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Variation in effectiveness of planned postpartum contraception at two time points from prenatal to postpartum care

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Abstract

Objective: To identify characteristics of women who have consistent plans in terms of contraceptive effectiveness from antepartum to postpartum care and whether consistency affects contraceptive outcomes.

Study Design: This is a secondary analysis of a retrospective chart review of women who delivered at a single tertiary care center from 2012–2014. Preferred postpartum contraceptive plan was abstracted at three time points (prenatal care, hospital discharge, and outpatient postpartum care) and categorized into three tiers of effectiveness. We then examined consistency between the first two time points for the effectiveness in postpartum contraceptive method planned.

Results: Of the 8,394 women in the study cohort, 2,642 (31.5%) had a consistent postpartum contraceptive tier planned at the first two time points. Women who had consistent contraceptive preferences were more likely to have higher parity (aOR 2.36, 95% CI 2.06–2.70 for parity 2+), delivered via cesarean section (aOR 1.50, 95% CI 1.34–1.68), and have received adequate prenatal care (aOR 1.93, 95% CI 1.66–2.24). Women who had a consistent choice were more likely to choose highly effective methods of contraception ($p < 0.001$) and more likely to achieve their contraception plan (adjusted odds ratio [aOR] 2.16, 95% confidence interval [95% CI] 1.85–2.52), but not more likely to have a subsequent pregnancy within 365 days of delivery (aOR 0.92, 95% CI 0.81–1.05).

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Declaration of interests

Conflict of Interest - Mustafa S Ascha reports employment at Flatiron Health, Inc., which is an independent subsidiary of the Roche Group, and reports equity ownership in Roche. All other authors report no conflicts of interest.

The authors report no conflicts of interest at time of the study. However, at time of submission, Dr. Mustafa Ascha reports employment and equity ownership with Roche though his duties are unrelated to women's health. No other authors have any conflicts.

Conclusion: The majority of women in our study had variation in effectiveness of their postpartum contraceptive method plan from prenatal to inpatient postpartum care. Better understanding contraceptive decision-making as a journey and removing external barriers during that process is a necessary component of pregnancy care.

Implications: Counseling and documentation of contraceptive preferences throughout antepartum and postpartum care can help improve contraceptive outcomes.

Keywords

postpartum contraception; decision-making; disparity; contraceptive counseling

Introduction

Provision of postpartum contraception has been shown to significantly decrease the rate of short interval pregnancy, which is associated with adverse maternal and neonatal outcomes [1–7]. Individual patients choose contraception based on effectiveness as well as many other factors such as privacy, ease of use, perceived side effects, relationship status, and impact on menstrual cycles [8–12]. Demographic and clinical factors such as age, parity, access to financial resources, and familial communication are also associated with type of postpartum contraception chosen [13–15]. Additionally, pregnancy and childbirth may change contraceptive priorities, especially in relation to prioritization of effectiveness [8,16,17].

While pregnancy and childbirth may impact choice of contraceptive method due to a change in desired effectiveness, it is unclear exactly how contraceptive choice changes during the prenatal, delivery, and postpartum recovery period. Better understanding of this dynamic process as a journey rather than a static decision can help facilitate improved counseling, removal of external barriers that may be impacting choice, improve shared decision-making, and ultimately, provision of desired postpartum contraception [17]. This study aims to explore whether and how the effectiveness of women's choice of intended postpartum contraceptive method changes through the course of prenatal care, inpatient postpartum care, and outpatient postpartum recovery. We also sought to better understand whether these changes were associated with clinical and demographic characteristics and whether the degree of change predicted provision of postpartum contraception. We hypothesized that factors such as higher maternal age, route of delivery, socioeconomic status, education level, and better access to prenatal care would result in more consistent postpartum contraception choice and increased rate of contraception provision.

Materials and Methods

This is a secondary analysis of a retrospective single-site cohort study of 8,654 women who delivered at or beyond 20 weeks of gestation at an urban, tertiary-care, teaching hospital in Ohio between January 1, 2012, through December 31, 2014. Full methodological details have been previously published [18]. Briefly, each patient's linked inpatient and outpatient electronic medical records were reviewed. Clinical and demographic characteristics were abstracted including maternal age, parity, gestational age, delivery type, adequacy of prenatal care, route of delivery, race and ethnicity, marital status, and education. Adequate

prenatal care was defined as six or more prenatal visits. Women were excluded from this analysis if they had zero prenatal visits as consistency could not be determined. For this analysis, we recorded documentation of postpartum contraception plan at three discrete time points: during prenatal care, at time of inpatient postpartum discharge, and at time of the outpatient postpartum visit. The provider could, but was not required to, document the intended contraceptive plan within the electronic medical record. If more than one plan was noted in the prenatal record, the plan documented closest to delivery was recorded. Conversations regarding contraception occurred at the provider's and patient's discretion. Our electronic medical record at the time of the study did not have standardized reminders about addressing contraception during antepartum or postpartum care. While documentation of contraceptive plan was not required during antepartum or outpatient postpartum care, contraceptive plan was a required field in our hospital's inpatient postpartum discharge summary.

Contraceptive methods were divided into Tiers based on the Centers for Disease Control and Prevention's Model of Tiered Contraceptive Effectiveness [19]. Tier 1 included female sterilization, male sterilization, and long-acting reversible contraception (LARC). Tier 2 included injectables, pills, patch, and vaginal ring. Tier 3 included barrier methods, fertility awareness, withdrawal, and abstinence. The "None" category included both the patient declining a method of contraception as well as lactational amenorrhea since it is not considered effective for the full 12 months that was used to define the study outcome of subsequent pregnancy. Less than 10% of our patient population was exclusively breastfeeding at the time of the outpatient six-week postpartum visit. Where absent, lack of documentation of a postpartum contraceptive plan at each time point was noted and counted as missing. For those patients who were sterilized within 42 days of delivery, plan at the outpatient postpartum time point was recorded as sterilization due to the permanence of this form of contraception. Inpatient postpartum long-acting reversible contraception was not available at our hospital (or any other hospital in the region) during the time period of the study.

We defined consistency in contraceptive plan prior to discharge as having the same tier of plan documented at the first two time points (during prenatal care and at time of postpartum discharge) given the clinical relevance and goal of achieving postpartum contraceptive requests prior to hospital discharge. Tests of differences (t-tests and χ^2 tests for continuous and categorical outcomes, respectively) and univariable and multivariable logistic regression were used to compare all prespecified demographic and clinical variables listed above across patients who had a consistent contraceptive plan versus those who did not. We compared contraceptive plan provision within 90 days of delivery, postpartum visit attendance, and subsequent pregnancy within 365 days of delivery between those who had consistent plans documented versus those that did not. Contraceptive method provision was defined as sterilization completion, LARC placement, prescription of a short-acting method, or patient's report of use of a non-prescription method such as condoms. Subsequent pregnancy was defined as a positive urine or serum pregnancy test, presentation for subsequent prenatal care, or notation of pregnancy care at an outside hospital in our electronic medical record. We calculated restricted mean survival time (RMST) for those with a consistent plan versus those without given we did not observe median achievement for both groups. We used

univariable and multivariable Cox proportional hazards models to analyze time to contraceptive plan provision between those who had consistent plans versus those who did not.

All tests were two-tailed and an alpha of 0.05 was used to define statistical significance. All analyses were performed using R Version 3.4.0. Records were abstracted by four trained researchers (JM, BW, EV, MM) who coded in an iterative process to clarify interpretation of chart documentation. Fleiss' kappa scores for concordance based on all four coders abstracting the same 100 charts were calculated and were 0.87 for a plan of Tier 1 contraception, 0.88 for Tier 2, 0.70 for Tier 3, and 0.74 for None. In a post-hoc power calculation of this secondary analysis, we calculated that we had a power of 1.0 for the association between change in contraceptive plan and plan provision in our study population. This study was approved by the institutional review board of MetroHealth Medical Center.

Results

A total of 8,654 patients had deliveries during the study period, 8,394 of whom were included in this analysis (Figure 1). Two thousand six hundred forty-two women (31.5%) had a consistent contraceptive plan between prenatal care and at time of hospital discharge.

Demographic and clinical characteristics of those women who had variation in effectiveness of planned postpartum contraceptive method versus those who did not are shown in Table 1. Women who had consistent contraceptive preferences were more likely to be older, of higher parity, Black or Hispanic, and publically insured. They were also more likely to have received adequate prenatal care, delivered at a later gestational age, delivered via cesarean section, and attended some college. Women who had a consistent plan were more likely to choose more effective methods of contraception ($p < 0.001$). They were more likely to choose a Tier 1 method (54.2% vs 15.6%) and less likely to choose a Tier 2 method (28.7% vs. 55.9%), Tier 3 method (1.1% vs. 6.2%) or decline contraception (3.7% vs. 20.5%) compared to women who changed their minds regarding contraceptive method.

Univariable and multivariable analyses identifying predictors of change in effectiveness of contraceptive plan preference are shown in Table 2. All demographic and clinical characteristics in Table 1 were utilized in regression analyses. After multivariable analysis, those who had consistent preferences were more likely to be older, of higher parity, and Black or Hispanic. They were also more likely to have delivered via Cesarean section at a later gestational age and received adequate prenatal care.

Associations between consistency in contraceptive method effectiveness and study outcomes are shown in Table 3. Women who had a consistent preference in terms of method effectiveness between prenatal care and hospital discharge were more likely to achieve planned contraceptive method provision (adjusted odds ratio [aOR] 2.16, 95% confidence interval [CI] 1.85–2.52) and achieved provision more quickly than those who changed their minds (RMST 37.2 (95% CI 35.5–39.0) days vs 43.4 (95% CI 42.3–44.5) days, adjusted hazards ratio [aHR] 1.07, 95% CI 1.01–1.12). Women with a consistent preference were just as likely to return to an outpatient postpartum visit (aOR 1.04, 95% CI 0.91–1.18) and as

likely to have a subsequent pregnancy within 365 days of delivery (aOR 0.92, 95% CI 0.81–1.05) as those who changed their minds.

Discussion

Age, parity, route of delivery, adequacy of prenatal care, and race/ethnicity were associated with consistency of desired effectiveness of postpartum contraceptive method from pregnancy through the inpatient postpartum time period in our study. Women with consistent plans in terms of contraceptive effectiveness were more likely to desire highly effective methods of contraception than those women whose plan changed. Consistency correlated with increased postpartum contraception provision and increased time to provision, but did not impact rates of postpartum visit attendance or subsequent pregnancy within a year after delivery. Increased time to provision was likely related to the need to schedule surgery for women desiring sterilization and the requirement for a separate insertion appointment for LARC, as was our practice at the time of the study. Minimization of such barriers by inserting LARCs at time of the postpartum visit and expedited sterilization scheduling is important to reduce time to provision and improve provision [20,21].

In our study, only 31.5% of women had a consistent tier of postpartum contraceptive method planned throughout the prenatal and inpatient postpartum time period, which is consistent with a prior patient survey of peripartum contraceptive attitudes of approximately 500 women [8]. Thus, fluidity in contraceptive choice is normal during the prenatal and postpartum time period. Fewer patients desired highly effective methods of contraception at time of the outpatient postpartum visit than at hospital discharge after delivery. It is unclear whether this is due to changing reproductive goals and contraceptive preferences, or due to external barriers to receipt of highly effective methods such as requirements for a separate procedural visit for LARC insertion, inability to complete sterilization during delivery admission, and waiting period for patients with Medicaid insurance prior to sterilization completion [18,22,23].

Physicians should be mindful that demographic and clinical factors are associated with consistency in contraceptive plan. Recognition of these characteristics may help physicians intentionally explore patients' existing knowledge, beliefs, and priorities regarding contraception options, especially in adolescents and young women who may not have had prior exposure to robust contraceptive counseling. Adequacy of prenatal care were also associated with consistency in contraceptive plan. This may be due to additional time available to conduct thorough contraceptive counseling given an increased number of prenatal visits. Given the number of women in our study with missing information regarding postpartum contraceptive plans, greater attention to contraceptive counseling as a key component of pregnancy care is essential [24]. Specific documentation of such counseling is important to communicate with other care providers and reinforce the need for longitudinal counseling.

As this was a retrospective study performed at a single medical center and subject to our institutional practices and policies, external generalizability may be limited. Given our observational chart review methodology, we are unable to comment on when methods were

desired by patients but not recorded by providers, factors motivating contraceptive choice, and reasons for lack of method provision. Documentation of contraceptive plan by clinicians may also be biased by clinical and public health recommendations to prioritize highly-effective methods of contraception. In addition, those women who did not return for their postpartum visit may have procured postpartum contraception outside of our institution. Finally, we only recorded the proposed contraception plan at the prenatal visit closest to the time of delivery, however, this does not account for the possible alterations that women make to their contraception plans at earlier prenatal visits.

In conclusion, consistency of planned effectiveness of postpartum contraception from the prenatal to postpartum period impacts likelihood of contraception provision postpartum. Better understanding this contraceptive journey is important to ensure decision-making is based on accurate information and external barriers to contraceptive plan fulfillment are minimized. While robust and longitudinal contraceptive counseling should ideally occur for all women during pregnancy, identification of demographic and clinical characteristics associated with change in contraceptive plans can help providers continue ongoing counseling and reevaluation as needed. Further research is required on the reasons why women change their minds to adequately anticipate concerns, improve counseling, and facilitate improved provision.

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Figure 1 –.
Flow chart of the study population (exclusions not mutually exclusive)

Table 1.

Demographic characteristics of patients with variation versus consistency in effectiveness of planned postpartum contraception as documented during prenatal and inpatient postpartum care Presented as n(%) or mean(SD)

	Variation in Plans	Consistency in Plans	p-value
Number of patients	5752	2642	
Age at delivery (years)	25.52±5.82	27.05±6.37	<0.001
Parity (%)			<0.001
0	2429 (42.2)	738 (27.9)	
1	1679 (29.2)	690 (26.1)	
2 or more	1644 (28.6)	1214 (46.0)	
Gestational age at delivery (weeks)	38.19±2.90	38.42±2.42	<0.001
Adequate prenatal care	4443 (80.1)	2274 (87.7)	<0.001
(Missing)	203 (3.5)	48 (1.8)	
Cesarean section	1317 (22.9)	823 (31.2)	<0.001
Insurance			0.01
Private	940 (16.3)	392 (14.8)	
Public	4555 (79.2)	2159 (81.7)	
None	257 (4.5)	90 (3.4)	
(Missing)	0 (0)	1 (0.0)	
Race			<0.001
White	2101 (36.5)	868 (32.9)	
Black/African American	2612 (45.4)	1283 (48.6)	
Hispanic	648 (11.3)	359 (13.6)	
Asian	147 (2.6)	43 (1.6)	
Other	244 (4.2)	89 (3.4)	
Married	1246 (22.1)	600 (23.3)	0.22
(Missing)	115 (2.0)	71 (2.7)	
Attended college	1807 (32.6)	841 (33.2)	0.63
(Missing)	214 (3.7)	109 (4.1)	
Plan tier			<0.001
Tier 1 ^a	897 (15.6)	1432 (54.2)	
Tier 2 ^b	3214 (55.9)	759 (28.7)	
Tier 3 ^c	355 (6.2)	30 (1.1)	
None	1178 (20.5)	99 (3.7)	
Missing	108 (1.9)	322 (12.2)	

Presented as n(%) or mean(SD)

^aTier 1 – long-acting reversible contraception, female sterilization, and male sterilization.

^bTier 2 - injectables, pills, patch, and vaginal ring.

^cTier 3 - barrier methods, fertility awareness, withdrawal, abstinence.

Table 2.

Predictors of consistency in effectiveness of postpartum contraceptive plans as documented during prenatal and inpatient postpartum care

Demographic Variable	Univariable OR ^a (95% CI ^b)	Multivariable aOR ^c (95% CI [†])
Age at delivery	1.04 (1.03–1.05)	1.01 (1.00–1.02)
Parity 1	1.35 (1.20–1.53)	1.35 (1.18–1.54)
Parity 2 or more	2.43 (2.18–2.72)	2.36 (2.06–2.70)
Gestational age at delivery	1.03 (1.01–1.05)	1.03 (1.01–1.06)
Adequate prenatal care	1.77 (1.55–2.03)	1.93 (1.66–2.24)
Cesarean section	1.52 (1.38–1.69)	1.50 (1.34–1.68)
No insurance	0.84 (0.64–1.09)	0.89 (0.66–1.18)
Public insurance	1.14 (1.00–1.29)	1.11 (0.94–1.30)
Asian	0.71 (0.49–0.99)	0.74 (0.50–1.06)
Black /African American	1.20 (1.07–1.32)	1.19 (1.06–1.34)
Hispanic	1.34 (1.15–1.56)	1.25 (1.06–1.34)
Other race	0.88 (0.68–1.14)	0.89 (0.67–1.17)
Married	1.07 (0.96–1.20)	1.02 (0.89–1.18)
Attended college	1.03 (0.93–1.13)	1.00 (0.89–1.13)

^aOR = Odds Ratio

^b95% CI = 95% Confidence Interval

^caOR = adjusted Odds Ratio

Table 3.

Association of consistency in planned effectiveness of postpartum contraception and contraceptive plan provision, postpartum visit compliance, and short interval pregnancy

Postpartum Outcome	Univariable OR ^a (95% CI ^b)	Multivariable ^c aOR ^d (95% CI)
Plan provision ^e	0.78 (0.70–0.87)	2.16 (1.85–2.52)
Time to plan achievement ^f	1.01 (0.96–1.07)	1.07 (1.01–1.12)
Postpartum visit compliance	1.16 (1.05–1.29)	1.04 (0.91–1.18)
Subsequent pregnancy within 365 days of delivery	0.76 (0.68–0.84)	0.92 (0.81–1.05)

^aOR = Odds Ratio

^b95% CI = 95% Confidence Interval

^cAdjusted for maternal age, parity, gestational age, delivery type, adequacy of prenatal care, route of delivery, race and ethnicity, marital status, and education

^daOR = adjusted Odds Ratio

^eReceipt of planned contraceptive method within 90 days of delivery

^fHazards ratio and adjusted hazards ratio calculated for time to achievement