A NATIONAL STUDY OF THE OUTCOMES OF DOULA-ASSISTED BIRTHS

By

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A paper presented to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirement for the
Degree of Master of Public Health
In the Department of Maternal and Child Health

Chapel Hill, N.C.

April 4, 2014

Abstract

OBJECTIVE
This study is a descriptive analysis of doula-assisted care in the United States from a national sample of women, including African American, Hispanic/Latina, Asian, and Native American.

METHODS
The study population (n=12,577) comprised primiparous women with normal pregnancies, and no planned cesareans, who received intrapartum care from doulas from 2000 to 2013. Descriptive statistics were calculated for characteristics of mothers, and their outcomes during labor, birth, and immediate postpartum, by race and ethnicity. Comparisons were drawn with national data.

RESULTS
Cesarean delivery rates for doula mothers ranged from 12-22% depending on ethnicity, compared to the national rate of 32.8%. Doula mothers were nearly 50% less likely to use medical interventions, and more likely to initiate breastfeeding than the general population of birthing mothers.

CONCLUSIONS
Substantial evidence indicates intrapartum care by doulas may be a safe way to decrease medical interventions, lower the primary cesarean rate, and increase breastfeeding initiation for primiparous women in the United States.

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I. Introduction

Experiences early in life, including the birth experience, can have far-reaching impact, and influence the health of both the mother and the infant across an entire lifetime. Risk experiences at the beginning of life can trigger a cascade of poor health outcomes, some of which might be invisible for decades.[1] Early exposure to positive and protective factors, however, can set a woman and an infant on a course toward a healthy life. [1] Focusing on improving the type and quality of maternity care and outcomes during the birthing process can promote optimal outcomes for mothers and babies.

In the United States, the infant mortality rate is the highest among an analogous group of 17 high-income countries with at least 100,000 per annum births, and the cesarean rate is among the highest of all industrialized countries.[2] This is despite the fact that we spend more on healthcare and use more technology than any other country.[3]

Because medical interventions are escalating in frequency in the United States, and there is considerable concern that the practice of cesarean delivery is overused,[4] these issues are of increasing importance in the maternal and child health community. It is imperative to develop systems and protocols of care that prevent unnecessary intervention.

II. Literature Review

Routine maternity care in the United States is characterized by high rates of medical interventions during labor and delivery. According to national birth certificate data, the cesarean rate is nearly 33%, and 22.8% of all women (and 42% of first time mothers) undergo labor induction.[5] Clinical evidence indicates that among women undergoing induction of labor, women with their first pregnancy have a higher rate of

cesarean delivery than do women who have had prior vaginal births. [6] Repeat cesareans occur in 75-90% of women who have had at least one prior birth by cesarean.[7]

Medical interventions have known side effects for mother and baby, and commonly applied interventions in labor are closely linked with unplanned cesareans.[8] Although medical interventions during labor and childbirth are used with the intentions of ensuring the safety of mother and baby, they can bring greater health risks and complications for both with little benefit in the large majority of cases.[7-9] Interventions during the birthing process include medical induction of labor, artificial rupture of membranes to release amniotic fluid to induce or speed up labor, synthetic oxytocin (Pitocin) to hurry labor, pain medication, and back-lying positions for labor and birth.[9]

In many contexts these interventions may disrupt the normal physiology of labor and birth. One intervention can trigger a snowball sequence, increasing the likelihood of further interventions with unintended consequences. These are often solved with further interventions. For example, a recent study points out labor was prolonged by more than two hours in women with epidural compared to women without. This held for both nulliparous and multiparous women. Under current clinical definitions of prolonged labor about one-third of nulliparous women with epidural could be categorized with having abnormal labor, potentially leading to unnecessary interventions, including cesareans.[10] The cascade of interventions often ends with a primary cesarean birth that then increases the likelihood of subsequent cesarean births.

In recent years the cesarean rate has leveled off in the United States, which means that currently about one in three women (32.8%) give birth by cesarean.[2,11] Though the ideal cesarean rate is unknown, evidence from one study found that countries where the

rate was greater than 15% might be doing more harm than good.[12,13] For the majority of women in the United States with low-risk pregnancies, cesarean deliveries are associated with greater risks for maternal mortality and morbidity than vaginal deliveries.[4] Moreover, many medical interventions during labor are used as a matter of course when not indicated, increasing the probability of cesarean delivery.[4] Since the 1990s, cesarean deliveries have increased among women of all races and ethnicities. However, persistent inequities in birth outcomes between racial-ethnic and socioeconomic groups demonstrate that non-Hispanic black, Hispanic, and Native American mothers are more likely to have cesarean deliveries than non-Hispanic white or Asian mothers, even after adjustments for demographic, behavioral, medical, and institutional level factors.[14-18]

While trends for increased medicalization of the birthing process are disturbing, emerging evidence of the clinical benefits of continuous labor support to reduce unnecessary interventions is encouraging. A Cochrane systematic review of randomized control trials on the effects of continuous intrapartum care found that mothers were more likely to have a spontaneous vaginal birth (risk ratio (RR) 1.08, 95% confidence interval (CI) 1.04, 1.12), and less likely to have a cesarean (RR 0.78, 95% CI 0.67, 0.91). Additional positively correlated outcomes included reduced need for pain medication, shorter labors, lower rates of regional anesthesia, and reduced need for instrumental-assisted delivery. [19] Labor support was most effective when provided by an individual, such as a doula, who was not on the hospital's staff and was not a family member or close friend without specialized training.[19]

Maternity care authorities, including the World Health Organization and the Association of Women's Health, Obstetric and Neonatal Nurses mandate supportive care

during labor. [20] In the United States continuous intrapartum care is available to birthing mothers from doulas—maternity caregivers who have special training in childbirth and who provide support for expectant mothers before, during, and after childbirth. Doulas work in partnership with maternity care teams to support women in having safe and satisfying childbirth experiences. [21] Historically and traditionally, providing laboring women with continuous support from other women is not new, but as modern obstetrics became progressively interventionist, doulas began to fill a gap in maternity care, as intrapartum nurses could not spend much of their time in a supportive role.[20,21] Nurses often look after more than one woman at a time, have numerous clinical tasks, consult with doctors and midwives, are saddled with increased monitoring and charting, provide intermittent comfort measures, have shift changes, and take breaks.[21] Doulas, on the other hand, have no clinical responsibilities, and do not make clinical decisions.[21] Their role is to provide continuous individualized physical, emotional, and instructional/informational support to laboring women and their families throughout the entire birthing process. They are trained to help women and their families advocate for themselves. And, while a caring partner, family member, or friend may provide labor support, most lack the specialized skills and experience doulas have to assist women in a hospital environment.[20] A national survey of mothers reported that women rated the supportive care they received from doulas higher than the care received from midwives, obstetricians, labor and delivery nurses, spouses or partners, and family members or friends.[5]

The effectiveness of doulas in reducing medical interventions and improving maternal and infant outcomes is established in scientific journals. Studies that examine the relationship between birthing mothers and their doulas report consistently positive

experiences for mothers.[22-24] Other studies note positive early postpartum outcomes among doula-assisted mothers with higher rates of breastfeeding, early initiation rates, and delayed first formula feeding.[25-27] There is also evidence that the effects of doula care are found to be greater for low-income, single women, birthing in a hospital without support of a companion.[25,28]

The body of evidence of high cesarean rates in the United States recently resulted in the American College of Obstetricians and Gynecologists and the Society of Maternal-Fetal Medicine issuing joint clinical guidelines for safe reduction of the rate of primary cesarean deliveries. Among the recommendations is increasing women's access to continuous labor and delivery support, which has been shown to lower cesarean deliveries.[29]

Because there is an evidence base for continuous supportive care during the childbirth process, and a recommendation from two professional organizations[29] to expand the use of continuous care for birthing mothers, it is likely that these services will become more widespread. In national surveys of childbearing women in the United States, it is estimated that only three to six percent of women use doulas for support during childbirth (~240,000 out of ~4,000,000 births each year).[30] Moving forward, it will be important to monitor changes in practice and continue to evaluate the effectiveness of continuous one-on-one doula support, as it develops to include more women.

Despite the growing evidence base through studies on impacts of doula care,[22,23,25-28] there does not exist any national data on outcomes of doula-assisted births. This study provides a baseline report of outcomes associated with doula delivered care in

the United States. It is the first report to describe the characteristics of women who are cared for by doulas, as well as the impact of doulas on labor, birth, and immediate postpartum outcomes from a national sample, including data on African American, Hispanic, Asian, and Native American women. This study presents an opportunity to assess what doulas are doing well during the birthing process, and where there is room for improvement in the type and quality of care they provide. It additionally provides baseline data from which to compare any future studies as continuous labor support become more commonplace. Focusing concurrently on the quality of doula care, as well as on the context and outcomes of that care will establish a case for expanding doula-supported births in this country without diminishing its impact. This study will serve to inform future studies about doula-assisted births in order to improve the quality of maternity care for mothers and babies in the United States each year.

III. Methods

Data Collection

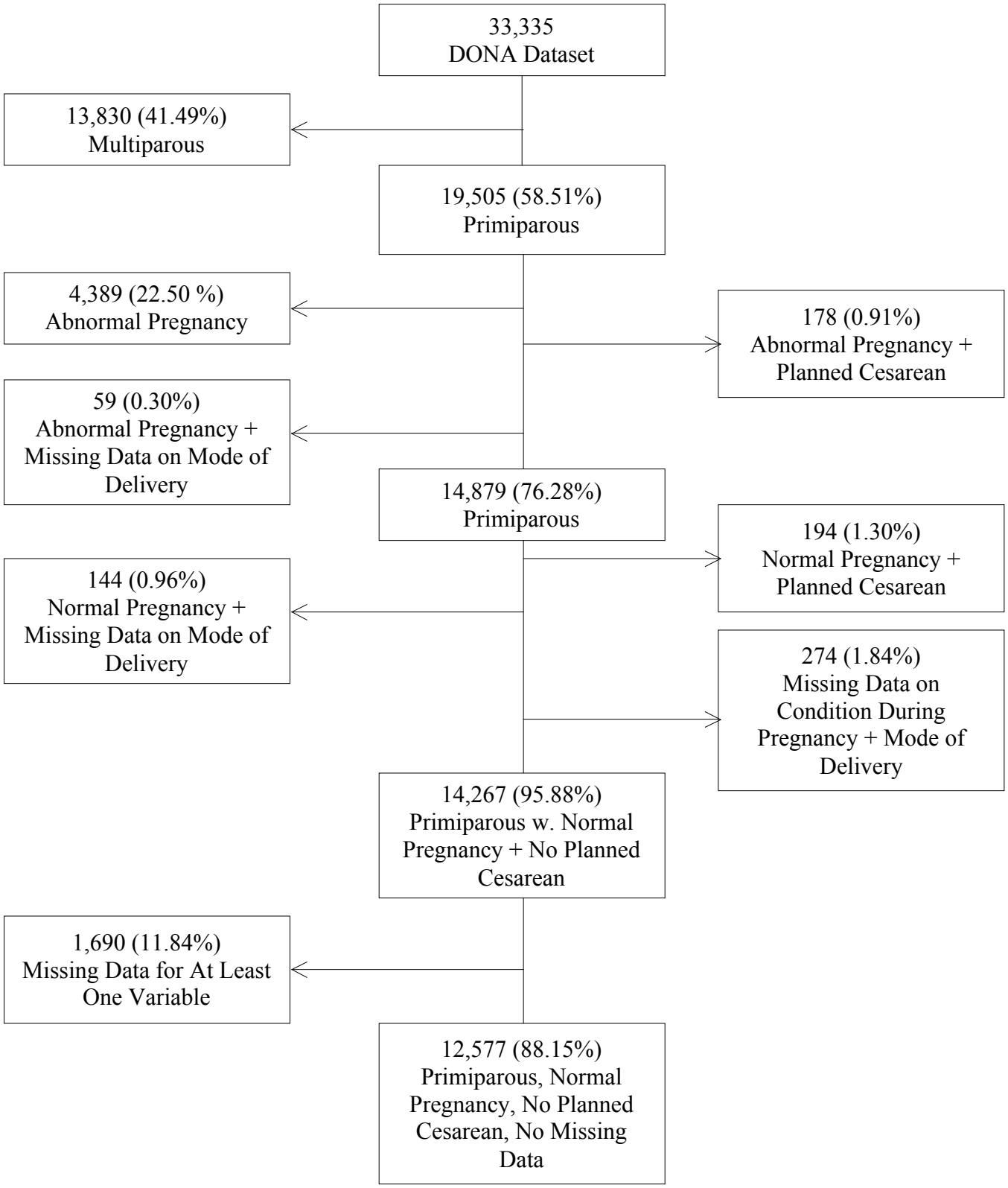
Data were collected by doulas registered with Doulas of North America (DONA) International, the largest doula organization in the United States. DONA currently has 6,688 members of which 2,344 (35.04%) are trained and certified doulas. Of the 2,344 trained and certified doulas, 1,947 (83.06%) practice in the United States, 325 (13.86%) in Canada, and 72 (3.07%) in other countries. Doulas received training from the organization's certified doula trainers and childbirth educators using standardized training materials. DONA trained and certified birth doulas use the paper-based DONA Birth Data Collection Form (Appendix), which contains 37 variables that describe

characteristics of birthing women, as well as labor, birth, and immediate postpartum outcomes. Doula participation in the submission of data collection forms to DONA is voluntary.

Inclusion and Exclusion Criteria

The study population comprised birthing women who received intrapartum care by DONA trained and certified birth doulas in hospitals, birth centers, or at home in the United States during the years from 2000 to 2013. Women who gave birth for the first time were included, whether carrying a singleton or multiple gestations. Exclusion criteria was no gestational diabetes, pregnancy induced hypertension, high-risk pregnancy, or other pregnancy complications. Women were also excluded if they did not give birth in the United States. Additionally, women were excluded if they delivered at gestational age <38 weeks or gestational age >42 weeks, and/or had planned cesarean delivery. Women with missing information for at least one variable were also excluded. As reported in Figure 1, of the 33,335 women that were delivered during the study period 12,577 (37.72%) were primiparous, with normal pregnancies, no scheduled cesareans, and no missing data for any variables.

Figure 1. Inclusion/Exclusion Flowchart



Data Analysis

Data was imported from SPSS into Stata version 13 for analysis. Descriptive statistics for comparison groups by ethnicity were calculated and frequency counts and percentages reported for all categorical variables. The only continuous variable was summarized with descriptive statistics (n, mean, standard deviation (SD), and confidence interval (CI)).

This study was stratified by maternal ethnicity and examined in two ways: first, characteristics of doula-assisted mothers and, second, outcomes of doula-assisted mothers during labor, birth, and the immediate postpartum period. Where possible, and unless otherwise stated, comparisons were drawn with national data from Births: Final Data for 2012, National Vital Statistics Report, Volume 63, number 1, which reported 3,952,841 births registered in the United States during that year.

IV. Results

Characteristics of Doula-Assisted Mothers

Maternal Race and Ethnicity

The ethnic composition of the study population is reported in Table 1,

Table 1. Maternal Race-Ethnicity Compared to Women Who Gave Birth in the United States

	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)
Study Population	75.53 (9,499)	6.56 (825)	9.30 (1,170)	4.17 (525)	0.96 (121)	3.47 (437)
United States[§]	52.92 (2,092,143)	16.04 (634,126)	22.9 (907,677)	6.90 (272,802)	1.16 (46,093)	

[§]Births by race and Hispanic origin of mother, 2012 (National Vital Statistics Report, Births: Final Data for 2012, Volume 63, number 1)

Maternal Age

Of the 12,577 women in the study population, the mean age of mother was 28.64 years (SD +/- 6.12, CI 28.53, 28.74), 2.84 years older than the United States mean age of mother at first birth, 25.8 years. Age of mother is reported in Table 2. Less than 10% of first time mothers were teenagers ranging in age from 13 to 19, with two mothers under age 13. The majority of birthing women, nearly one-third (31.33%), were between the ages of 30 and 34. Less than 0.01% of mothers were between the ages of 50 and 55.

Table 2. Maternal Age by Race/Ethnicity: DONA International, 2000-2013

Years	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)
11-14	0.24 (30)	36.67 (11)	‡	‡	‡	‡	‡
15-19	9.23 (1,161)	47.29 (549)	18.17 (211)	24.63 (286)	5.17 (60)	1.29 (15)	3.45 (40)
20-24	16.19 (2,036)	62.13 (1,265)	10.61 (216)	17.68 (360)	4.19 (100)	1.23 (25)	3.44 (70)
25-29	26.28 (3,305)	79.21 (2,618)	5.42 (179)	7.35 (243)	3.57 (118)	0.67 (22)	3.78 (125)
30-34	31.33 (3,941)	34.70 (3,296)	3.27 (129)	4.59 (181)	4.14 (163)	1.04 (41)	3.32 (131)
35-39	3.45 (1,692)	83.04 (1,405)	3.84 (65)	4.61 (78)	4.43 (75)	0.83 (14)	3.25 (55)
40-44	3.09 (389)	86.12 (335)	4.88 (19)	3.08 (12)	‡	‡	2.83 (11)
45-49	0.15 (19)	84.21 (16)	‡	‡	‡	‡	‡
50-55	‡	‡	‡	‡	‡	‡	‡

‡N = < 10

Childbirth Education

Overall, three quarters (74.99%) of all doula-supported mothers attended some form of prepared childbirth classes, as reported in Table 3. White women were most likely to have participated in childbirth education, followed by Native American, Asian, Other, Hispanic, and African Americans women. Comparable US data was unavailable.

Table 3. Childbirth Education by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)
Yes	74.99 (9,431)	81.65 (7,756)	48.85 (403)	49.74 (582)	65.71 (345)	69.42 (84)	59.73 (261)
No	25.01 (3,146)	18.35 (1,743)	51.15 (422)	50.26 (588)	34.29 (180)	30.58 (37)	40.27 (176)

Primary Birth Attendant and Place of Birth

The primary maternity care provider and place where doula-supported mothers gave birth are reported in Table 4. Obstetricians (68.09%) were the primary birth attendants of doula-supported mothers, followed by midwives (22.48%), and family practitioners (5.13%). Compared to the population of birthing women in the United States, doctors of medicine attended 85.8% of all United States hospital births, while midwives attended 7.6%, and doctors of osteopathy 6.0%. Across comparisons groups, one in four White and Native American mothers used midwives compared to mothers in other groups.

Overall, nine out of ten (89.54%) mothers who were assisted by a doula gave birth in a hospital, slightly lower than the overall number of mothers who gave birth in a hospital (98.6%) in the United States. Of out of hospital deliveries, mothers supported by a doula were ten times (10.43%) more likely to deliver in a birth center or at home compared to the general population of mothers with out of hospital deliveries (1.4%) in the United States.[11]

Table 4. Primary Birth Attendant and Place of Birth by Race/Ethnicity: DONA International, 2000-2013

Primary Birth Attendant	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)	United States %[§]
Obstetrician	68.09 (8,564)	67.18 (6,381)	72.00 (594)	65.73 (769)	75.62 (397)	66.94 (81)	78.26 (342)	85.8
Midwife	22.48 (2,827)	24.67 (2,343)	18.91 (156)	12.48 (146)	17.33 (91)	23.97 (29)	14.19 (62)	7.6

Family Practitioner	5.13 (645)	3.72 (353)	5.09 (42)	18.21 (213)	3.05 (16)	‡	3.43 (15)	
Combination	4.29 (539)	4.42 (420)	4.00 (33)	3.59 (42)	4.00 (21)	‡	4.12 (18)	
Other	‡	‡	‡	‡	‡	‡	‡	6.0
Place of Birth								
Hospital	89.54 (11,261)	89.09 (8,463)	89.94 (742)	90.85 (1,063)	91.62 (481)	85.95 (104)	93.36 (408)	98.6
Birth Center	7.73 (972)	7.97 (757)	8.97 (74)	6.58 (77)	5.71 (30)	10.74 (13)	4.81 (21)	0.36[§§]
Home	2.70 (340)	2.91 (276)	‡	2.56 (30)	2.67 (14)	‡	‡	0.82[§§]
Other	‡	‡	‡	‡	‡	‡	‡	

[§]Births: Final Data for 2012 (National Vital Statistics Report, Volume 63, number 1); [‡]N = < 10; [§§]Author calculated based on 50,000 out of hospital births (65.6% at home; 29.0% at free-standing birth center) from Births: Final Data for 2012 (National Vital Statistics Report, Volume 63, number 1)

Supportive Care During Childbirth

In addition to the care provided by a doula, nearly all mothers (95.6%) received some type of other supportive care during childbirth, as reported in Table 5. More than three in four (80.61%) women had the support of a husband. Across comparison groups, less than half (46.06%) of African American women were likely to be married, compared to more than half (62.91-85.70%) of women in other groups. African American women were more than four times as likely (3.78%) to be single and alone, compared to White women (0.83%).

Table 5. Supportive Care During Childbirth by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)
Husband Present	80.61 (10,138)	85.70 (8,141)	46.06 (380)	62.91 (736)	82.29 (432)	76.86 (93)	81.46 (356)
Husband Not Present	3.19 (401)	2.63 (250)	5.94 (49)	2.82 (33)	8.95 (47)	‡	3.43 (15)
Single with Male	5.73 (721)	4.27 (406)	14.06 (116)	13.08 (153)	2.86 (15)	‡	5.95 (26)
Single with Female	4.46 (561)	3.19 (303)	13.33 (110)	8.55 (100)	3.81 (20)	‡	4.81 (21)
Single with Both	4.80 (604)	3.38 (321)	16.97 (140)	10.26 (120)	‡	‡	2.97 (13)
Single Alone	1.19 (150)	0.80 (76)	3.64 (30)	2.39 (28)	‡	‡	‡
Other	‡	‡	‡	‡	‡	‡	‡

[‡]N = < 10

How Mothers Were Referred to Doulas and Paid for Doula-Assisted Care

The referral sources expectant mothers used for doula-supported care, as well as the payment method for doula services are reported in Table 6. More than half of all mothers were referred to the care of a doula by a source other (55%) than hospitals (36.78%), or DONA (8.22%). One in ten mothers had the support of a volunteer doula during childbirth, while more than half (58.40%) of all White mothers paid for doula care out of pocket. Hospitals covered the payment for doulas for more than half of African American (57.09%) and Hispanic (59.91%) mothers.

Table 6: Referral Source of Doulas and Payment of Doulas by Race/Ethnicity: DONA International, 2000-2013

	Overall	White	African American	Hispanic	Asian	Native American	Other
Referral Source	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
DONA	8.22 (1,034)	9.37 (890)	3.76 (31)	2.99 (35)	6.67 (35)	11.57 (14)	6.64 (29)
Hospital	36.78 (4,626)	32.07 (3,046)	51.03 (421)	60.0 (702)	44.38 (233)	28.93 (35)	43.25 (189)
Other	55.0 (6,917)	58.56 (5,563)	45.21 (373)	37.01 (433)	48.45 (257)	59.50 (72)	50.11 (219)
Payment Source							
Private Pay	51.21 (6,441)	58.40 (5,547)	22.30 (184)	23.25 (272)	40.95 (215)	46.28 (56)	38.22 (167)
Hospital	34.71 (4,366)	29.12 (2,766)	57.09 (471)	59.91 (701)	40.76 (214)	23.97 (29)	42.33 (185)
Volunteer	11.42 (1,436)	10.46 (994)	16.61 (137)	11.62 (136)	14.67 (77)	20.66 (25)	15.33 (67)
Third Party	1.41 (177)	1.04 (99)	‡	3.68 (43)	‡	‡	2.52 (11)
Other	1.25 (157)	0.98 (93)	3.03 (25)	1.54 (18)	2.29 (12)	‡	‡

‡N = < 10

Outcomes of Doula-Assisted Mothers

Medical Interventions During Labor

The medical interventions used by doula cared-for mothers are reported in Table 7. Less than one-quarter (23.15%) of women cared for by a doula were induced,

compared to 42% of first time mothers in the United States. [31] Across comparison groups, Asian mothers were most likely to be induced, followed by African American, White, Other, Hispanic, and Native American mothers.

Slightly more than one-third (35.08%) of doula-supported women were given Pitocin (synthetic oxytocin) to speed up or strengthen contractions after labor had begun. A little more than three in ten (36.26%) women had membranes artificially broken to release amniotic fluid to induce or speed up labor, compared to more than six in ten (65.0%) women in the general population of the United States.[31]

Epidural analgesia was the most widely used medication for pain relief amongst all doula-assisted mothers. Just over one-half (52.84%) of mothers used epidural, and of those, nearly half (23.77%), used epidural before 5cm, while just over half used epidural after 5cm (29.07%). Overall, doula mothers were less likely to use epidural than the general population of birthing mothers (59.0%) in the United States.[31] However, among comparisons groups, African American mothers had a higher rate of epidural use (62.28%) than all other doula-assisted mothers, as well as mothers in the general population of the United States.

Among comparison groups African American mothers were most likely to be induced, undergo artificial rupture of membranes, use epidural, IV medications, and/or some form of other medication than mothers in any other comparison group.

Table 7. Intrapartum Interventions by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)	United States %[§]
Induction								
No Induction	76.85 (9,666)	76.83 (7,298)	74.30 (613)	79.40 (929)	73.33 (385)	81.82 (99)	78.26 (342)	
Prostaglandin	10.17 (1,279)	10.20 (960)	10.67 (88)	6.41 (75)	17.90 (94)	11.57 (14)	8.92 (39)	

Pitocin	12.50 (1,572)	12.49 (1,186)	14.42 (119)	13.50 (158)	8.76 (46)	‡	12.59 (55)	
Cytotec	0.47 (59)	0.47 (45)	‡	‡	‡	‡	‡	
Combination	‡	‡	‡	‡	‡	‡	‡	
Total Induction	23.15%	22.69	25.09	19.91	26.66	18.18	21.51	42.0
AROM†								
No	63.74 (8,016)	64.90 (6,165)	57.45 (474)	60.17 (704)	59.81 (314)	74.38 (90)	61.56 (269)	
Yes	36.26 (4,561)	35.10 (3,334)	42.55 (351)	39.83 (466)	40.19 (211)	25.62 (31)	38.44 (168)	65.0
Augmentation								
No	64.61	65.51	60.48	63.93	6.95	59.50	60.41	
Augmentation	(8,126)	(6,223)	(499)	(748)	(320)	(72)	(264)	
Pitocin	35.08 (4,412)	34.14 (3,243)	39.52 (326)	35.81 (419)	38.67 (203)	39.67 (48)	39.59 (173)	
Other	0.31 (39)	0.35 (33)	‡	‡	‡	‡	‡	
IV Medication								
No	70.77 (8,901)	73.33 (6,966)	53.33 (440)	61.37 (718)	72.0 (378)	75.21 (91)	70.48 (308)	
Yes	29.23 (3,676)	26.67 (2,533)	46.67 (385)	38.63 (452)	28.0 (147)	24.79 (30)	29.52 (129)	
Other Medication								
No	11,671 (92.80)	8,837 (93.03)	748 (90.67)	1,083 (92.56)	493 (93.90)	112 (92.56)	398 (91.08)	
Yes	906 (7.20)	662 (6.97)	77 (9.33)	87 (7.44)	32 (6.10)	‡	39 (8.92)	
Epidural								
No Epidural	47.17 (5,932)	47.27 (4,490)	37.82 (312)	57.78 (676)	41.14 (216)	47.93 (58)	41.19 (180)	
Before 5cm	23.77 (2,989)	23.58 (2,240)	28.48 (235)	18.21 (213)	30.10 (158)	17.36 (21)	27.92 (122)	
After 5 cm	29.07 (3,656)	29.15 (2,769)	33.70 (278)	24.02 (281)	28.76 (151)	34.71 (42)	30.89 (135)	
Total Epidural	52.84 (6,645)	52.73 (5,009)	62.28 (513)	42.23 (494)	58.86 (309)	52.07 (63)	58.81 (257)	59.0

§ Births: Final Data for 2012 (National Vital Statistics Report, Volume 63, number 1); ‡N = < 10; †AROM: artificial rupture of membranes

Mode of Delivery

Mode of delivery for doula-assisted mothers is reported in Table 8. More than seven in ten women (73.7%) had a natural spontaneous vaginal birth, compared to less than seven in ten women (67.05%) in the general birthing population in the United States.

Compared to the overall national cesarean rate (32.8% planned/unplanned), doula-assisted mothers were nearly half as likely to deliver by cesarean (18.09%).

Rates for cesarean delivery varied by race and ethnicity. White women (17.9%) with doula care were 1.8 times less likely to undergo cesarean delivery than comparable women (32.3%) in the national population of birthing mothers. African American women (22.3%) with doula support were 1.6 times less likely to deliver by cesarean than comparable population of women (35.8%) in the national population. Hispanic women (15.73%) with doula care were two times less likely to deliver by cesarean than Hispanic women (32.2%) in the national population.

Forceps and vacuum assisted vaginal births (8.61%) in doula mothers were more than double that of mothers giving birth in the United States (3.94%). However, use of forceps and vacuum have declined in the overall United States population of birthing women as cesarean rates rose. In 1990, when data on forceps and vacuum extraction became available, they were used in 9.01% of births.[11]

Native Americans mothers were more likely to have a vaginal birth (87.61%), followed by Hispanic (84.28%), White (82.21%), Asian (80.19%), Other (79.86%), and African American (77.7%) mothers.

Table 8. Mode of Delivery by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)	United States %[§]
Spontaneous Vaginal	73.70 (9,219)	73.73 (7,004)	68.61 (566)	76.50 (895)	68.95 (262)	75.21 (91)	68.88 (301)	67.05
Forceps/ Vacuum	8.61 (1,083)	8.37 (795)	9.09 (75)	7.78 (91)	11.24 (59)	12.40 (15)	10.98 (48)	3.94
C/S Unplanned[†]	18.09 (2,275)	17.90 (1,700)	22.30 (184)	15.73 (184)	19.81 (104)	12.40 (15)	20.14 (88)	32.8[§§]

[§] Births: Final Data for 2012 (National Vital Statistics Report, Volume 63, number 1); [†]C/S Unplanned: cesarean delivery unplanned; [§§]Planned and unplanned cesarean delivery

Immediate Postpartum Outcomes

Immediate postpartum outcomes for infants of doula-supported mothers are reported in Table 9. Birth outcomes were normal for more than nine in ten (93.98%) infants. Hispanic infants were more likely to have better outcomes, followed by White, Asian, Other, African American, and Native American infants.

More than one-third (38.62%) of babies spent less than 30 minutes during the first hour immediate postpartum with mothers. Hispanic babies (58.03%) and African American babies (50.18) spent less than 30 minutes during the first hour with mothers compared to White babies (35.69%). White babies (35.69%) were slightly less likely to spend 30 minutes with mothers during the first hour postpartum than Asian (31.05%) and Native American (32.23%) babies.

Table 9. Immediate Postpartum Outcomes by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)
Infant Outcome Normal							
Yes	93.98 (11,820)	94.0 (8,929)	91.52 (755)	96.24 (1,126)	94.10 (494)	91.74 (111)	92.68 (405)
No	6.02 (757)	6.0 (570)	8.48 (70)	3.76 (44)	5.90 (31)	8.26 (10)	7.32 (32)
Infant w/ Mother <30 minutes[†]							
Yes	38.62 (4,857)	35.69 (3,390)	50.18 (414)	58.03 (679)	31.05 (163)	32.23 (39)	39.36 (172)
No	61.38 (7,720)	64.31 (6,109)	49.82 (411)	41.97 (491)	68.95 (362)	67.77 (82)	60.64 (265)

[†]Infant spent <30 minutes with mother during first hour immediate postpartum

Breastfeeding

Breastfeeding initiation among mothers with doula support is reported in Table 10. Doula mothers initiated breastfeeding early postpartum (80.78%) slightly more than

the general population of mothers (76.5%).[32] Although the beginning postpartum period is a critical time for establishing and supporting breastfeeding, there is no further information about whether doula-supported mothers continued to breastfeed beyond this point.

Among comparison groups, White mothers were more likely than any other group to begin breastfeeding, followed by Other, Native American, Hispanic, Asian, and African American mothers. White mothers were 1.25 times more likely to initiate breastfeeding than African American mothers.

Table 10. Breastfeeding Initiation by Race/Ethnicity: DONA International, 2000-2013

	Overall % (N)	White % (N)	African American % (N)	Hispanic % (N)	Asian % (N)	Native American % (N)	Other % (N)	United States %¶
Yes	80.78 (10,160)	82.84 (7,869)	65.82 (543)	76.58 (896)	79.05 (415)	76.86 (93)	78.72 (344)	76.5
No	19.22 (2,417)	17.16 (1,630)	34.18 (282)	23.42 (274)	20.95 (110)	23.14 (28)	21.28 (93)	

¶The percent of United States infants who began breastfeeding, 2010 (Breastfeeding Report Card, United States/2013, Centers for Disease Control and Prevention)

V. Discussion

It was expected that these findings provide strong evidence that doula-supported primiparous mothers with low-risk pregnancies are more likely to have decreased medical interventions, including cesarean deliveries, and higher rates of breastfeeding during early postpartum with respect to the national population of birthing mothers. Results from this study confirmed clear benefits and no adverse effects of continuous labor support, which is concordant with those from the Cochrane review and other studies of doula-assisted care during the birthing process. However, the considerable degree to which continuous support was effective in reducing the likelihood of cesarean delivery in the study population was unexpected.

Overall, first time mothers were 50% less likely to deliver by cesarean, compared to birthing mothers in the United States. More than three quarters (82.31%) of doula mothers, and more than three-quarters (75%) of doula mothers of different races and ethnicity, had a vaginal birth. When compared to vaginal births (70.99%) in the national population, doula-supported mothers had significantly better birth outcomes. Additionally, the effectiveness of continued support signifies doula mothers were nearly 50% less likely to undergo induction and artificial rupture of membranes, less likely to have epidural analgesia, and more likely to initiate breastfeeding during early postpartum than the general population of birthing mothers in the United States.

The positive correlation between continuous doula support and the birthing process for primparous women in this study indicates doulas might play a role in increasing equity for all mothers in maternity care environments. Doulas might also play a role in decreasing inequities in primary cesarean rates among all mothers. Decreased medical interventions were significant among doula mothers of different races and ethnicities compared to the overall national population, with the exception of epidural analgesia for African American mothers. African American mothers had a higher epidural rate than mothers in comparison groups, as well as the national rate, even with doula support. There is need here for further investigation.

While study findings of the effects of continuous one-to-one support by doulas are encouraging for all women giving birth in the United States, African American, Hispanic, Asian, Native American, and Other mothers did not fare as well as White mothers. These results parallel national trends. Although education and income level of mother were not documented in the dataset, the majority of White women paid out of pocket for doula

care, while hospitals paid for doula care for the majority of African American and Hispanic women. This suggests that the doulas only began care with these mothers at the time of labor and delivery, and not during the last trimester of pregnancy, which is recommended. Future studies could provide a better understanding of doula demographics in the United States.

Many factors may contribute to the differences in medical intervention and cesarean rates for all mothers. Though purely speculative, reasons to examine include whether doulas are hampered from providing optimal care to all birthing mothers because of the known differences in policies and protocols across hospitals, practices, and maternity care providers from state to state, and within states. The effectiveness of type and quality of doula care might vary depending on whether doulas are paid by hospitals, are community- or hospital-based volunteers, or are privately paid by women who can afford to engage them earlier. In some environments, maternity care teams might be unfavorably biased against doulas, preventing the best outcomes that these paraprofessionals can accomplish for birthing mothers. Though unintentional, the level and quality of continuous labor support doulas provide might vary for mothers of different races and ethnicities, and different socioeconomic levels. Further research about the type and quality of care doulas provide and the settings in which they provide continuous labor support is warranted to understand differences in racial and ethnic outcomes of doula-assisted birth.

Strengths of this study include a relatively large, multi-ethnic study population, geographic diversity of doulas contributing data, data collection over a period of 13 years, and no incomplete data for variables in the study population. One limitation of this

study is that all women chose to have a doula, introducing selection bias into the study. Women opting to have a doula are likely to differ from women who did not. However, while these women might differ from women who do not choose to have a doula rendering this study unable to generalizable to the population at large, it is difficult to come to any conclusion since the estimate of women using a doula in the United States is small (about 6%). Another limitation of this study is that because obstetric care practices differ across hospitals, practices, and maternity care providers from state to state, and within states, the positive effects associated with doulas might be underestimated.

VI. Conclusion

Significant evidence indicates that trained and certified doulas can have a positive impact on the birth experience for low-risk primiparous mothers in the United States. With the recent recommendation from American College of Obstetricians and Gynecologists and the Society of Maternal-Fetal Medicine to expand the use of supportive care throughout labor to safely lower the primary cesarean rate in the United States, it is likely that there will be an increase in the number of practicing doulas nationwide in the years ahead. However, in order to transform doula support into a prominent feature of maternity care in the United States, a considerable amount of research remains outstanding. Studies about doula care, the women who use doulas, and the propensity of women who might be inclined to use a doula would help to close gaps in the literature.

With roughly six percent of birthing mothers in the United States assisted by doulas during childbirth, there exists a need to establish what expectant mothers know

about doulas and the benefits associated with doula care in order to correct misconceptions, dispel myths, and educate the general population about the positive effects of continuous labor support. Research that provides a geographic census of practicing doulas might help to establish regions of the country where there is an unmet need for doula care. Studies that describe the characteristics of women who would choose doula-supported care during childbirth, but face barriers accessing such care could provide insight into increasing equity in maternity care. Similarly, research that examines barriers to acquiring doula training and certification could identify why there aren't more practicing doulas in the United States. Though costly, time consuming, and logistically cumbersome, a randomized control trial of a nationally representative sample of women with and without a doula in an optimal maternity care environment might be warranted to hone in on the pure effects of doula-supported care across all ethnic groups. Results might clarify if the impact of continuous support has been under or overestimated.

Evidence from these studies could further bolster the demand for doulas in birthing environments, and also be instrumental in assessing future implementation challenges for hospitals, practices, and certifying doula organizations. Strategizing how to provide the infrastructure for supportive care, and how to scale up and deliver a high level of quality care without diluting or sacrificing positive labor and delivery outcomes associated with doula care will need to be well thought out and monitored—both quantitatively and qualitatively.

Increasing the exposure of childbearing women to the safe, effective, and supportive care provided by doulas throughout labor has the potential to reduce unnecessary medical interventions while simultaneously enhancing immediate and

lifelong positive impacts on the health and well-being of mothers and infants. Developing systems and protocols of maternity care that include doula support could conceivably help to reduce the poor birth outcome rates currently experienced in the United States.

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Acknowledgements

I am grateful to Doulas of North America (DONA) International for making this primary dataset available to me for analysis. DONA is responsible for the original data only, and not for any content of this publication.

I am also grateful to the following individuals for their valuable input during the research, learning, and writing process of this master's paper.

Dr. Vijaya Hogan
Clinical Associate Professor, Department Of Maternal And Child Health

Merry-K Moos, BSN, MPH, FAAN
Adjunct Professor, Department of Obstetrics and Gynecoloty

Dr. Jon Hussey
Research Assistant Professor, Department of Maternal and Child Health

Barbara A. Hotelling, MSN, WHNP, CD (DONA)

The Odum Institute and staff were an important resource for their computer software guidance.

Appendix

Birth Doula
Data Collection Form

Please answer all applicable items in each category. Use one form per birth. Make copies of this form for additional births. Mail or fax the completed form to:

DONA International, 35 East Wacker Drive, Suite 850, Chicago, IL 60601 or fax to 312-644-8557

Your signature implies that, to the best of your knowledge, you have supplied accurate information. Thank you for your efforts to collect data on birth doula support. This form is for data only. Birth stories cannot be entered.

REFERRAL SOURCE
____ DONA International
____ Hospital
____ Other

PAYMENT
____ Private pay
____ 3rd party reimbursement
____ Volunteer
____ Hospital
____ Other

CLIENT RACE
____ African American/Black
_____Asian
____ Caucasian/White
____ Native/Indigenous
____ Mixed (2 or more)
____ Other

CLIENT ETHNICITY
____ Hispanic or Latino (any race)
____ Not Hispanic or Latino

MOTHER'S INFORMATION
_____Married
____ Single
Age_____
Pregnancy #_____
Birth #_____

ATTENDED BY
____ Partner/baby's father
____ Family member(s)
____ Friend(s)
____ Unaccompanied

PLACE OF BIRTH
____ Home
____ Hospital
____ Birth Center
____ Other

CAREGIVER
____ Midwife
____ OB doctor
____ Combination
____ Family practice doctor
____ Unattended

PREGNANCY
____ Uncomplicated
____ Gestational diabetes
____ Pregnancy induced hypertension (PIH)
____ Gestation < 38 weeks
____ Gestation > 42 weeks
____ High risk
____ Other

CHILDBIRTH EDUCATION CLASSES
(past or present)
____ Yes
____ No

LENGTH OF LABOR
____ As perceived by mother (hours)
____ Hospital admission to birth (hours)
____ Doula's labor hours

INTERVENTIONS
____ Induction
____ Artificial rupture of membranes
____ Pitocin augmentation
____ Doppler (auscultation)
____ Electronic fetal monitoring
___continuous ___intermittent
____ IV fluids
____ Other

MEDICATIONS
____ Pain medications (IV/IM)
____ Epidural before 5 cm
____ Epidural after 5 cm
____ Other
____ Mother's desire for pain medication before birth based on scale of 1–10
1=No meds 10=Full meds

METHOD OF BIRTH
____ Spontaneous vaginal
____ Forceps/vacuum
____ Planned cesarean birth
___Previous cesarean
___High risk status
___Postdates
___Large baby
___Maternal choice
____ Unexpected cesarean birth
___Failed VBAC attempt
___Failed induction
___Fetal distress
___Maternal distress
___Other_____
____ Vaginal birth after cesarean

BABY OUTCOME
____ No immediate health concerns
Birth weight:_____lb_____oz/_____g
____ With mother less than 30 minutes in first hour
____ Premature
____ Stillbirth/demise
____ Intensive care (NICU)
____ Breastfeeding

DOULA'S NAME (PRINT) _____ DOULA'S ZIP/POSTAL CODE _____

CD(DONA) WHILE WORKING WITH THE CLIENT? _____YES _____NO

DOULA'S SIGNATURE _____ DATE _____

Revised 10/09