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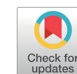
Improving birth and breastfeeding outcomes among low resource women in Alabama by including doulas in the interprofessional birth care team



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ABSTRACT

Background: Birth outcome disparities are particularly evident in Alabama and evidence has shown that including doulas in an interprofessional birth care team (IBCT) may improve these outcomes.
Purpose: The purpose of this study is to assess whether including doulas in the birth care team was associated with improved birth outcomes among low resource mothers in Alabama.
Methods: Doula supported birth outcomes in 2013–2014 (n = 120) were restrospectively compared to all 2014 Medicaid funded births in Jefferson County, Alabama (n = 3782).
Results: Doula supported births were associate with lower rates of epidural anesthesia and birth by cesarean as compared to the reference population (OR 3.0, 95% CI 2.1–4.4 and OR 1.8, 95% CI 1.1–2.9, respectively, for reference population). Doulas were also associated with a ten-fold increase in breastfeeding initiation (OR 10.5, 95% CI 5.4–23.2).
Conclusions: Doula support is associated with increased breastfeeding initiation and reduced rates of epidurals and cesareans among low resource mothers in Alabama.

1. Introduction

Research has shown that poor birth outcomes and birth related complications are more frequent among families with limited resources, and families of African American heritage.[1] In 2014, fifty-three percent of births in Alabama, the eighth poorest state in the nation at that time, were covered by Medicaid.[2,3] Despite this spending, Alabama has a high rate of adverse maternal and infant health outcomes, with racial and socioeconomic health disparities associated with birth being particularly evident.[4–13] This study assesses a strategy to improve Alabama's parinatal health outcomes by including doulas, non-medical health care providers, in the birth care team.

Alabama had the nation's second highest infant mortality rate in 2013–2015, with Black infants three times more likely to die than White infants.[9] Alabama's maternal mortality rate in 2014 was reported as 19.9 per 100,000, while nationally, the maternal mortality rate among Black mothers is nearly three times that of White mothers.[10–13] Alabama mothers are more likely to undergo cesarean sections, a procedure associated with documented risks and higher cost relative to vaginal births[5–8] Compared to other states in 2014–2015, Alabama had the fifth highest rate of birth by cesarean (2014–35.4%; 2015–35.2%)[5] and sixth highest rate of birth by cesarean performed after low risk pregnancies (2014: 29.7%; 2015: 28.5%).[6] Alabama also had the third highest rate of preterm births (2014–11.66%; 2015–11.73%), defined as all births occurring before 37 weeks gestation, and late preterm births, defined as births between 34 weeks and 36 weeks gestation (2014–8.16%; 2015–8.20%).[5] Additionally, in 2015, the Centers for Disease Control reported Alabama as having the fourth lowest breastfeeding rate, with only 68% of mothers ever breastfeeding compared to 83% nationally. Breastfeeding rates among Black mothers are even lower.[4] The available data support the need for strategies to improve birth outcomes in Alabama, especially among low resource women and infants.

Including doulas in the birth care team is one strategy that might benefit families in Alabama and lower birth related complications and costs. Doulas are non-medical support professionals and are typically trained in comprehensive workshops. DONA International, an organization that certifies doulas, defines a doula as “a trained professional

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who provides continuous physical, emotional, and informational support to a mother before, during and shortly after childbirth to help her achieve the healthiest, most satisfying experience possible.“[14] Doulas are trained to provide support that is culturally sensitive, spiritually supportive, and informative. During pregnancy and the early postpartum period, doulas are trained to discuss the importance of breastfeeding, skin to skin contact immediately after birth, safe sleep practices, and parenting methods such as attachment and caregiver responsiveness to newborns.[14] Doulas can be a critical part of an interprofessional birth care team (IBCT) by facilitating communication between medical professionals and the mother.

Research has shown that doula support during the perinatal period improves maternal and child health.[1,15-24] Support from a doula during labor and birth is associated with lower cesarean rates, lower operative delivery rates, reduced pain medication use, shorter labor durations, lower costs, and increased satisfaction with the birth experience.[17,18,21] Continuous labor support, such as that provided by a doula, is associated with improved infant outcomes, as well, including higher newborn APGAR scores,[21,22] lower rates of preterm birth,[17] and decreased incidence of infants who are low birth weight, defined as a birth weight < 5.5 pounds.[23] Doula care is also correlated with improved breastfeeding success[15,19] and lower postpartum depression scores.[24]

Leading organizations in maternal and child health have recognized that doulas are a cost-effective way to positively influence maternal and child health outcomes. In 2016, two community based doula programs were featured on The Association of Maternal and Child Health Program's online “Innovation Station,” which shares best practices and emerging programs in maternal and child healthcare.[25,26] Also in 2016, a meeting of the National Academies of Sciences, Engineering, and Medicine concluded that the future viability of healthcare depends on empowering individuals and families, improving health literacy, shifting to prevention and wellness, and integrating non-medical health workers to act as liaisons between the patient and medical providers. Contributors referenced these components as key to effectively rebalancing the power structures in healthcare between providers and receivers of care.[27] The World Health Organization's (WHO) Safe Childbirth Checklist lists six evidence based items to check upon admission in order to reduce maternal and newborn harm. Two of these six items relate to enabling access to the desired presence of a birth companion.[28] In 2014, The American College of Obstetricians and Gynecologists (ACOG) and the society for Maternal-Fetal Medicine publish a joint consensus statement on safe prevention of primary cesarean delivery.[16] The statement references a 2013 Cochrane meta-analysis in making the statement that “one of the most effective tools to improve labor and delivery outcomes is the continuous presents of support personnel, such as a doula.“[16,18] Doulas, as birth companions, serve as non-medically trained professionals that empower individuals, provide information leading to better health literacy, and can act as liaisons with obstetricians, midwives, nurses, and other health care providers during pregnancy, labor, birth and the early postpartum phase. Effective models of doula care highlight the need for sustainable funding to support doulas as members of the IBCT.

A cost-benefit analysis conducted by Kozhimannil et al., determined that when reimbursement for doula care ranges from $929 to $1,047, this cost is balanced by the savings realized due to reduced preterm birth and cesarean rates.[17] Despite the benefits and the low cost of doula care relative to other medical interventions, and the associated savings attributable to reduced medical interventions, only six percent of births in the U.S. are currently supported by a doula.[29] This low level persists despite increasing evidence that mothers desire doula support. According to a recent survey of women who are aware of doulas (n = 2400), twenty-seven percent expressed the desire to have a doula included in their birth care team.[29] These findings point to an unmet need for more doulas to provide perinatal support. Although third party coverage for doulas continues to be rare, some state Medicaid programs and managed care organizations are considering covering doula care in response to evidence that doula support is a cost efficient means to improve health outcomes.[30–32] However, people of low socioeconomic status, who are most at risk for poor birth outcomes, continue to be the least likely to be able to afford and have access to doula support.[33–35]

BirthWell Partners (BWP) is an example of a nonprofit organization addressing poor birth oucomes by providing birth doula support for families with limited resources in Jefferson County, the largest county in Alabama.[2] Pregnant women are referred to BWP by local organizations and health care providers that support families with limited resources. Women also find BWP through internet searches and recommendations from friends and family. All BWP doulas complete a five day doula training workshop including: a one day Introduction to Childbirth Class, a DONA International approved three day Birth Doula Workshop, a 4 h class on supporting breastfeeding and a 4 h class to address causes and possible solutions to maternal and infant health disparities nationally and in the local community. The doulas are trained to enhance and facilitate communication among the IBCT, a team that includes the input of the mother. Examples of how a doula might facilitate communication and reduce power differentials is by encouraging clients to ask questions, ask for clarification, and request time to make decisions. Doulas also facilitate dialogue between health care providers and clients in trouble-shooting complicated labors, and doulas help implement suggested position changes and support techniques. In addition to the training provided, BWP doulas receive mentoring and support from BWP directors and experienced doulas.

The purpose of this study was to assess whether including doulas from BWP in the birth care teams of low resource families is associated with improved birth outcomes when compared to a reference population of births among Medicaid recipients in Jefferson County, Alabama, and whether these positive results persist for Black and White mothers.

2. Methods

This study retrospectively compared outcomes from a reference population of all Medicaid covered births in Jefferson County to a subset of births supported by doulas (2013–2014). The reference population included all Medicaid covered births in Jefferson County, Alabama in 2014, as reported in the Alabama Vital Events Database (N = 3782) and provided in aggragate to the researchers by the County Health Department. The study population, many of whom were also in the reference population, included 120 pregnant women and their 124 infants (including 4 sets of twins), who were born in local hospitals between January 2013 and December 2014. BirthWell Partners (BWP), a nonprofit organization in Central Alabama, provided doula services for these women at little or no cost. Outcomes assessed were incidence of birth by induction, preterm birth, low birth weight infants, epidural anesthesia use for pain management, birth by cesarean, and breastfeeding initiation in the hospital. A separate analysis was also conducted on outcomes for Black and White mothers.

Due to the smaller number of subjects in the study population relative to the reference population, there is significant potential for correlated twin births to skew the data for preterm birth, low birth weight, and cesarean rates in the smaller study subset.[36] Therefore, twin births were excluded from analysis of preterm birth rates and low birth weight rates for the study population, leaving a sample of 116 for those analyses (with the exception of low birth weight that had missing weight data for 4 births; n = 112).[36] Furthermore, when analyzing cesarean rates, twins and births that were planned to be cesarean before the time of labor were excluded (n = 104). There were two missing data points for the epidural pain management (n = 118) and one missing data point for induction (n = 119) analyses. All doula supported mothers were included for the breastfeeding analysis (n = 120, missing data for four infants).

2.1. Statistical analysis

Descriptive statistics were used to report percent incidence of birth by induction, preterm birth, low birth weight infants, epidural anesthesia use for pain management, birth by cesarean, and breastfeeding initiation in the hospital. Gestational age for Jefferson County Medicaid population births was calculated based on obstetrical estimate as ascertained from the patient's reported last menstrual cycle and the first valid ultrasound examination.[37] The outcomes for the doula supported clients were compared to the reference data, and among Black and White births, using the maximum likelihood odds ratios and 95% confidence intervals (CI). A Mid-P exact p-value = / < 0.05 was considered significant. The hypotheses were tested using odds ratios (OR) and confidence intervals. This study was approved by the Institutional Review Board at Samford University.

3. Results

The majority of the BWP participants (97%) were eligible for state supplemented food and nutritional services through the Women, Infants and Children (WIC) program, and 93% of births were covered by Medicaid. Thus, the reference population included a large majority of the study population. The mean maternal age (range; standard deviation) of the doula supported and reference populations were 26.4 (14–42; 5.8) and 25.5 (13–46; 5.5) years of age, respectively. Forty-five female doulas provided support for the study population [80% (36) White; 18% (8) Black; < 1% (1) hispanic]. Of those doulas, sixty-four percent qualified for need based scholarships to complete their doula training. Support provided by doulas included an average of 1.9 prenatal meetings between the doula and client (n = 117, range 0–6), continuous support from the time the doula arrived at the hospital until birth and for 1–2 h post-birth, as well as an average of 1.5 postpartum meetings between doulas and their clients (n = 54, range 0–3). Prenatal and postpartum meetings last one to 2 h each.

Mothers in the Medicaid population were three times more likely to receive epidurals for pain management than in the doula supported group (OR = 3.0; 95% CI 2.1–4.4; $p < 0.0001$) (Fig. 1). Women in the reference population were also 1.8 times more likely to give birth by cesarean than doula supported individuals (OR = 1.8; 95% 1.1–2.9; p = 0.008). Women supported by doulas were 10.5 times more likely to breastfeed in the hospital than the reference population (OR = 10.5, 95% 5.4–23.2; $p < 0.001$). These significant findings persisted when Black and White mothers were analyzed separately, except for cesarean rates among Black mothers [Epidural: Black (OR = 5.6, 95% 3.1–9.9; $p < 0.0001$) White (OR = 2.8, 95% 1.6–4.9; $p < 0.001$); Cesarean: Black (OR = 1.4, 95% 0.7–2.8; p = 0.31) White (OR = 2.7, 95% 1.3–6.6; $p < 0.01$); Breastfeeding: Black (OR = 7.8, 3.4–18.4; $p < 0.0001$) White (OR = 13, 3.2–53.8; $p < 0.0001$)](Fig. 2). In other words, Black mothers supported by a doula were significantly less likely to have an epidural and exponentially more likely to breastfeed, with no significant difference in the odds of black mothers having a cesarean between the reference and doula populations. Although singleton infants born to mothers supported by a doula had lower incidence of preterm births and low birth weight relative to the reference population, these differences were not statistically significant.

4. Discussion

This study suggests that funding doula services as part of IBCTs could be a cost effective strategy for improving birth outcomes in Alabama. Relative to the reference population of Medicaid recipients in Jefferson County, doula supported births were associated with lower odds of using epidurals for pain management, lower odds for cesarean delivery and exponentially higher odds of initiating breastfeeding in the hospital. These positive results persisted when analyzed by race with the exception of cesarean rates among Black mothers.

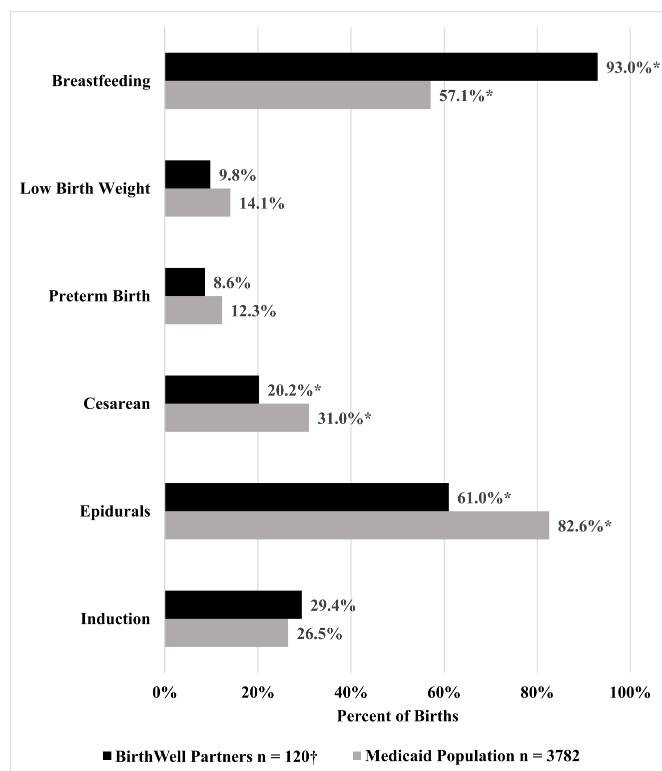

Fig. 1. Comparison of birth outcomes and breastfeeding between study population (BirthWell Partners: 2013–2014) versus the reference population (Medicaid populaton).
*Significant difference in odds ratios between study and reference populations ($p < 0.05$).†Adjusted n for cesarean section (n = 104), low birth weight (n = 112), epidural (n = 118), and preterm birth (n = 116) analyses.

These significant findings are consistent with previous research showing reduced utilization of pain medication during labor and birth, reduced cesarean rates, and increased breastfeeding initiation in the hospital when doula support is present.[18,38] The persisting effect for Black mothers is consistent with evidence that doula care can positively impact some of the social determinants of health that contribute to poor outcomes for Black families.[39] The dramatic findings of doula support being associated with exponentially higher breastfeeding initiation in the current study are especially promising given the profound impact of breastfeeding on infant and maternal health.

Breastfeeding is associated with numerous nutritional and immunological health benefits that reduce rates of infant morbidity and mortality.[40,41] The positive benefits of breastfeeding have been shown to persist into childhood and beyond, and include benefits to both the mother and child.[40] A recent systematic review and *meta*-analysis by Khan et al., found that early initiation of breastfeeding, within the first hour, is associated with reduced risk of infant mortality. Exclusively breastfed infants also had a lower risk of mortality and infection-related deaths in the first month.[42] Breastfeeding as an infant is also associated with lower rates of obesity in childhood and lower rates of infant mortality.[43,44] This is especially important among Black children who have been shown to have a 59% higher BMI than White children and have higher infant mortality rates than White infants.[9,45] This evidence suggests that lower breastfeeding rates among Black mothers is a contributing factor to health disparities, and that interventions are needed to promote breastfeeding as a mechanism for improving health among diverse, low resource families.

Breastfeeding self-efficacy, a mother's confidence in her ability to breastfeed, has been shown to be a modifiable mechanism for improving breastfeeding rates.[46] The increased rates of breastfeeding initiation associated with doula support may be explained in part by

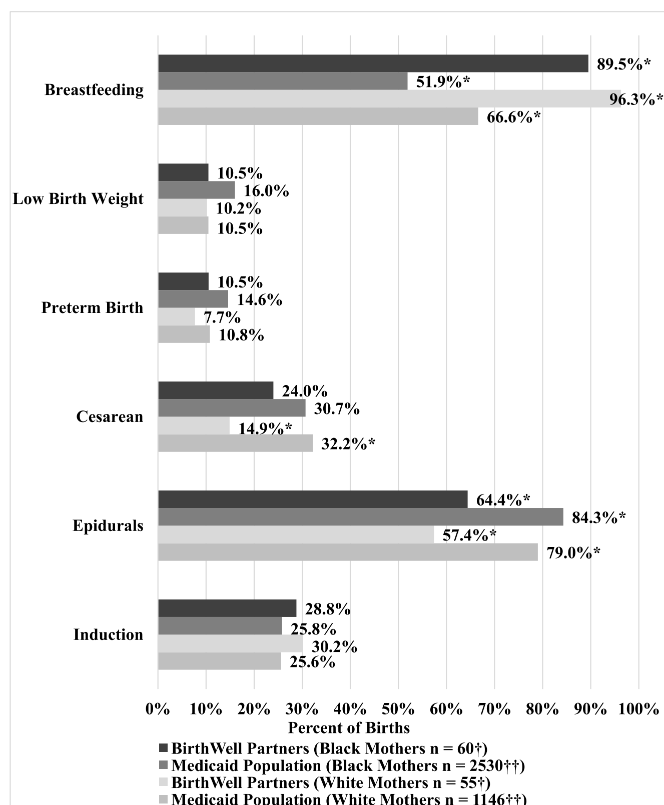

Fig. 2. Comparison of birth outcomes and breastfeeding based on race. *Significant difference in odds ratios between study and reference populations ($p < 0.05$).†Other races account for 4.2% of doula-supported population; Adjusted n for cesarean section (n = 104), low birth weight (n = 112), epidural (n = 118), and preterm birth (n = 116) analyses.†† Other races account for 2.8% of reference population.

improved maternal breastfeeding self-efficacy. Benefits of continuous emotional support are often attributed to increasing a patient's satisfaction and sense of self efficacy, control, security and comfort.[47,48] The doula's impact depends on the trusting relationship built between the doula and her client before, and in the early stages of labor and birth. Through this relationship, the doula gains an understanding of her client's concerns and expectations for birth, as well as extensive knowledge of the client's labor coping skills and specific emotional needs.[49] Adding the doula relationship to the IBCT supports client behaviors that are associated with positive birth outcomes.

Doulas can also improve outcomes by boosting their client's health literacy, and by enhancing communication with other health care professionals.[38,39] Health literacy is the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions. The Global Forum on Health Care Innovation in Health Professional Education described health literacy as the "currency for identifying solutions to society's problems" and also identified health literacy as key to rebalancing power structures between patients and providers.[27] Health literacy in pregnant individuals is associated with behaviors that promote their own health and that of their infants.[50] By increasing health literacy through enhanced communication, clearly articulating the mothers' available options and empowering the mothers' decision making, doulas promote person centered care that optimizes health outcomes.

The reduction in preterm birth rates seen in other studies was not replicated in this study.[17,23,51] Study limitations that may have contributed include (1) limited power due to the small sample size of doula supported births; (2) on average, the doula and client interactions during the prenatal period may have been insufficient (doulas met their clients an average of 1.9 times for two to 4 h); and (3) limited racial diversity among doulas so that Black clients were typically not with doulas of the same race. With a larger sample size, the differences in low birth weight may have become significant. Alternatively, a greater number of doula-client meetings over a longer period of time may be necessary in order to significantly impact low birth weight and preterm birth outcomes. Furthermore, pairing clients with doulas of the same race may enhance the doula-client relationship, increasing trust and positively impacting factors like preterm birth.[52,53] Future studies should focus on determining the optimum dose and content of prenatal interactions necessary to see significant differences in birth outcomes and consider the impact of matching doulas and clients by racial or ethnic identity.

This study also failed to show a reduction in induction rates among doula supported mothers. Reference population induction rates were derived from birth certificate data. Research has shown that both birth certificates and hospital discharge data underreport induction rates.[54] Thus, the National Vital Statitics reported induction rate for 2014 of 23% and this study's reference population rate of 26.5% may be low.[55] Its useful to compare these rates to Childbirth Connection's 2013 "Listening to Mother's Survey" finding that 41% of women reported their labors were medically induced by their health care provider.[29] More accurate reporting may show higher induction rates in this study's reference population. Data on reasons for inductions and cesareans could provide insight into whether a doula's support has an impact on induction or cesarean rates. When an induction or cesarean is elective, doulas may be more likely to have an impact on the rates than if the procedure is medically necessary. Furthermore, a greater number of prenatal doula-client meetings may be necessary in order to impact the rates of non-medically indicated procedures.

It is also relevant to consider that positive outcomes in the doula supported births may be due to selection bias. The mothers supported by doulas may have been predisposed to being more motivated to give birth without medical interventions and to initiate breastfeeding than the mothers in the reference population who were not actively seeking doula support. Future studies could control for mothers referred by providers to doula care versus those mothers who sought doula care. It would also be useful to analyze findings based on information about the mother's preferred birth plan and preferences for breastfeeding prior to client interactions with their doula. In summary, future, prospective studies could strengthen and expand these conclusions through a larger sample size of doula supported mothers, controlling for number and content of prenatal visits, addressing the impact of doula and client racial and ethnic identity, improving the reporting of induction rates in the Medicaid population, and controlling for selection bias.

Although doula services have been shown to contribute to significant cost savings, in part by reducing epidural anesthesia and cesarean rates, insurance companies in the United States do not typically reimburse for doula services, and Medicaid coverage of doula services is rarely mandated. Only Minnesota and Oregon were identified as authorizing Medicaid coverage for doula care.[31,56,57] Most families who have doula support in Alabama hire their doula privately at a cost of $400 to $1000. Therefore, families that rely on public assistance for their basic needs and who are often at highest risk of poor health, cannot afford to have a doula. To address this need, nonprofit organizations, such as BWP, are providing free or low-cost doula support for vulnerable populations. Another example is the New York City Department of Health and Mental Hygiene's Healthy Start Brooklyn that operates the By My Side Birth Support Program. This program provided doula assistance for 560 pregnant individuals living in neighborhoods in Brooklyn that were identified as having disproportionately high rates of poor health and high utilization of federal aid. The By My Side program demonstrated an increase in emotional stability and birthing empowerment among families. Participants reported that the By My Side program empowered them to participate in their individual perinatal health decisions.[58] Despite these promising outcomes, funding sources for doula programs are limited, leading nonprofit doula

organizations to dedicate significant time and resources to grant seeking activities, rather than direct services.[59] Thus, access to doulas is often limited among families at most risk for poor birth outcomes.

5. Conclusions

This study demonstrates that in Alabama, a region with documented racial and socioeconomic health disparities, doula support could positively impact maternal and infant birth outcomes. Including doulas in the IBCTs in Alabama was associated with increased initiation of breastfeeding in the hospital, less use of epidural anesthesia for pain management, and lower incidence of births by cesarean. These positive outcomes persist whether the mother is Black or White, with the exception of births by cesarean. Based on this evidence and other research supporting improved outcomes with doula supported births, health care payers and administrators are urged to promote cost effective interprofessional birth care team (IBCT) models that include non-medical support, such as doulas.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.xjep.2019.100278.

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