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Why Didn't You Text Me? Poststudy Trends From the DepoText Trial

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Abstract

Objective—To evaluate the longitudinal impact of a 9-month text message intervention on participant adherence beyond the intervention to highly effective contraceptive methods among urban adolescent and young adult women enrolled in the DepoText randomized control trial (RCT).

Study Design—Retrospective longitudinal cohort study of long-term follow-up data from the DepoText RCT. Sixty-seven female participants (aged 13–21 years) using depot medroxyprogesterone acetate (DMPA) were recruited from an urban academic adolescent practice in Baltimore, Maryland. The principal outcome measured was a comparison of contraceptive method choice between the control and intervention groups during the 20 months postintervention.

Results—Intervention participants were 3.65 times more likely to continue using DMPA or a more efficacious method at the 20-month postintervention evaluation (odds ratio 3.65, 95% CI 1.26–10.08; $P = .015$).

Conclusion—Participation in the DepoText trial was associated with continued use of DMPA or a more effective contraceptive method almost 20 months after the intervention exposure ended.

Keywords

adolescent; DMPA; Depo-Provera; text messaging; family planning; adherence

Introduction

The unintended pregnancy rate among adolescents is one of the highest across all age groups —with Baltimore City's teen birth rate higher than both the Maryland and US national

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MET :Funding
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rates.[1] With 82% of teen pregnancies reported as unplanned, adolescents account for one-fifth of total annual unintended pregnancies.[2,3] Urban minority youth have high rates of missed clinic appointments,[4,5] but access to and use of text message technology is not associated with socioeconomic or racial/ethnic disparities.[6,7] Recent federal health policy efforts have sought to incentivize improvements in safety and efficiency of patient care delivery through improved use of technology to target health disparities in areas such as those affecting adolescent populations. “Meaningful use of technology” through improved patient communication is one such initiative.

Over the past 15 years, the decline in US teen pregnancy rates has been primarily attributed to improved contraceptive use and adherence.[8–10] Text messaging is a simple tool to communicate with teenagers who are at high risk for unintended pregnancy as a way of promoting healthy decisions related to contraceptive adherence and safe sexual practices. Youth-friendly text messages are a culturally relevant, convenient technology that can connect young, socially disadvantaged populations with the clinical setting to yield positive short-term health outcomes.[12–14] Previous studies have demonstrated the use of texting as a health behavior modifier that improves short-term oral contraceptive pill continuation.[15–19] To our knowledge, no study has been conducted to evaluate the longitudinal impact of a short-term, depot medroxyprogesterone acetate (DMPA) texting intervention on subsequent family planning behavior beyond the culmination of the text message intervention.

DMPA is a safe, effective, and commonly chosen contraceptive method by adolescents and young adults.[20] Among young, urban women of color, DMPA has one of the highest rates of user satisfaction.[21,22] These rates persist in the presence of documented risks, including a Black Box warning related to bone mineral density (BMD) loss with extended use. New recommendations to reevaluate women using DMPA after 24 months have been published and disseminated to address this concern. Recent studies also demonstrate that BMD loss dramatically slows after 24 months of use and is almost always completely reversed in adolescents within 2 to 3 years of discontinuation.[23]

DMPA is a unique contraceptive method that does not require male consent or cooperation and cannot be controlled, observed, or felt (eg rod beneath the arm, intrauterine device [IUD] strings) by male partners or others.[24,25] Women often appreciate the “hidden” nature of DMPA, and freedom from daily compliance.[26–28] In addition, as a progestin-only method, DMPA remains an important option for patients with medical contraindications for combined estrogen-progesterone contraceptive methods, and one that is supported by the American College of Obstetricians and Gynecologists and the World Health Organization.[29,30]

The purpose of this study is to evaluate long-term postintervention outcomes of the control and intervention participants in the DepoText trial to better understand the influence of text message interventions on participant adherence to highly effective methods such as DMPA or long-acting reversible contraception (LARC). We hypothesized that the effects of the original DepoText trial would be sustained, resulting in long-term adherence to or improvement in contraception choice.[31]

Materials and Methods

Original DepoText Trial

The DepoText trial was a randomized controlled pilot trial (RCT) conducted in an urban academic practice serving adolescent patients in Baltimore, Maryland between January 2011 and February 2012 (clinical trials registration #NCT01641380).[31] The primary goals of the trial were to evaluate feasibility, acceptability, and preliminary efficacy of using a text message reminder system for family planning clinic appointments and delivery of positive sexual health messages during DMPA use. The messages were created to maintain patient privacy and empower adolescents by promoting self-management of their family planning decisions. Urban adolescents aged 13 to 21 years who were using DMPA and had a cell phone for personal use were eligible. One hundred participants were recruited and randomized into either the control or intervention arm. Each arm had 50 participants. Participants completed a baseline web-based survey during which demographic, parental, sexual, and use-of-technology histories were collected. Participants received $10 remuneration for completion of the survey and $5 for notifying the nurse case manager of changes in contact information over time. The major findings of the study support the feasibility, acceptability, and preliminary efficacy of the DepoText program for improving clinic attendance for family planning visits[11]. The Johns Hopkins Institutional Review Board approved this study.

DepoText Intervention

Participants in the intervention arm received text message reminders via the Compliance for Life (CFL) platform. Reminder messages for DMPA-specific family planning appointments were sent to all intervention participants 72 hours prior to the scheduled appointment time, and prompted the participant to reply. Additional reminders were sent at 48 and 24 hours prior to the appointment until the patient responded. One sample appointment reminder read, “Will you be going to your appointment on MM/DD/YYYY?—Nurse Kathy. If yes, reply 1. If no, reply 2”. A reply of “no” automatically sent an email alerting the nurse case manager to follow-up with the participant to reschedule the family planning clinic appointment. Communication was intentionally designed as 2-way; specific response categories were predetermined to result in flags being generated to the nurse case manager to contact the participant. Per the standard of care quality assurance DMPA clinical protocol, all participants in both study arms received a phone call from the clinic to their home phone reminding them of the clinic appointment as well as a call from the nurse case manager following missed appointments. Only intervention arm participants, however, received previsit text reminders.

Safe sexual health message content encouraged condom use and healthy eating using simple, teen-friendly language. Sample messages included, “Condoms prevent STDs. Stop by the clinic if you need some,” “Eat right and exercise to prevent weight gain on DEPO,” and “Call the clinic if you have questions or problems with DEPO.” Each message was delivered once during every 12-week DMPA injection cycles for 3 cycles. A total of 9 safe sexual health messages were delivered by completion of the trial.

Eligibility Criterion for Posttrial Follow-Up

Eighty-seven participants from the original 100 enrolled participants completed all 3 injection cycles of DMPA for the DepoText trial. The primary analysis of this study, to determine the effect of the short-term DepoText intervention on long-term contraceptive use and behavior, involved a retrospective chart review to document participant continued adherence to DMPA or alternative contraceptive choice and compare results between control and intervention participants. Eligible participants for this posttrial follow-up analysis were therefore limited to those participants who completed all 3 injection cycles of the original DepoText trial and sought clinical follow-up care within the period selected for evaluation, February 2012 to October 2013 (Figure 1). Participants without a clinic visit in the electronic health record system between the end of the initial trial and the 20 months posttrial and/or participants who did not have a documented LARC placement, were categorized as not having returned to seek clinical care (N = 20).

For those who did return to clinical care or had a documented LARC placement (N = 67), the method of contraception reported at the most recent visit within the 20-month cross-sectional time frame was used to evaluate contraceptive effectiveness in the follow-up analysis. The time from enrollment to the last clinical visit was documented to assess differences in clinic utilization between groups.

Outcome Measures and Statistical Analysis

The reviewers were blinded to the study arm designation of the participants for chart reviews. Data were evaluated using chi-square and logistic regression analysis in SPSS (version 22). A dichotomous variable was selected to classify the primary outcome of contraceptive method choice: “DMPA or more efficacious method” such as the implant or IUD (ie, LARC) or “less efficacious method” (ie, pill, patch, or ring) from the most recent family planning visit within the 20-month postintervention time frame. Published contraceptive failure rates for the percentage of women experiencing an unintended pregnancy during the first year of typical use and perfect use were used to classify method efficacy compared with DMPA.[32]

Confounding Variables

For this study, bivariate logistic regression analysis was used to evaluate the relationship between participation in the DepoText intervention and subsequent contraceptive behavior. Using the change-in-estimate method,[33] age, race, living situation, parental education, status in school, insurance status, number of reported sexual partners in the past 3 months, history of prior sexually transmitted disease (STD) diagnosis, and history of pregnancy were evaluated as potential confounders or effect modifiers. However, the population of young women in this sample as a whole proved to be characteristically very similar. A chi-square analysis of demographic characteristics was performed to determine whether any statistically significant differences existed between the control and intervention groups for selected factors (Table 1). This served to isolate the impact of the DepoText intervention on decisions related to contraceptive choice.

Post Hoc Analysis

In Baltimore, adolescents can seek contraceptive services in a variety of settings, including school-based health centers, the public health department, young adult transition clinics, and so on. Therefore, a post hoc analysis was performed on the 87 participants who completed the original DepoText trial to determine if there were any identifiable differences between those participants who had visits in the 20-month follow-up period (N = 67) and those for whom follow-up data were not available (N = 20).

Results

Sample Characteristics

The mean age of all participants was 17.1 (SD 1.67) years. Almost all the participants were African American (97%) residing in mother-headed households (63%). Most participants were in school (67%) at baseline and had some form of health insurance (93%). Notably, in both the intervention and control groups, only a minority of girls felt that the ideal age to have a child was at age 21 or younger (28%). A chi square analysis of demographic characteristics revealed no statistically significant differences between the control and intervention groups for selected factors (Figure 1).

The overall mean days from enrollment to last clinical visit were 837 (SD 181) days. There were no differences between the 2 groups (Intervention 843 [SD 134] days; Control 832 [SD 180] days; $P = .4$). Of participants who did not seek clinical care, 10 were from the control arm and 10 from the intervention arm, resulting in no proportional difference between study arms (odds ratio [OR] 0.64, 95% CI 0.24–1.67; $P = .356$). Those who did not return were also similar to those included in the post-trial follow-up analysis on other patient characteristics (age, race, living situation, parental education, status in school, insurance status, number of reported sexual partners in the past 3 months, history of prior STD diagnosis, and history of pregnancy).

Contraceptive Method Choices and Outcomes

Overall, of the 67 participants in the postintervention assessment, 33 adolescent and young adult women (49%) were classified as using “DMPA or a more efficacious method” based on the most recent clinic visit documented within 20 months postintervention. Within this group, 30 young women (91%) remained on DMPA and 3 switched to a contraceptive rod (9%). The remaining 34 adolescent and young adult women in the postintervention assessment (51%) were classified as using a “Less efficacious method.” Within this group, 5 switched to using condoms only (14%), 3 switched to oral contraceptive pills (8%), 2 switched to using the vaginal ring (5%), 1 switched to the transdermal patch (2%), and the remaining 24 participants reported not using any method of contraception (71%) at the most recent documented visit within the 20-month postintervention time frame.

The bivariate logistic regression analysis to evaluate intervention and contraceptive method outcome yielded the results that 75% of young women in the DepoText intervention arm chose to either remain on DMPA or a more efficacious method compared with 46% of those in the control arm. Intervention participants were 3.65 times more likely to use DMPA or

more effective intervention at 20 months (OR 3.65, 95% CI 1.26–10.08; $P = .015$) (Figure 2).

Discussion

This study demonstrates that participants in the DepoText trial maintained prolonged adherence to DMPA or selected a more efficacious contraceptive method following completion of the trial. To our knowledge, this is the first study to demonstrate sustained improvement in long-term contraceptive adherence after short-term exposure to a contraceptive text messaging intervention. Intervention factors likely contributing to the positive effect on young women include the following: participant acceptance of text message timing and teen-friendly content, continuity and personalization of care from the nurse case manager, confidentiality of person-based communication, and development of a sense of clinical connectedness to the adolescent clinic practice as a home for contraception needs. The influence of personalized care with the clinic team is consistent with a preliminary review of positive participant feedback, which indicates the importance of having a specific person to contact in the clinic that was familiar with their contraceptive needs.[34] Finally, the language of instructions in the text messages was simple, easy to understand and provided practical information. Over time, participants may have become more attuned to self-management of contraception.

Ongoing efforts to encourage LARC such as implant or IUD use among adolescents are important to enhance uptake of these highly effective methods.[35] However, current data indicate that less than 5% of young women across the United States choose a LARC method.[36–38] There are many obstacles to placement of LARC methods, including financial or insurance barriers, knowledge gaps in safety and efficacy, and parental support. In addition, waiting periods to coordinate LARC insertion can leave adolescents vulnerable to unintended pregnancy.[39] Even when all the barriers are removed, one-third of adolescents still chose shorter acting methods and of that group, 20% chose DMPA.[40,41] It is therefore critical to optimize support for existing methods chosen by young women for their contraceptive needs while progress is made on securing access, knowledge, and support for LARC methods.

Meaningful Use

The Centers for Medicare & Medicaid Services (CMS) is authorized to provide payments to eligible entities that demonstrate “meaningful use” of electronic health record (EHR) technology. “Meaningful use” is broadly defined as technology-based improvements in safety, efficiency, and health disparities that engage patients, improve coordination of care and maintain privacy and security of health information.[42] Compliance with “meaningful use” initiatives is expected to improve clinical outcomes, increase efficiency, empower individuals and augment research data on health systems. The DepoText reminder system is an example of a text-based intervention that could be feasibly integrated into an EHR with texting capability. While many youth have access to email, texting is the preferred method of communication by low-income teens.[6] Incorporation of programs like DepoText into an

established EHR may foster effective, person-based communication between physicians and patients needing family planning support.

Limitations

The findings from this study should be considered in light of several general limitations. This study was limited to one geographic location with a largely homogenous sample, so generalizability may be limited. Approximately one-fifth of the sample did not seek clinical services within the 20-month postintervention follow-up time frame as per chart review in the EHR system. It is possible that unmeasured factors influenced return to the clinic or contributed to the observed contraceptive practices in the remaining cohort. Our analysis of the baseline traits, however, indicates similar demographic characteristics. The assessment of contraceptive practice also represents a cross-sectional view of former study participants and outcomes may be subject to prior study experiences and duration of time after study completion. Nonetheless, the results of our analysis suggest a similar follow-up period for participants in both arms and active care-seeking behavior by participants in the posttrial sample.

Conclusion

The DepoText intervention had sustained effects on contraceptive choice for intervention participants compared with controls. Among participants that sought ongoing clinical care, exposure to the DepoText intervention was associated with greater continued use of DMPA or more effective contraceptive methods. Until there is wide-spread uptake of LARC methods for adolescents, it is critical to support adolescent contraceptive choices. This intervention represents a promising strategy to encourage family planning appointment adherence, prevent unintended pregnancy, and promote “meaningful use” of technology for adolescents. Scaled up work to integrate this technology into EHR platforms and to evaluate impact on quality, outcomes, and cost-effectiveness is warranted.

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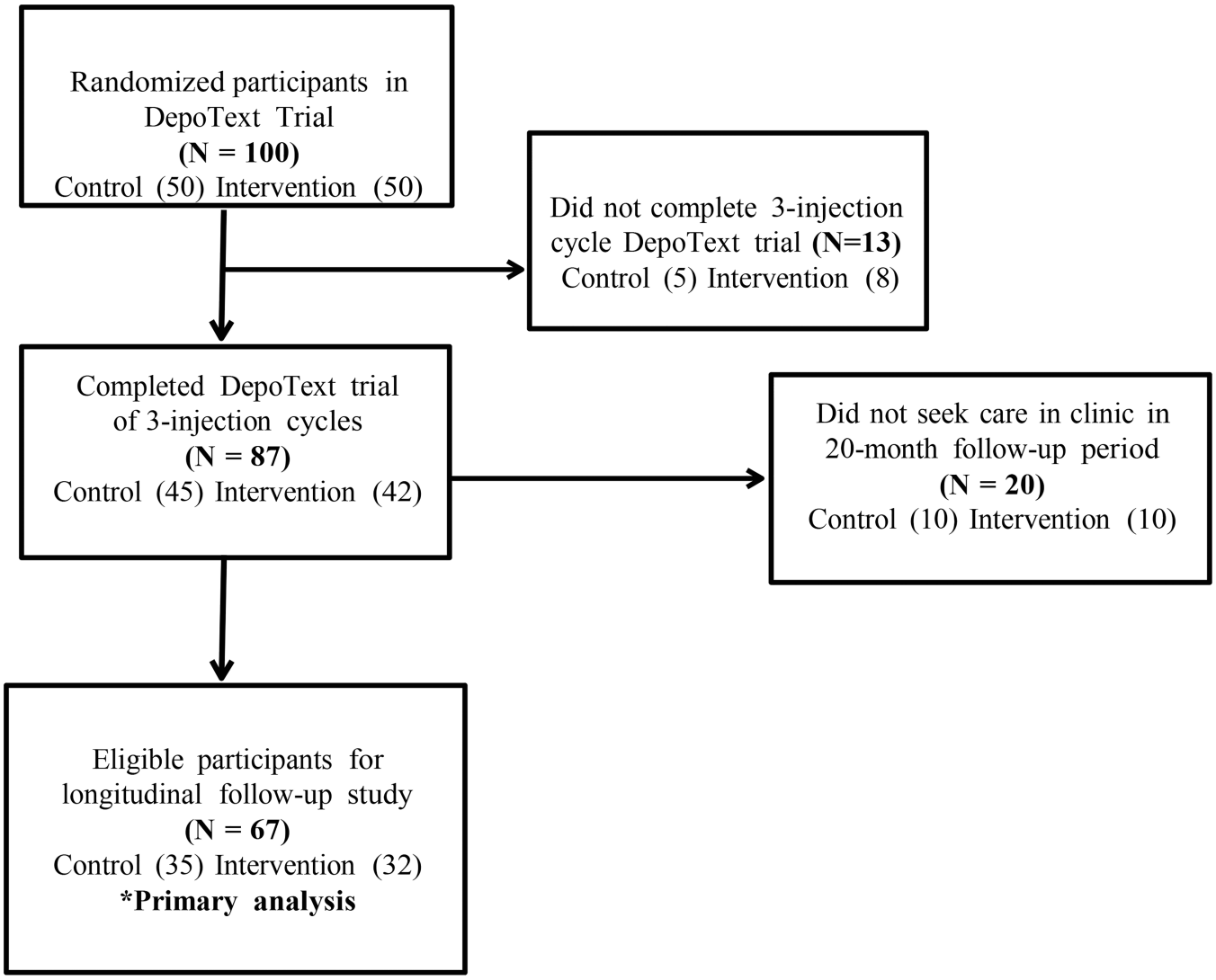

Figure 1.
DepoText enrollment and eligibility for longitudinal follow-up study.

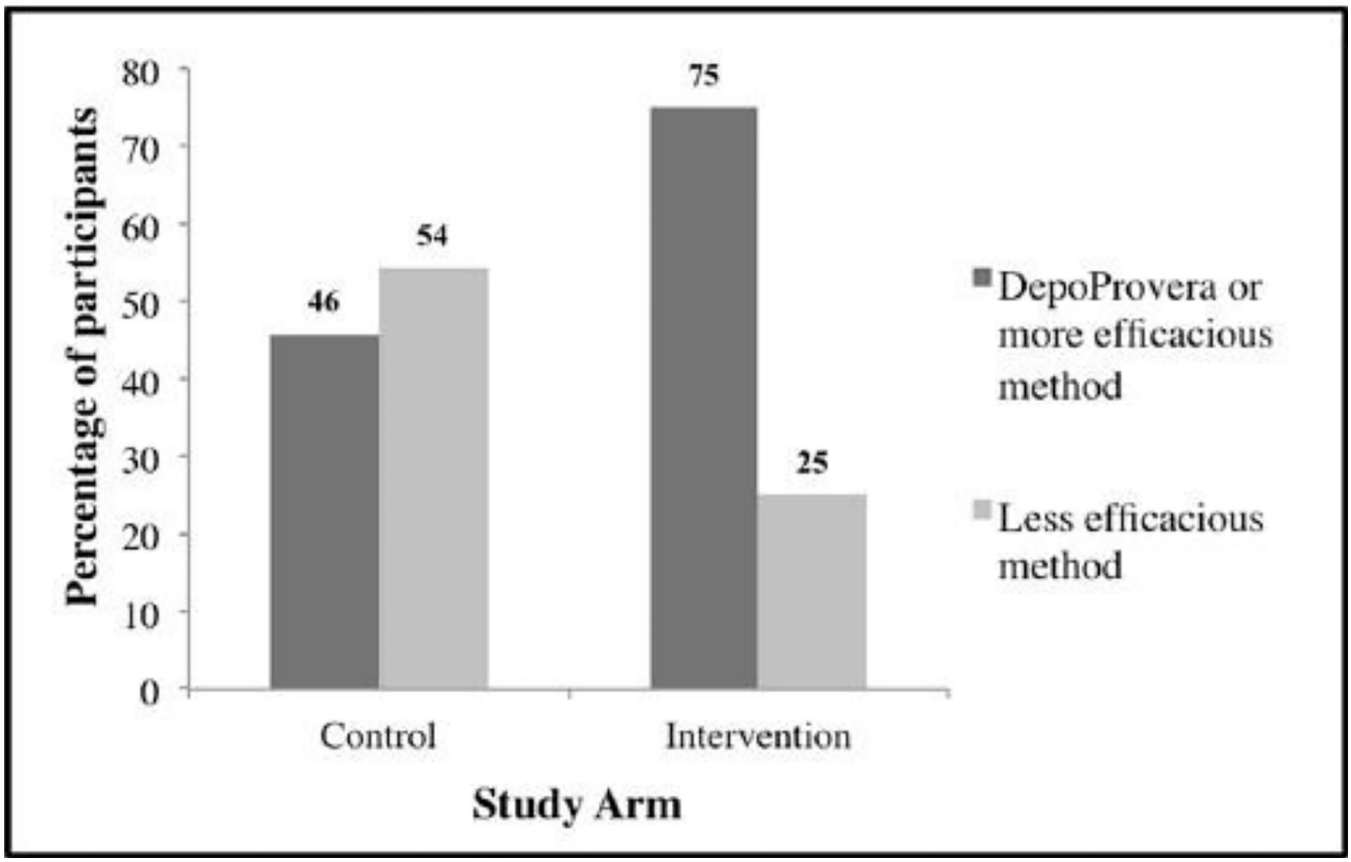

Figure 2.
Contraceptive method outcome by study arm 20 months postintervention (N = 67; odds ratio 3.56, 95% CI 1.26–10.08, $P = .015$).

Table 1

Selected Demographics of Study Sample (N = 67).

Characteristic	Intervention (n = 32), %	Control (n = 35), %	*P*
Age, years, mean (SD)	17.41 (1.64)	16.71 (1.69)	.582
Adolescent 13–17 years	56.2	62.9	
Young adult 18–21 years	43.8	37.1	
Race			
Race African American	96.9	97.1	.949
Resides in single-female headed household	65.5	60.0	.559
Parental education high school or less	72.4	61.8	.399
In school at baseline	82.8	94.1	.153
Had some form of insurance	93.8	91.4	.718
Ideal age to have a child, 21 years or younger	21.4	35.3	.280