection still needs to be demonstrated (Smith et al., 2015). These findings should be validated through a study with a larger group of contraceptive injection users that distinguishes between women who return for the next injection and those who switch to another method.

Our results for adolescents are consistent with a qualitative study on adolescents' contraceptive use where adolescents considered text message reminder systems as a valuable tool for contraceptive continuation, but reported problems using their cell phone consistently owing to bill nonpayment, phone loss, and cell phone number change (Irons, Tomaszewski, Munos, Buchanan, & Trent, 2015; Nelson et al., 2011).

This study has strengths and limitations. We used claims data rather than contacting women and relying on self-report, thus reducing selection and reporting bias. However, the strength of using administrative databases was limited by the state's data access protocol which resulted in our inability to monitor completeness of contraceptive claims on an ongoing basis. Because of this, we were unable to alert clinics of potential missing claims or to clarify inconsistencies between Bedsider enrollment information and claims data. The high number of women who signed up for Bedsider reminders without a contraceptive index claim in the Family PACT claims database was unexpected and the resulting smaller sample impacted our ability to look at sub group differences. The impact on women preferring to speak Spanish may not have been captured fully, because only appointment reminders, but not method and refill reminders, were available in Spanish in the first 6 months of client recruitment. Because the educational video and Bedsider

Table 4
Returned on Time of Bedsider and Comparison Group by Demographics

| | Injections | | | | OC/Patch/Ring | | | |
|------------------------|-------------------|----|---------------------|-----|--------------------|----|----------------------|----|
| | Bedsider (n = 97) | | Comparison (n = 97) | | Bedsider (n = 268) | | Comparison (n = 268) | |
| | n | % | n | % | n | % | n | % |
| Total | 65 | 67 | 55 | 57 | 92 | 34 | 89 | 33 |
| Age (y) | | | | | | | | |
| 13–19 | 15 | 56 | 15 | 56 | 35 | 34 | 35 | 34 |
| 20–29 | 31 | 82 | 23 | 61 | 45 | 42 | 32 | 30 |
| ≥30 | 19 | 59 | 17 | 53 | 12 | 20 | 22 | 37 |
| Race/ethnicity | | | | | | | | |
| White | 4 | 57 | 8 | 62 | 16 | 53 | 15 | 36 |
| Asian/Pacific Islander | 9 | 90 | 5 | 100 | 15 | 41 | 5 | 22 |
| Black | 5 | 56 | 6 | 55 | 13 | 28 | 14 | 52 |
| Latina | 45 | 67 | 33 | 52 | 47 | 31 | 51 | 31 |
| Other | 2 | 50 | 3 | 60 | 1 | 25 | 4 | 36 |
| Language* | | | | | | | | |
| English | 37 | 60 | 38 | 61 | 72 | 35 | 67 | 33 |
| Spanish* | 28 | 80 | 17 | 49 | 21 | 35 | 22 | 37 |

* Includes 5 women who selected to receive text message reminders in Portuguese.

Table 5

Women Who Returned on Time for Their Refill/Injection, by Intervention and Matched Comparison Group* (n = 365 Pairs)

| | Returned on Time Bedsider (%) | Returned on Time Comparison (%) | McNemar's Test for Paired Samples, p Value |
|----------------------------------|----------------------------------|------------------------------------|---|
| Injections (n = 97 pairs) | 67 | 56 | .08 |
| OC/Patch/Ring (n = 268 pairs) | 34 | 33 | .78 |
| Total (n = 365 pairs) | 43 | 39 | .27 |

Abbreviation: OC, oral contraceptive.

* Comparison group was matched by contraceptive method, time, age group, and language preference.

website is now available in Spanish, it may be worthwhile to conduct a study assessing the impact of reminders in the context of an interactive, educational website with a larger group of Spanish-speaking women.

Implications for Practice and/or Policy

The Internet-based Bedsider program, available in English and Spanish, is perceived by clinic managers to be a valuable tool to provide education about contraception and reproductive health issues that can be integrated into clinic flow and used by clients after their initial clinic visit. Its reminder system can help to reduce missed family planning visits and may improve timely returns for contraceptive injections, but no impact was observed for return on time for contraceptive refills. The Bedsider reminders should be presented to women using user-dependent contraceptive methods as part of a range of reminder options that includes smartphone, outlook calendar, and clinic reminders so that they can determine what suits them best.

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