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Postpartum contraceptive counseling for first-time adolescent mothers: a randomized controlled trial

Alhambra Frarey[1] · Elizabeth P. Gurney[1,2] · Stephanie Sober[1] · Paul G. Whittaker[1] · Courtney A. Schreiber[1]

Abstract

Purpose Rapid repeat pregnancy is common among adolescent mothers and is associated with increased risks of adverse perinatal and maternal outcomes. Increasing contraceptive uptake among postpartum adolescents may decrease these outcomes through pregnancy prevention. This randomized controlled trial of 100 postpartum adolescent women assessed the effect of a standardized immediate postpartum contraceptive counseling intervention emphasizing healthy birth spacing and the use of long-acting reversible contraceptives (LARC).

Methods After a baseline survey about reproductive health and pregnancy intentions, all subjects received routine postpartum contraceptive counseling. The intervention group also received the standardized counseling intervention. All participants had access to immediate postpartum contraceptive implant initiation or to intrauterine device (IUD) insertion at postpartum follow-up. Contraceptive use and repeat pregnancy were assessed quarterly for 12 months. Differences in repeat pregnancy, as well as contraceptive initiation, continuation, and satisfaction were analyzed.

Results There was no difference in repeat pregnancy or contraceptive initiation, continuation or satisfaction between the study groups. However, regardless of group assignment, all subjects who desired the contraceptive implant used the method, compared to 15% of subjects who desired the IUD ($p < 0.001$). Three pregnancies occurred among subjects who desired the IUD versus none amongst subjects who desired the implant ($p = 0.10$).

Conclusions This standardized postpartum contraceptive counseling intervention did not affect teens' repeat pregnancies or contraceptive use. However, immediate postpartum availability of the contraceptive implant was associated with increased utilization of this method when compared to the IUD. Future postpartum contraceptive efforts should investigate procedures to improve teens' access to postpartum contraception.

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Keywords Postpartum · Adolescents · Contraception · Counseling

Introduction

The United States' adolescent pregnancy rate declined 23% from 2008 to 2011, and the teen birth rate in 2010 was at an historic low of 31.3 per 1000, approximately half the rate in 1991 [1]. This reduction has been attributed to improved

✉ Alhambra Frarey
frareya@uphs.upenn.edu

1 Department of Obstetrics and Gynecology, University of Pennsylvania School of Medicine, 3400 Spruce St, Philadelphia, PA 19104, USA

2 Present Address: Department of Obstetrics and Gynecology, Einstein Medical Center Philadelphia, 5501 Old York Road, Philadelphia, PA 19141, USA

contraceptive access and use, particularly of highly effective methods such as the user-independent, long-acting reversible contraceptive (LARC) methods: the intrauterine devices (IUDs) and the subdermal contraceptive implant [2]. In 2012, 4.3% of adolescent female contraceptive users benefited from an IUD or implant, up from just 0.3% in 2002 [2, 3].

Unfortunately, despite this progress, teens in the United States continue to experience pregnancy and childbirth at higher rates than their peers in other developed nations [4], and the majority of adolescent pregnancies in the U.S. are unintended [5]. Furthermore, nearly 20% of births to teens are repeat births [6], and 35% of recently pregnant teens will become pregnant again within 24 months [7, 8]. Rapid, repeat pregnancies increase risks of adverse perinatal and

maternal outcomes for all women [9, 10], and these negative birth outcomes occur more frequently among teenage mothers [11, 12]. Increasing contraceptive use among postpartum adolescents through improved counseling and education could decrease these negative outcomes. However, while contraceptive counseling has long been considered an integral component of routine antenatal and postpartum care, its provision is hardly standardized [13], and studies examining postpartum contraceptive education interventions have reported mixed results [14].

Peripartum contraceptive counseling emphasizing appropriate birth spacing, in combination with the availability of LARC methods at the time of delivery, provides an opportunity for a short-term educational intervention to potentially reduce rapid repeat pregnancy among adolescent mothers by increasing teens' immediate use of highly effective methods. We developed a postpartum counseling intervention incorporating information on both healthy pregnancy spacing and LARC methods. The content covered in our intervention was informed by our prior research, which used semi-structured interviews to explore the unique contraceptive needs of postpartum adolescent women [15]. This study demonstrated adolescents' desire to avoid repeat pregnancy through immediate postpartum use of a contraceptive of their choice upon hospital discharge. We hypothesized that our brief, standardized contraceptive counseling intervention, performed in conjunction with routine contraceptive counseling prior to hospital discharge, would lead to lower repeat pregnancy rates at 6 and 12 months postpartum among first-time adolescent mothers. We also hypothesized that the intervention would increase teens' LARC initiation and continuation, and their satisfaction with postpartum contraception, compared to routine counseling alone.

Methods

We conducted a randomized, controlled trial to assess the effect of a one-time, in-person, standardized, postpartum contraceptive counseling intervention among adolescent women delivering their first child atour University's Hospital. Our primary outcomes were repeat pregnancy at 6 and 12 months postpartum. Secondary outcomes included differences in contraceptive uptake, continuation and satisfaction. Our University's institutional review board approved the study protocol prior to recruitment.

Our standardized postpartum counseling intervention was developed from the results of our prior qualitative research [15]. One study investigator performed the in-person, one-on-one intervention. Counseling utilized empowerment messaging, provision of evidence-based contraceptive information with emphasis on LARC safety and efficacy, and a survey instrument that was completed together with participants to clarify their contraceptive preferences, and to contextualize contraceptive decisions within their goals for future childbearing. Intervention sessions lasted approximately 20 min, and were performed in private rooms on the postpartum ward.

English speaking women, aged 14–19 years, admitted for postpartum care after delivery of a live, full-term, singleton infant, were eligible to participate. Women planning to leave the area or unable to follow up during the study timeframe were excluded. After verification of eligibility, informed written consent and enrolment were performed by a research coordinator in subjects' private rooms. A baseline survey of demographic variables, health habits, medical and obstetrical history, and family planning goals was administered. Study data were managed using REDCap (Research Electronic Data Capture, Vanderbilt University).

Randomization took place after the baseline survey was completed. The randomization schedule was created using a computer-based random number generator and used permutated blocks of 8 with a 1:1 allocation ratio, to ensure an equal number of subjects in each group. Sequentially numbered, opaque, sealed envelopes, containing the randomization assignment, were opened to indicate study group. No crossover occurred between groups.

All subjects received routine postpartum care and contraceptive counseling, which were provided by the primary obstetrician and/or postpartum staff. Subjects in the intervention group also received the standardized counseling intervention. The intervention was delivered either immediately after enrolment and randomization, or at another time prior to hospital discharge. Etonogestrel contraceptive implant insertion or administration of intramuscular depo medroxyprogesterone acetate (DMPA) was available on the postpartum unit to all patients, regardless of study participation, throughout the study. These methods were provided free or by private health insurance. At the time of this study, immediate postplacental IUDs were not available at our institution, although IUDs were available at a subsequent postpartum visit, if covered by subjects' insurance or by full cash payment. In practice, postpartum women desiring an IUD were often asked to return for a separate visit, following their routine 6-week postpartum check-up, for device placement.

Study staff contacted participants by phone at three months postpartum to administer a questionnaire about general health, contraception use and satisfaction, and pregnancy status. Participants then returned for in-person follow-up at 6, 9, and 12 months postpartum to repeat the questionnaire and take a urine pregnancy test. Subjects who did not participate in one of the study visits were not considered lost to follow-up; they were contacted at each subsequent visit, to minimize loss to follow-up at 12 months.

Any participant who suspected a pregnancy at any time during the study was asked to present to the research office for a pregnancy test. Subjects with a positive pregnancy test exited the study after administration of a final questionnaire regarding pregnancy intention and contraception use. Pregnant participants were referred for prenatal or abortion care within our health system.

A standardized subject-tracking protocol was used to minimize loss to follow-up. Participants were reimbursed for time and travel at each study visit: $30 with enrolment; $50 at months 3, 6 and 9; $70 at month 12; and $20 for early withdrawal or a pregnancy visit.

We intended our sample size to achieve 80% power to detect a clinically significant difference of 25% in the one-year pregnancy rate between groups, approximating a one-year repeat pregnancy rate of 35% in the control group [16,17]. Assuming $\alpha = 0.05$ and using a two-sided test of proportions, we initially calculated 41 subjects per group. Increasing the sample size in anticipation of 20% loss to follow-up at 12 months resulted in a total planned sample of 100 subjects.

Baseline characteristics of the two groups were summarized using descriptive statistics. Associations of demographic and clinical characteristics with initial group assignment and study outcomes were assessed by Chi-squared and rank-sum tests using Stata 14 (Statacorp LP, College Station, TX).

Results

Between March 27, 2012 and September 6, 2012 a total of 103 postpartum adolescents met inclusion criteria and were approached for enrolment. Three patients were unwilling to participate; 100 consented and entered the study. Subject flow through the study is shown in Fig. 1.

Participants' mean age was 17.8 years (SD ± 1.2); 88.0% were African American; all were primiparous and 73.0% were primigravid. Baseline characteristics were similar in both study groups, with the exception of desire for future pregnancy (Table 1).

Of the 100 women randomized, 79 completed the 12-month follow-up visit: 40 (80.0%) in the routine counseling group, 39 (78.0%) in the intervention group ($p = 0.81$) (Fig. 1). Those women who completed 12-month follow-up were more likely be African American (73 of 79, 92.4%) than those who did not (15 of 21, 71.4%; $p = 0.03$). Women who were cohabitating were less likely to attend the 12-month follow-up (19.0% vs. 52.4%, $p = 0.003$). Other characteristics were similar (data not shown).

There were 6 repeat pregnancies among 85 participants who completed the 6-month follow-up (7.1%), and 9 total pregnancies by 12 months (10.6%). There was no difference in the proportion of pregnant subjects by study group at 6 and 12 months. One pregnancy occurred in a woman who used a LARC method at any time throughout the study period (1 of 34, 3.0%), compared to 8 pregnancies in women who did not use LARC (8 of 66, 12.1%; $p = 0.16$). The woman who became pregnant in the LARC group had an IUD placed by 3 months, but had it removed by 6 months. She did not initiate another contraceptive method; the pregnancy occurred after IUD discontinuation.

There was no difference in rate of initiating an immediate postpartum contraceptive (implant or DMPA) prior to hospital discharge between groups. The intervention and control groups did not differ in use of LARC or other effective contraceptives at 6 or 12 months. Satisfaction rates were not significantly different by group at 6 or 12 months (Table 2). No baseline characteristics differed significantly between pregnant and non-pregnant participants at 12 months (Table 3).

Thirty participants used a contraceptive implant at any time during the study. Twenty-four implants (80.0%) were placed prior to hospital discharge, and all subjects who desired an immediate implant postpartum received one. In contrast, among the 27 adolescent women who desired to use an IUD for postpartum contraception, only four obtained an IUD during the study (14.8%; comparison with implant use, $p < 0.001$). There were no pregnancies among women who desired and used a contraceptive implant at any time during the study period, while 3 (11.1%) of the 27 women who had desired an IUD had a subsequent pregnancy over the study period ($p = 0.10$). Two of these three women who became pregnant never initiated postpartum birth control, while the third woman discontinued her IUD by 6 months, and subsequently became pregnant while using no contraception.

Discussion

Findings and interpretation

We designed a postpartum contraceptive counseling intervention for adolescents, focused on healthy pregnancy spacing and the safety and efficacy of LARC methods. This randomized, controlled trial did not demonstrate a difference in repeat pregnancies, or in contraceptive initiation, continuation, or satisfaction. There were 6 repeat pregnancies by 6 months and a total of 9 pregnancies by 12 months among all participants. A total of 34 subjects used any LARC method over the 12-month study period: 30 women used a contraceptive implant and 4 used an IUD.

Our institution is home to a well-established Ryan Residency Training Program and a Family Planning Fellowship; both employ enhanced contraceptive training curriculums. Contraceptive counseling with emphasis on LARC methods is taught to OB/GYN housestaff, and is routinely provided

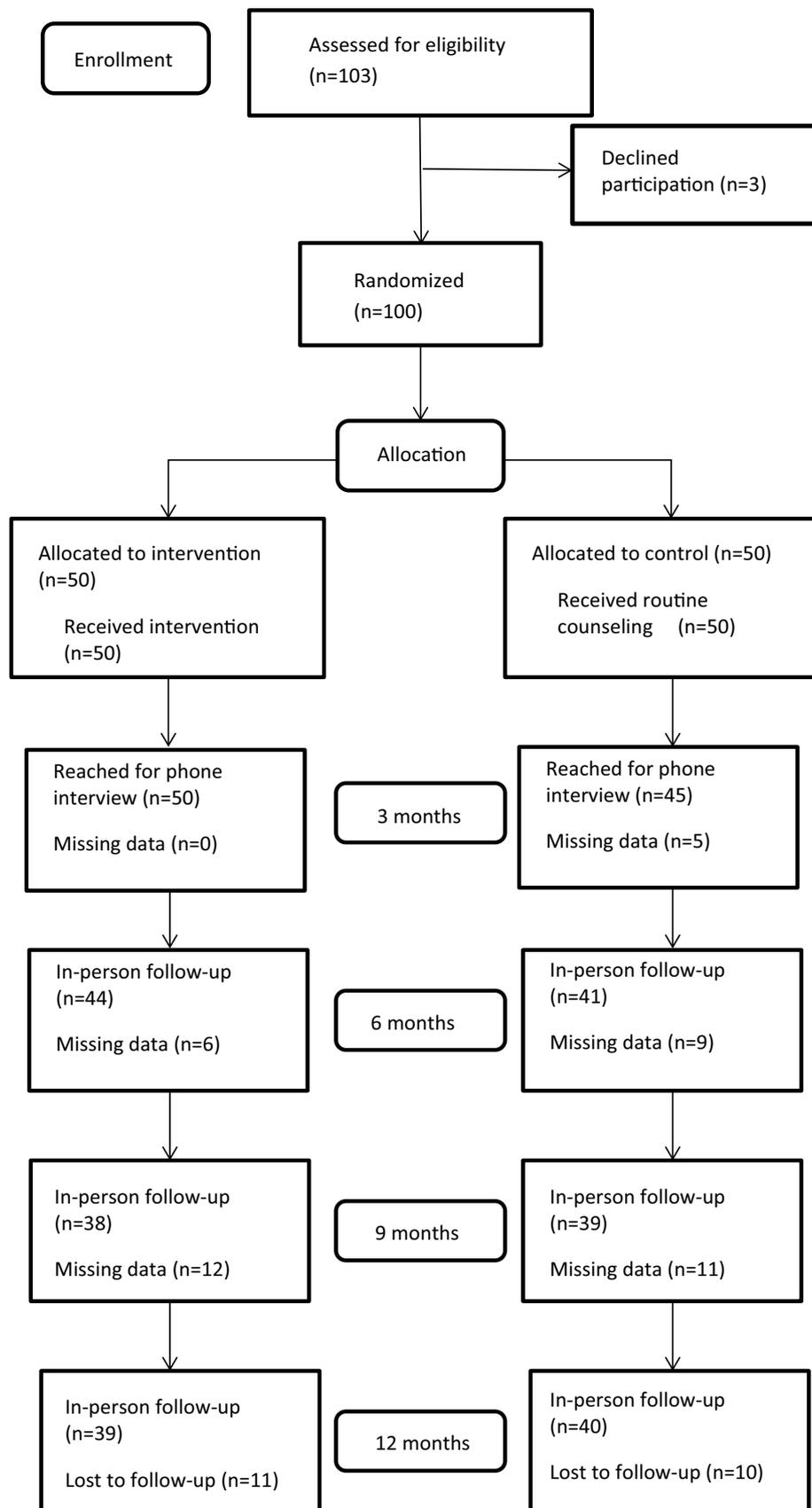**Fig. 1** Selection, randomization, treatment, and follow-up of participants

Table 1 Demographic and clinical characteristics at enrollment

Characteristic		Intervention ($n=50$)	Control ($n=50$)
Age (years)	15–17	15 (30)	19 (38)
	18	15 (30)	12 (24)
	19	20 (40)	19 (38)
Race/ethnicity	African American	46 (92)	42 (84)
	Hispanic	2 (4)	2 (4)
	White/other	2 (4)	6 (12)
Education	≤ 12th grade	46 (92)	48 (96)
	> 12th grade	4 (8)	2 (4)
Cohabiting with partner	No	38 (76)	36 (72)
	Yes	12 (24)	14 (28)
Gravidity	1	33 (66)	40 (80)
	≥ 2	17 (34)	10 (20)
Timing of last pregnancy	Too soon	32 (64)	38 (76)
	Right time	13 (26)	10 (20)
	Later than desired	1 (2)	1 (2)
	Did not care	4 (8)	1 (2)
Contraceptive failure with last pregnancy	Method failure	2 (4)	6 (12)
	Method improperly used	11 (22)	7 (14)
	No method used	37 (74)	37 (74)
Desire for future pregnancy[a]	No	8 (16)	1 (2)
	Yes	42 (84)	49 (98)
Planned to use LARC	No	23 (46)	27 (54)
	Yes	27 (54)	23 (46)
Planned to use effective contraception[b]	No	10 (20)	11 (22)
	Yes	40 (80)	39 (78)

N (%) are shown

For bivariate comparisons all $p > 0.15$ except [a]$p = 0.03$

[b]Effective contraception: oral contraceptives, patch, ring, DMPA, implant, IUD

during antepartum and postpartum care. This likely explains the high overall LARC uptake among our cohort (34.0%) over the 12-month study period. This may, in turn, also explain the lower-than-expected incidence of pregnancy, with only nine women becoming pregnant during the study.

At the time of our study, immediate postpartum implants were available prior to hospital discharge, but immediate post placental IUD placement was not yet offered. We discovered increased use of the contraceptive implant in our study cohort. This finding may demonstrate that the administrative or logistical barriers associated with interval postpartum LARC (initiated at the 6-week postpartum visit or thereafter) may have a clinically significant impact on adolescent mothers' ability to utilize their contraceptive of choice after hospital discharge.

Comparison with other studies

Although data demonstrate that women who receive contraceptive counseling in the postpartum period are more likely to utilize contraception postpartum [18], studies have failed to elucidate which counseling intervention or modality is most effective at increasing contraceptive use and decreasing repeat pregnancy among adolescents [19–21]. A systematic review of randomized controlled trials of postpartum contraceptive education interventions [14] found that, among six trials focusing on adolescent or young adult women, only three interventions were effective. These involved longer-term programs, including in-home visits or rigorous follow-up with multiple reminders about contraceptive use, and provision of additional clinical contraceptive services [22–24]. Given that significant resources are required for these longer-term intensive interventions, such programs may be difficult to implement in many clinical settings. More data are needed on how to effectively educate adolescents and influence their contraceptive behavior using efficient, short-term contraceptive counseling programs.

Table 2 Contraceptive uptake and satisfaction at initiation, 6, and 12 months

	Intervention	Control	*p* value
Initiation	50	50	
Started prior to hospital discharge:			0.90
Implant	11 (22.0)	13 (26.0)	
DMPA	13 (26.0)	12 (24.0)	
Other effective contraception[a]	6 (12.0)	4 (8)	
No contraception	20 (40.0)	21 (42.0)	
6 months			
Contacted/missing	44/6	41/9	
Current use:			0.75
LARC	12 (27.3)	13 (31.7)	
Other effectivecontraception[a]	17 (38.6)	15 (36.6)	
Less-effective contraception	10 (22.7)	11 (26.8)	
No contraception	5 (11.4)	2 (4.9)	
Very satisfied/satisfied with contraception	39 (88.6)	37 (90.2)	0.42
12 months			
Contacted/missing	39 /11	40 /10	
Current use:			0.43
LARC	12 (30.8)	13 (32.5)	
Other effective contraception#	18 (46.2)	12 (30.0)	
Less-effective contraception	7 (17.9)	12 (30.0)	
No contraception	2 (5.1)	3 (7.5)	
Very satisfied/satisfied with contraception	31 (79.5)	27 (67.5)	0.29

N (%) are shown. LARC: implant, IUD

P value—comparison of Intervention vs. control for frequency of all contraceptive options at each time point (Fisher exact test)

[a]Other effective contraception: DMPA, oral contraceptives, patch, ring; Less-effective contraception: condom and other barrier methods, withdrawal, spermicide, emergency contraception, abstinence, natural family planning

Strengths and weaknesses

Strengths of our study include the randomized design and the use of a standardized contraceptive counseling intervention informed by prior qualitative research on the needs of our patient population [15]. Our study was limited by unequal allocation on subjects' baseline desire for a future pregnancy. Women in the intervention group were more likely to report no desire for a future pregnancy (8 of 50, 16.0%) compared to the control group (1 of 50, 2.0%; *p* = 0.03). This may have biased the intervention group toward LARC uptake or toward use of other effective forms of contraception during the study period. However, we did not find significant differences between baseline desire for LARC or effective contraception, or differences in actual contraceptive use between the study groups, suggesting that the unbalanced allocation in fact had no impact on our results.

Additionally, our initial power calculation was based on a 35% repeat pregnancy rate in the control group [16, 17]. Although based on previously published evidence, this overestimation may have underpowered our study to detect a significant result, given our observed 9% pregnancy rate.

Using an estimate of repeat pregnancy rates at one year postpartum among teens delivering at our institution may have revealed a lower baseline pregnancy rate in our population, and thus resulted in a larger planned sample. Despite this limitation, the nearly equal findings in the control and intervention groups suggest that a significant difference in outcomes would have been unlikely, even if the study were powered to detect a smaller difference.

Our study design may have led to some additional limitations. Although we did not observe it in a previous preliminary study [17], participation in the current clinical trial, by itself, might have led to a lower incidence of unwanted pregnancies. This 'Hawthorne effect' can reduce the magnitude of between group differences [25]. The use of strict eligibility criteria (to control for potentially confounding client characteristics) meant that certain other at-risk subgroups, such as adolescents with premature or multiple pregnancies, or who were non-English-speakers, were excluded. This reduces the generalizability of our findings. The moderating influence of clinically important client characteristics on the intervention's effects would require a large-scale study to examine different subgroups in sufficient numbers.

Table 3 Participant characteristics associated with pregnancy during the study period

Characteristic		New pregnancy ($n=9$)
Counseling assignment	Routine	4 (44)
	Intervention	5 (56)
Age (years)	15–17	3 (33)
	18	3 (33)
	19	3 (33)
Race/Ethnicity	African American	8 (89)
	Hispanic	1 (11)
	White/other	0
Education	≤ 12th grade	9 (100)
	> 12th grade	0
Cohabiting with partner	No	6 (67)
	Yes	3 (33)
Gravidity	1	6 (67)
	≥ 2	3 (33)
Timing of last pregnancy	Too soon	6 (67)
	Right time	1 (11)
	Later than desired	0 (0)
	Didn't care	2 (22)
Contraceptive failure with last pregnancy	Method failure	2 (22)
	Method improperly used	1 (11)
	No method used	6 (67)
Desire for future pregnancy	No	1 (11)
	Yes	8 (89)
Planned to use LARC	No	6 (67)
	Yes	3 (33)
Planned to use effective contraception[a]	No	2 (22)
	Yes	7 (78)

N (%) are shown

For all bivariate comparisons (with non-pregnant participants) $p > 0.10$

[a]Effective contraception: oral contraceptives, patch, ring, DMPA, implant, IUD

The intervention was delivered to adolescent women, the majority of whom were African American, by one study investigator, a Caucasian physician in her 30s. A randomized, controlled trial of outpatient contraceptive counseling by an age- and race-matched adolescent peer, found that peer counseling, stressing the convenience, safety and effectiveness of immediate postpartum LARC, increased teens' knowledge and positive attitudes towards LARC in comparison to routine counseling [26]. Future studies examining short-term postpartum contraceptive counseling interventions for teens, might incorporate peer counseling by teen mothers to assess the impact of age and race concordance on teens' contraceptive uptake and continuation in the postpartum period.

Implications for clinicians, policy makers and future research

This study continues to support previous findings that initiation of immediate postpartum LARC is high among adolescents and is associated with lower rates of rapid repeat pregnancy [7, 27]. This is of particular importance as many states are working towards modification of Medicaid policy to provide reimbursement for insertion of immediate postpartum LARC [28], as endorsed by the Center for Medicaid and Children's Health Insurance Program (CHIP) in 2016, as well as the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics [29–31].

Our study found no effect on teens' repeat pregnancies or contraceptive initiation, continuation or satisfaction when a short-term contraceptive counseling intervention was delivered prior to postpartum discharge. We did discover a statistically significant difference in use of the implant compared to the IUD, which may have been driven by the immediate availability of implant placement on the post-partum ward, prior to hospital discharge. This difference is also clinically meaningful: while no pregnancies occurred among subjects planning to use an implant for contraception, three women intending to use an IUD became pregnant during the 12-month study period. This is consistent with prior research on the impact of immediate postpartum contraception [7, 26]. Future postpartum contraceptive efforts among adolescents should continue to investigate methods to improve the accessibility of postpartum contraception. These efforts mayincrease teens' use of highly effective methods, ultimately decreasing rapid repeat unintended pregnancies.

Author contribution AF: Data analysis, manuscript writing/editing. EPG: Manuscript writing/editing. SS: Protocol/project development, data collection, management, analysis. PGW: Data analysis, manuscript writing/editing. CAS: Protocol/project development, manuscript writing/editing.

Compliance with ethical standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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