

## **Planned use of long acting reversible postpartum contraception in low-risk women in CenteringPregnancy® group versus individual physician prenatal care**

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**Keywords:** CenteringPregnancy®, group prenatal care, contraception, long acting reversible contraception, LARC

### **Abstract**

**Introduction:** Education on effective contraceptive methods is necessary during the prenatal period to help women achieve optimal birth spacing. This study identified rates of long-acting reversible contraception (LARC) uptake in women who attended CenteringPregnancy® (CP) group prenatal care versus individual physician care (IP).

**Methods:** Charts for low-risk women who participated in group CP or IP prenatal care between March 2012 and May 2016 were reviewed. Charts of IP subjects were randomly selected in each year to achieve a CP:IP ratio of at least 1:3. The primary outcome was rate of LARC use at discharge and within 8 weeks postpartum. Pearson chi-squared test and Wilcoxon rank-sum tests were performed, and a *p*-value <0.05 was considered significant.

**Results:** 129 women participated in CP care and 412 in IP care. CP women were more likely nulliparous (91, or 70.5% vs 212, or 51.5%,

*p*=0.0001) and more likely to attend at least 15 prenatal visits (54, or 41.9% vs 62, or 15.1%, *p*<0.0001). LARC use rates at discharge and at the postpartum visit were similar (36, or 27.9% vs 89, or 21.6%, *p*=0.142; 39, or 32.2% vs 110, or 29.4%, *p*=0.557). Rates of women using effective contraception (LARC and other hormonal options, including oral contraceptives and Depo Provera) at discharge and at the postpartum visit were similar (59, or 45.7% vs 206, or 50.0%, *p*=0.177; 72, or 59.5% vs 229, or 61.2%, *p*=0.157). IUD use was greater than subdermal implant use in both groups (31, or 24.0% vs 5, or 3.9%; 72, or 17.5% vs 17, or 4.1%; *p*=0.081). Rates of routine postpartum visit attendance at 6-8 weeks postpartum were similar and high in both groups (121, or 93.8% vs 374, or 90.8%; adjusted *p*-value=0.164).

**Conclusion:** Although CP subjects had more prenatal visits and spent more time with providers, there was no difference on uptake of LARC or effective contraception at discharge or at the postpartum visit when compared to IP subjects.

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## **Introduction**

Maternal and neonatal mortality rates are increasing in the United States more than in other countries, despite the US spending more money on medical care<sup>1</sup>. In the US, it is estimated that there are 26.4 maternal deaths per 100,000 live births, higher than other developed nations<sup>2</sup>. An estimated one-third of US pregnancies occurs less than 18 months after a delivery and this increases the risk of preterm delivery, low birth weight, and maternal/neonatal morbidity<sup>3,4</sup>. With US pregnancies occurring before an ideal interpregnancy interval is achieved, and with high rates of US maternal mortality, effective forms of contraception are necessary to help women appropriately space pregnancies<sup>4,5</sup>. It is recommended by the American College of Obstetricians and Gynecologists (ACOG) that counseling and education about contraceptive options, including immediate postpartum long-acting reversible contraception (LARC), subdermal implants and intrauterine devices (IUD), be done during prenatal care and then reinforced postpartum<sup>6</sup>. Adequate and accurate counseling on contraceptive options improves method satisfaction and acceptance of more effective options<sup>7</sup>. Women prefer contraceptive counselling in the mid-trimester, reporting high levels of readiness to make contraceptive plans

in the prenatal and immediate postpartum period<sup>8</sup>. LARC devices have failure rates <1%, but are underutilized in the US with only 8-10% of fertile, sexually-active women who are at risk of unintended pregnancy using these effective methods<sup>9</sup>. Immediate postpartum LARC initiated before hospital discharge, may optimize the success of LARC in reducing undesired pregnancy in postpartum women who have barriers to returning for visits, with an estimated 40-75% of postpartum women failing to receive LARC when initially intending to do so<sup>6</sup>. It is unknown how many private insurers cover immediate LARC after delivery, however problematic reimbursement with public insurance is well known. Beginning in 2012, 28 states have enacted coverage of postpartum LARC for Medicaid users, including the state in which this study was conducted<sup>10</sup>.

Traditionally, a patient visits obstetric care providers individually for 10-15 minutes up to 15 times throughout the pregnancy for general prenatal care. Group prenatal care is an alternative approach to traditional individual prenatal visits. It has been suggested that this model of care fosters feelings of community and accountability that aids providers in counselling on important issues in the predelivery period, such as breastfeeding benefits, contraception, expectations of the labor/delivery course, and maternal/neonatal nutrition<sup>11,12</sup>. Additionally, this model of care allows for increased time with providers compared to individual care. This model of care also allots time for discussions on the various forms of contraception, with discussions of the

safety and efficacy of LARC methods. CenteringPregnancy® (CP) is a standardized method of group prenatal care with an emphasis on women as active participants in their care. Accredited CP programs require providers to complete standardized training on group care and follow specific curriculum. While data exists on group prenatal care, studies included heterogeneous and unstandardized group care curricula. One study of CP care found subjects to be more compliant with postpartum visit attendance and were found to have higher rates of breastfeeding at hospital discharge (6.7% vs 13.9% no-show rate,  $p=0.01$ ; 91.0% vs 69.4%,  $p<0.001$ , respectively)<sup>13</sup>. Hale et al, found that among 3,637 persons with Medicaid, those who participated in CP were more likely to access family planning services in the first six months postpartum (15.1% vs 22.02%; OR, 1.68; 95%CI, 1.35-2.09), however the type of services were not noted<sup>14</sup>. Two additional studies, again among Medicaid patients, showed that postpartum contraception and LARC use were increased in CP patients<sup>15,16</sup>. No data on other types of insurance users are available.

It is not known if uptake of LARC is improved in postpartum women who attend CP versus individual physician care during the prenatal period in a group of subjects with various insurance types. We predict that low-risk obstetrics patients who attended CP will have increased LARC uptake following delivery (immediate and delayed) over women who participated in traditional individual care with general OB providers.

## **Methods**

A retrospective analysis of low-risk women who participated in prenatal care with either CenteringPregnancy® (CP) or individual physician (IP) care between March 2012 and May 2016 at a university tertiary care center. The CP offered by this institution received grant funding to provide training and support to healthcare providers in order to offer accredited CP at their institution<sup>17</sup>. The CP group of women had already been reviewed and data collected from a prior study. All women who participated in CP care during this time period were included, and there were no selection criteria for this group. At the tertiary care center studied, low-risk women are offered CP care as well as general individual physician care. Women who engaged in CP care were also eligible for IP care, and vice versa. The CP group received prenatal care from certified nurse midwives, and the IP group received care by obstetrician generalists. Low-risk qualifications include women without chronic medical conditions that may significantly impact pregnancy, including but not limited to, chronic hypertension, pre-gestational diabetes, gestational diabetes requiring medications, significant fetal anomalies, twin gestation, renal/cardiac disease, and morbid obesity (pre-pregnancy BMI  $>40$ ). This qualification did not change throughout the study period. Women were excluded from the study if they did not meet low-risk qualifications, if the pregnancy ended, or if prenatal care transferred from low- to high-risk OB care prior to the second trimester. For women who had multiple pregnancies during the study period, only the first

was considered. For low-risk women who did not participate in CP, care was received from an individual obstetric care physician. Immediate post-delivery LARC was offered starting in 2012 and in the state the study was conducted, immediate post-delivery LARC was unbundled by state insurance in 2014. This institution offers immediate post-delivery LARC to all delivering persons regardless of insurance type or mode of delivery (vaginal and cesarean).

Charts of subjects who participated in IP physician care during the study time were randomly chosen via every 3<sup>rd</sup> chart in alphabetical order with a goal of a 1:3 CP to IP ratio and ensuring that charts were evenly reviewed per year. A 1:3 ratio of CP to IP patients was desired because this ratio provided adequate study power, as the sample of CP women was small. Women in IP who did not meet low-risk criteria were excluded and the next subject was reviewed until an eligible subject was found. The data on all outcome measures recorded were obtained via retrospective analysis of electronic medical records (EMR) by the same two reviewers. The data obtained was gathered from notes including routine obstetric visit notes, labor and delivery summary notes, and demographic information recorded in the EMR. Approval was obtained from the Institutional Review Board of the university.

The primary outcome of the study was postpartum LARC at discharge and/or within 8 weeks of delivery. LARC included intrauterine devices and subdermal implants. LARC devices

placed either immediately following delivery prior to discharge, or during the routine 6-8week routine postpartum visit were included. Separate visits for LARC placement outside of the 6-8week postpartum period were not considered in the primary outcome. Data was collected on patients that delivered both vaginally and via cesarean section. Additionally, demographic information, obstetric history, prenatal complications, obstetric complications, discharge contraception plans, and infant feeding method were recorded after identification of low-risk women and review of subject's medical record. Obstetric history included parity, history of preterm delivery, and prior cesarean sections. These variables were recorded to provide context for generalizability of study results and as possible confounders. Data were aggregated and input into Research Electric Data Capture (REDCap) for statistical analysis and analysed using Pearson chi-square test or Fisher's exact test for nominal categorical variables, Wilcoxon rank-sum test for ordinal/continuous variables (shown with median), and t-test for continuous variables (shown with mean) using SAS 9.4 (SAS Institute Inc, Cary, NC, USA). Multivariate analysis was performed for covariates. A p-value of <0.05 was considered significant<sup>18</sup>.

## **Results**

### *Demographics*

Of the 541 subjects that met criteria for review, 129 women participated in CP care and 412 women attended IP care. The cohorts were similar (Table 1) in

terms of age at delivery, median gestational age, race (Caucasian), use of private insurance, educational level above high school, and history of prior preterm delivery. CP patients were more likely to be nulliparous (70.5% vs 51.5%, p-value 0.0001) and attend at least 15 prenatal visits (41.9% vs 15.1%, p-value

<0.0001). IP patients were more likely to be married/co-habiting (88.8% vs 81.1%, p-value 0.021) and have a history of cesarean section (15.1% vs 3.1%, p-value 0.0003).

**Table 1: Demographic Information**

Demographic Variable	CenteringPregnancy® (CP) (n=129)	Individual Physician (IP) (n=412)	p-value
<b>Age at delivery (years)</b>			
mean (SD)	29.2 (5.3)	29.9 (4.6)	0.136
range	18-42	18-44	
<b>Median gestational age (weeks)</b>			
Median (IQR)	39 (39-40)	39 (38-40)	0.073
Range	25-42	23-41	
<b>Caucasian</b>	(n=127) 96 (75.6%)	(n=409) 304 (74.3%)	0.354
<b>Private insurance</b>	102 (79.1%)	(n=411) 340 (82.7%)	0.358
<b>Married or cohabitating</b>	(n=127) 103 (81.1%)	(n=411) 365 (88.8%)	0.021
<b>Education greater than high school</b>	94 (88.7%)	318 (84.8%)	0.351
<b>Nulliparous</b>	91 (70.5%)	212 (51.5%)	0.0001
<b>History of Cesarean section</b>	4 (3.1%)	62 (15.1%)	0.0003
<b>Prior preterm delivery</b>	4 (3.1%)	27 (6.6%)	0.141
<b>Median number of prenatal visits</b>		(n=411)	
Median (IQR)	14 (12-16)	12 (10-14)	<0.0001
Range	1-21	2-21	
<b>Prenatal visits &gt;15</b>	54 (41.9%)	(n=411) 62 (15.1%)	<0.0001

Outcomes

The statistics relating to LARC use were divided into 3 groups (Table 2): subjects who received LARC post-delivery prior to discharge, subjects discharged with a plan to receive LARC at the postpartum visit, and subjects who elected LARC at the postpartum visit. Multivariate

analysis controlling for gestational age, marital status, nulliparity and history of caesarean delivery. Immediate postpartum LARC use was higher in the IP group, but not significantly (2.3% vs 4.6%; adjusted OR 0.32, 95% CI: 0.07-1.03, adjusted p-value 0.086). LARC as planned primary contraception at discharge were similar (36, or 27.9% vs

89, or 21.6%, adjusted OR 1.32, 95% CI: 0.81-2.10, adjusted p-value 0.255). At the time of the postpartum visit, LARC use as primary contraception choice was similar between cohorts (39, or 32.2% vs 110, or 29.4%, adjusted OR 1.04, 95% CI: 0.65-1.64, adjusted p-value 0.876) (Table 2). At discharge and at 6-8weeks postpartum, IUD use was greater than subdermal implant use in both groups (31, or 24.0% vs 5, or 3.9% in CP; 72, or 17.5% vs 17, or 4.1% in IP; p-value 0.081). Composite result of effective contraceptive options chosen, which

included LARC, in addition to other hormonal options, showed no difference between prenatal care types at discharge or postpartum visit. The most chosen contraceptive method at discharge in both groups was no contraception/plan to discuss at the postpartum visit (34, or 26.4% in the CP group; 121, or 29.4% in the IP group, p-value 0.081). Rates of routine postpartum visit attendance at 6-8weeks postpartum were similar and high in both groups (121, or 93.8% vs 374, or 90.8%, adjusted p-value 0.164).

**Table 2: Contraceptive Outcomes**

Outcome	CenteringPregnancy® (CP) (n=129)	Individual Physician (IP) n=412	Unadjusted		Adjusted for Covariates	
			Odds Ratio (95% CI)	p-value	Odds Ratio* (95% CI)	p-value
Immediate post-partum LARC	3 (2.3%)	19 (4.6%)	0.49 (0.14, 1.69)	0.251	0.32 (0.07, 1.03)	0.086
Planned LARC at discharge	36 (27.9%)	(n=411) 89 (21.6%)	1.40 (0.89, 2.20)	0.142	1.32 (0.81, 2.10)	0.255
LARC use at postpartum visit	(n=121) 39 (32.2%)	(n=374) 110 (29.4%)	1.14 (0.73, 1.77)	0.557	1.04 (0.65, 1.64)	0.876
Effective contraception plan at discharge	59 (45.7%)	206 (50.0%)	0.84 (0.57, 1.25)	0.398	0.75 (0.49, 1.14)	0.177
Effective contraception plan at postpartum visit	(n=121) 72 (59.5%)	(n=374) 229 (61.2%)	0.93 (0.61, 1.41)	0.735	0.73 (0.47, 1.13)	0.157
Attendance at post-partum visit	121 (93.8%)	374 (90.8%)	1.54 (0.70, 3.38)	0.283	1.85 (0.82, 4.77)	0.164

**Discussion**

The results of this retrospective comparison of individual physician care

versus CenteringPregnancy® in a low-risk population suggest that there is no significant difference in LARC uptake in women who participated in CP with

CNM providers and in women who received prenatal care with an individual physician. While CP as an intervention alone was not adequate to increase LARC uptake, it may increase LARC uptake when combined with other effective counseling measures. It is necessary to educate mothers on the significance of spacing pregnancies to improve health outcomes, as prior studies show deficits in knowledge of contraceptive effectiveness among women, with 45% of women overestimating the effectiveness of the most common kinds of contraception<sup>19</sup>. These deficits in knowledge exist in postpartum women as well. In one study of women who had a preterm delivery, 90% stated they did not want to become pregnant within one year, although 50% reported using contraceptive methods of low effectiveness<sup>20</sup>. While contraception is traditionally initiated at the postpartum visit, previous studies show only 50% of women attend<sup>21,22</sup>. A plan for contraceptive method should therefore be discussed and in place during the prenatal period, since ovulation can return rapidly after breastfeeding is stopped or decreased<sup>23</sup>. Thus, it is recommended to introduce LARC options during the prenatal period to educate women, specifically about the availability of immediate post-placental LARC insertion, as it is associated with improved maternal outcome<sup>25-26</sup>. In this study, postpartum visit rates were substantially higher in both groups than reported in literature. Given that other studies have shown higher attendance in group prenatal care, perhaps IP care high attendance in this cohort explains the lack of difference between contraceptive use between groups.

CP and other similar group prenatal care models have become increasingly popular and allow increased provider contact time and a community environment to help mothers transition into labor and delivery and the postpartum period<sup>26</sup>. CP is one model that offers standardized curricula to address such topics, and includes discussions on postpartum contraceptive options<sup>12</sup>. There was no significant difference in use of LARC in the two cohorts, as both groups showed similar rates of LARC use at discharge and at 6-8 weeks postpartum. A substantial private insurance rate and white race is representative of the area in which the study was conducted but may limit generalizability to some populations.

A study published in 2019 evaluated the effect of insurance-type on uptake of LARC at the time of postpartum discharge, specifically comparing private insurance to Medicaid insurance. This study concluded that there were no significant differences in postpartum LARC uptake between women insured by Medicaid vs insured privately when adjustments for clinical and demographic characteristics were made. Additionally, this study concluded that prenatal counseling, rather than insurance type, was a more important determining factor in receiving LARC postpartum<sup>27</sup>. This suggests that while there exist financial barriers to care, access to maternal education and counseling on contraceptive options remains a more important factor in LARC uptake and effective contraception in general. The Iowa Medicaid Enterprise (IME) provided

Medicaid coverage for LARC devices prior to hospital discharge following delivery in March 2014<sup>10,28</sup>. This policy change was passed in the middle of the study period, which was between 2012 and 2016, however offering immediate post-delivery LARC has always been offered to all pregnant persons since it was started at the institution regardless of insurance type. It remains unclear whether LARC uptake increased the second half of the study period after introduction of this policy change, and this remains a limitation of the study. Overall, recent policy changes in many states in the country, including the state in which the study was performed, have reduced barriers to postpartum LARC related to insurance coverage. Despite this, at the time this study was conducted only one other hospital in the state provided immediate post-delivery LARC.

Unlike previous examinations of group care that did not have standard curriculum or studies of CP that only included Medicaid, our study included all payors and an accredited CP program. The limitations of this study include its retrospective design and size. It is possible that with more study data and power, postpartum LARC use may trend more towards significance. The exclusion of women who received LARC after the 6-8-week postpartum period may represent a limitation, given that these patients may benefit from LARC even if it is not placed in the immediate postpartum period. Lastly, there may be bias introduced, given that there were different types of providers for each group. The CP group received care with a certified nurse midwife, while the IP

group received care with an OBGYN physician. As each group did not receive prenatal care with the same provider, there may be bias that limits study findings. It is possible that a study design comparing CP vs IP with the same provider may limit this bias.

## **Conclusions**

Despite more contact time and a greater number of prenatal visits with providers at CenteringPregnancy®, this group of women did not show higher rates of LARC uptake at discharge and postpartum than women who participated in traditional, individual OB/GYN physician care. Both groups of women also had similar rates of high postpartum visit attendance. Future work is necessary to identify strategies to improve LARC availability, given known benefits of LARC and recent insurance-related policy changes aimed at decreasing financial barriers to access.

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