

Effects of CenteringPregnancy on Pregnancy Outcomes and Health Disparities in Racial Groups versus Traditional Prenatal Care

Adrienne M. Smith, MPH¹, Mehak Zainab, BSPH¹, and Brad Lian, PhD¹

¹Mercer University School of Medicine

Corresponding Author: Adrienne M. Smith • Mercer University School of Medicine • 1550 College St, Macon, GA 31207 • Telephone: (770) 654-0059 • Email: 10990673@live.mercer.edu

ABSTRACT

Background: Group prenatal care has been shown to be effective in reducing health disparities in pregnancy outcomes between racial/ethnic groups. Here, we assess the effectiveness of CenteringPregnancy, a group prenatal care program offered as an alternative to traditional prenatal care.

Methods: A retrospective cohort study was conducted to examine differences with respect to several pregnancy outcomes such as low birth weight.

Results: There were no statistically significant differences between the groups on pregnancy outcomes. When the groups were stratified by race/ethnicity, however, African American mothers saw some benefit from CenteringPregnancy with their babies being born, on average, one week later ($p=0.04$) and having fewer NICU admittances ($p=0.04$) than their African American counterparts receiving traditional care.

Conclusion: The CenteringPregnancy group prenatal care program may be especially valuable for African American mothers and may help reduce racial/ethnic disparities with respect to important pregnancy outcomes. Our results have implications that full adoption of CenteringPregnancy in clinical practice at the Anderson Clinic will better service communities of mothers who are underserved, at-risk and vulnerable.

Keywords: CenteringPregnancy, group, prenatal, pregnancy, outcomes, racial, disparities

INTRODUCTION

The state of Georgia ranks 40th in infant mortality and 50th in maternal mortality (Zertuche, Spelke, Julian, Pinto, & Rochat, 2016). Poor prenatal health is associated with these high mortality risks, along with factors related to decreased access to care, poverty, education, and nutrition (Miteniece, Pavlova, Shengelia, Rechel, & Groot, 2018). African American women have been shown to have a disproportionate number of more adverse health outcomes, such as higher morbidity and mortality, as compared to their white counterparts, and these factors may be related to the level of endogenous stress factors that African American women experience (Lensworth, Otado, Warren, 2003).

Currently, there are two models of prenatal care available to expecting mothers. There is the traditional prenatal care model that is available to all and consists of patients making individual appointments with obstetricians and then meeting in an exam room setting. Support staff help take vital signs and labs. Direct patient-doctor interaction may vary by the visit and interaction throughout the pregnancy may total

anywhere from one hour to several. Patients often must seek out other parenting classes or pregnancy support groups, often outside of the office, for information on topics such as breastfeeding, lifestyle risk factors, newborn care, and other pregnancy issues (Carter et al., 2017).

A second model of prenatal care is based on communication at the group level but is only available where offered. CenteringPregnancy is perhaps the most widely used example of such a model. It consists of women with similar due dates meeting in group settings with a care provider outside of the exam room. It allows more time with the physician or care provider as each session is 90-120 minutes and meets at least 10 times, totaling to approximately 200 hours throughout the pregnancy. It also allows women to be more involved in their care by having them take their blood pressure and record their health data. Each patient also has individual time with the physician at the beginning of the session. The provider and support staff then facilitate a discussion on important health topics such as breathing and

childcare, and any other topics that the group may want to discuss. This setting allows the group to form friendships, expand networks, and develop deeper connections. CenteringPregnancy promotes this type of prenatal care as offering better health outcomes, self-care, self-confidence, more provider time, support and friendship, learning and fun, and lower costs (Navicent Health, 2018; Schindler Rising, & Houde Quimby, 2016).

Multiple studies have been conducted comparing group care programs to traditional prenatal care concerning various outcomes, finding that they usually make positive impacts on prenatal care, pregnancy outcomes, and maternal and infant health markers. For instance, there have been four randomized controlled trials and 10 observational studies on group prenatal care and overall, this care model has been found to increase birth weight, reduce preterm births, increase the use of family planning resources postpartum, and increase knowledge and patient satisfaction (Carter et al., 2016). Studies on CenteringPregnancy specifically have also found a decrease in preterm births, low birth weight, very low birth weight, and fetal demise; however, the literature is limited to few randomized controlled trials and observational studies (Tanner-Smith, Steinka-Fry, & Lipsey, 2014).

CenteringPregnancy has also been found to address health disparities in prenatal care. Currently, the rate of preterm births in African American women is almost double that of Caucasians even after controlling for other factors such as socioeconomic status (Muglia & Katz, 2010). Health education interventions were found to be the most useful in reducing stress and increasing self-efficacy and social support in African American women who are pregnant and socioeconomically disadvantaged (Lensworth, Otado, Warren, 2003). One study even found that group care could reduce three preterm births per every 100 live births in African American women (Carter et al., 2016). Many studies have found that African American mothers who received group prenatal care see a decrease in poor pregnancy outcomes such as preterm births and low birth weight, although more rigorous study is needed to establish the strength of this association (Carter et al., 2016; Ickovics et al., 2007; Ruiz-Mirazo, Lopez-Yarto, & McDonald, 2012).

Purpose

Health disparities in prenatal care in Macon-Bibb County are a concern. Figure 1 below illustrates data collected by the Georgia Department of Public Health on neonatal mortality rate in Macon-Bibb County. While neonatal mortality has decreased steadily in White patients since 2006, it has not in African American patients and ranges between 2-10 times more than White patients (Georgia Department of Public Health, 2017). With 53.6% of the Macon-Bibb population being African American, addressing these health disparities would help improve

pregnancy outcomes and increase the quality of care among obstetric patients and ultimately the population (County Health Ranking and Roadmaps, 2017).

Navicent Health, located in Macon, Georgia, has made it a priority to address health disparities throughout the organization. They have been offering expecting mothers the option of enrolling in a CenteringPregnancy program for the past five years. In this study, we assess the CenteringPregnancy at the W.T. Anderson Clinic located in the Navicent Health facility. We compare the participants in the traditional prenatal care group to those enrolled in the CenteringPregnancy program. We examine several pregnancy outcomes by group and by race/ethnicity using Chi-square tests and t-tests. Our study involved a multidisciplinary team of physicians, public health professionals, nurses, and quality improvement officers along with students and professors from Mercer University. We assess the effectiveness of an innovative prenatal program to improve health outcomes for infants and mothers and reduce health disparities among populations, especially those concerning underserved, minority populations, in a data-driven manner.

METHODS

Setting

The W.T. Anderson Clinic located in the Navicent Health facility in Macon, Georgia, has been offering CenteringPregnancy to its obstetric patients as an alternative to traditional care since 2016. The Anderson Health Clinic serves underinsured and uninsured patients who may be enrolled in their CarePartners sliding scale program, Medicaid/Medicare, or completely uninsured. The Anderson Clinic has offered the incentive of a \$10 gift card for patients that attend at least 2 meetings along with baby items for patients who attend 5-8 visits. Snacks and refreshments are available at each meeting. Each patient is given a schedule of all their sessions at the beginning of their pregnancy to plan for time and childcare. CenteringPregnancy is billed just like any other prenatal appointment so patients do not have an increased financial burden. Each session is staffed by an OB/GYN resident and nurse (Navicent Health, 2018).

Study Population

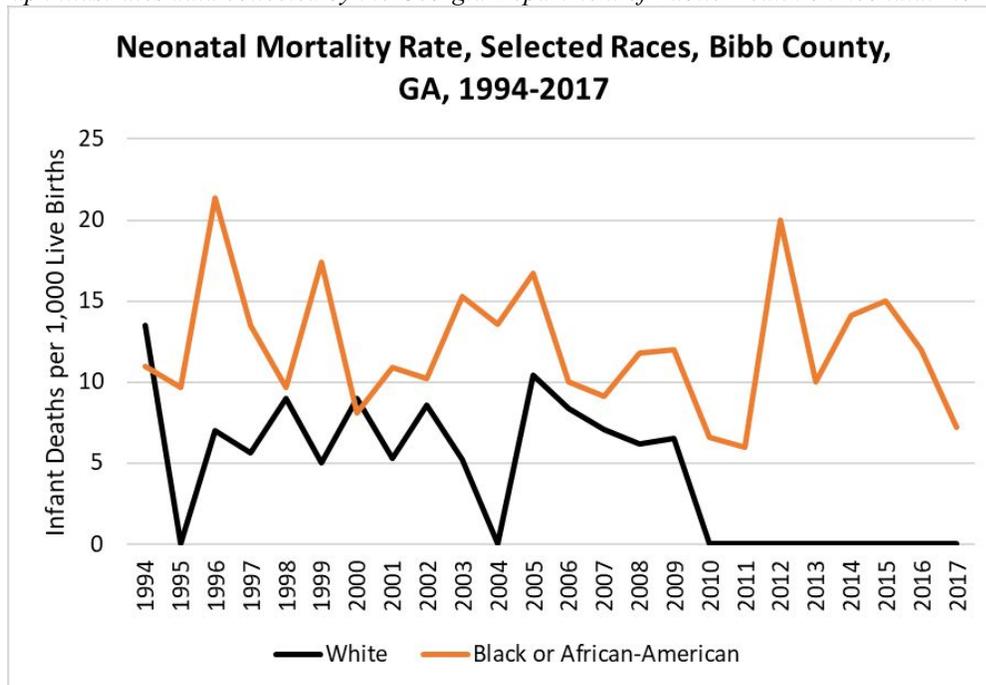
Our retrospective cohort study is based on two groups of patients. Our treatment group consisted of all patients in the history of the program who attended at least three classes (mean = 4.46, sd = 1.71) of the CenteringPregnancy at the Anderson Clinic and delivered between July 1, 2016 and January 31, 2019 (n=63). The control group in our study included patients that did not attend the program but received traditional prenatal care at the clinic and delivered during the same time period (July 2016 to January 2019) (n=63). Control patients were randomly selected to reflect a

similar racial/ethnic and age profile as the treatment group. The mean ages of the control and treatment groups were 26.01 (SD = 5.21) and 25.02 (SD = 5.70) years, respectively ($p = .269$), and the racial/ethnic distributions were identical for the groups (75% African American, ($n=47$), 16% White ($n=10$), 8% Hispanic ($n=5$), and 2% other ($n=1$)). The W.T. Anderson Clinic serves a predominantly low-income

population, reflected in the fact that almost all rely on Medicare for insurance coverage. So, study participants are relatively homogeneous with respect to income status; all are considered low-income, thus effectively controlling for income.

Figure 1

Graph illustrates data collected by the Georgia Department of Public Health on neonatal mortality rate in Bibb County.



Data Collection

Navicent Health’s Institutional Review Board approved this study in April 2018. Patient data was pulled from Navicent Health Center using PowerChart and we accessed attendance records logged by Anderson Clinic staff. Data collected included CenteringPregnancy participation, the number of classes attended, maternal age at delivery, maternal race, gestational age, delivery date and time, pregnancy complications, infant birth weight, infant outcome, and NICU length of stay.

Statistical Analysis

We assessed differences between study groups and stratified by race/ethnicity using t-tests and chi-squared tests (statistical significance equaling $p < 0.05$). By comparing differences of undesirable pregnancy outcomes (low birth weight: < 2.5 kg, pre-term births: < 37 weeks gestational age (WGA), C-section deliveries, NICU admittance, and fetal death) among demographic groups and prenatal care groups, we can evaluate if CenteringPregnancy is effective at diminishing these health disparities. Statistical analysis was

performed using the Statistical Package for the Social Sciences program (SPSS).

RESULTS

Overall, there were no statistically significant differences between the groups for any of the outcomes assessed, as can be seen in Table 1. The CenteringPregnancy group had what most would consider healthier (or more favorable) outcomes for most of the measures (e.g., higher birthweight, longer weeks of gestation, fewer NICU admissions), but the differences between the CenteringPregnancy and control (i.e., traditional care) groups were not different in a statistically significant manner (all $ps > .05$) based on t-tests and chi-square tests. NICU admittance was over twice as prevalent among control group participants (17.5% compared to 7.9% for the Centering group) and average length of NICU stays were over thrice as long (30.91 vs. 9.40, respectively), but again, such differences were not statistically significant.

Table 1
Pregnancy outcomes by group

	All participants	
	Control (n=63)	Centering (n=63)
Birthweight (kgs., (sd))	2.89 (.70)	3.04 (.58)
Low birthweight (% (n))	23.8% (15)	15.9% (10)
Gestational age (weeks, (sd))	37.19 (3.25)	38.03 (1.87)
Preterm birth (% (n))	31.7% (20)	31.7% (20)
C-section delivery (% (n))	34.9% (22)	33.3% (21)
Complications (% (n))	15.9% (10)	15.9% (10)
NICU admittance (% (n))	17.5% (11)	7.9% (5)
NICU stay (days, (sd))	30.91 (30.24)	9.40 (4.83)

When the groups were stratified by race/ethnicity, however, two statistically significant differences in outcomes for African American participants were revealed, as reported in Table 2. African American mothers saw more benefit from the CenteringPregnancy program with respect to pregnancy outcomes than the other racial/ethnic groups (which were combined due to the small sample sizes).

Specifically, African American mothers who received CenteringPregnancy prenatal care delivered at 38.1 weeks gestation on average (WGA), over 1 week later than deliveries by African American mothers receiving traditional care (p=0.04). Babies from African American

CenteringPregnancy recipients also had a lower NICU admittance rates than their counterparts receiving traditional care, at 6.4% versus 21.3%, respectively ($\chi^2(1) = 4.37$, $p=0.04$; $RR = .30$, 95% CI (0.08, 1.02)).

None of the outcomes associated with the “White/Hispanic/Other” racial/ethnic groups were statistically significant. If anything, the trends for those groups were generally more favorable for those in the traditional care group (e.g., birthweight, preterm birth, and NICU admittance).

Table 2
Pregnancy outcomes by group, stratified by race/ethnicity

	African American participants		White/Hispanic/Other participants (n=10/5/1=16)	
	Control (n=47)	Centering (n=47)	Control (n=16)	Centering (n=16)
Birthweight (kgs., (sd))	2.75 (.73)	2.99 (.59)	3.30 (.39)	3.19 (.55)
Low birthweight (% (n))	29.8% (14)	19.1% (9)	6.3% (1)	6.3% (1)
Gestational age (weeks, (sd))	36.87 (3.54)	38.06 (1.76)*	38.13 (2.00)	37.94 (2.21)
Preterm birth (% (n))	34.0% (16)	27.7% (13)	25% (4)	43.8% (7)
C-section delivery (% (n))	36.2% (17)	31.9% (15)	31.3% (5)	37.5% (6)
Complications (% (n))	14.9% (7)	12.8% (6)	18.8% (3)	25.0% (4)
NICU admittance (% (n))	21.3% (10)	6.4% (3)*	6.3% (1)	12.5% (2)
NICU stay (days, (sd))	33.90 (30.12)	9.33 (4.04)	1.00 (0)	9.50 (7.78)

Note. * $p < .05$

Regression analyses using birthweight as the dependent variable in one model (linear) and low birth weight (no/yes) as the dependent variable in another (logistic regression) with group membership (treatment/control), gestational age,

C-section delivery (no/yes), complications (no/yes), race/ethnicity (African American/combined other), and age as predictors essentially corroborated the bivariate findings. Only gestational age and race/ethnicity were statistically

significant predictors in either model, with both being statistically significant in both models (both $p < .01$ in the linear regression and both $p = .03$ in the logistic regression). Gestational age was positively associated with birthweights and negatively associated with low birthweight outcomes (coded no = 0 and yes = 1), while being African American was negatively related to birthweights and positively related to low birthweight outcomes. (A follow-up regression using gestational age as the dependent variable and group, C-section delivery, complications, race/ethnicity, and age as predictors found only age to be a statistically significant predictor ($p = .03$, in a positive manner).

DISCUSSION

A retrospective cohort study was done to examine the efficacy of CenteringPregnancy compared to traditional prenatal care. Overall, there were no statistically significant differences in the outcomes associated with each group. We did find some evidence, however, indicating that CenteringPregnancy improves pregnancy outcomes for African American women, when examining outcomes stratified by race/ethnicity. Specifically, African American mothers who participated in CenteringPregnancy had babies born, on average, one week later ($p = 0.04$) and had lower rates of NICU admittances ($p = .04$) than their African American counterparts receiving traditional care.

Limitations

Our study has several limitations. It is difficult to generalize results to other or broader populations based on small sample sizes, and our sample sizes may be considered small. Moreover, small sample sizes also influence our results directly. Statistical significance is based on effect size and sample size, after all, and our small sample sizes may mean that some clinically meaningful effect sizes between groups may not reach statistical significance at $p < .05$. In addition, although our sample is based on participants visiting a clinic that serves a predominantly lower-income population, specific information with respect to income and socio-economic status (SES) is absent in this study and is another limitation. Both income and SES are related to pregnancy outcomes and should be accounted for in any study examining such outcomes. Another limitation concerns the incomplete implementation of the CenteringPregnancy program. Our threshold for inclusion into the CenteringPregnancy group was three sessions. Session content varies, as does the number of sessions attended. Future studies need to consider how to standardize or better control for the experiences within the treatment groups.

PUBLIC HEALTH IMPLICATIONS

While the majority of outcomes assessed in this study were not statistically significant, the generally positive trends found support continuation of CenteringPregnancy at the

W.T. Anderson Clinic. A more complete implementation of the program will allow for more sophisticated analyses and perhaps a better understanding of the mechanisms responsible for successful outcomes and benefits. This was multidisciplinary, data-driven research in a real-world setting that has shown to have immediate and valuable implications addressing health disparities among underserved and African American populations. As one of the six Regional Perinatal Centers in Georgia, Navicent Health provides care to a large population of high risk, disadvantaged and underserved mothers in central Georgia. This population of patients, specifically African American mothers, may benefit from group style prenatal care. Our results have implications that full adoption of CenteringPregnancy in clinical practice at the Anderson Clinic will better service communities of mothers who are underserved, at-risk and vulnerable. Expansion of this program should increase optimal pregnancy outcomes in all patients while also addressing the health disparities seen in maternal and infant health among African American patients at Navicent Health and the population of middle Georgia. This manuscript suggests that CenteringPregnancy makes a difference with respect to important pregnancy outcomes, perhaps especially so for African American mothers, and efforts to continue and expand the program at Navicent Health should be encouraged.

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