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Original Research

Evaluation of a Student-Nurse Doula Program: An Analysis of Doula Interventions and Their Impact on Labor Analgesia and Cesarean Birth

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Introduction: The aim of this study was to describe specific doula interventions, explore differences in doula interventions by attending provider (certified nurse-midwife vs obstetrician), and examine associations between doula interventions, labor analgesia, and cesarean birth in women receiving doula care from student nurses.

Methods: A secondary analysis of data from the Birth Companions Program at the Johns Hopkins University School of Nursing was conducted using *t* tests, chi-square statistics, and logistic regression models.

Results: In the 648 births in the sample, doulas used approximately 1 more intervention per labor with certified nurse-midwife clients compared to obstetrician clients. In multivariate analysis, the increase in the total number of interventions provided by doulas was associated with decreased odds of epidural (adjusted odds ratio [AOR] 0.92; 95% confidence interval [CI], 0.86-0.98) and cesarean birth (AOR 0.90; 95% CI, 0.85-0.95). When examined separately, a greater number of physical interventions was associated with decreased odds of epidural (AOR 0.85; 95% CI, 0.78-0.92) and cesarean birth (AOR 0.80; 95% CI, 0.73-0.88), but number of emotional/informational interventions was not.

Discussion: Student nurses trained as doulas have the opportunity to provide a variety of interventions for laboring clients. An increase in the number of interventions, especially physical interventions, provided by doulas may decrease the likelihood of epidural use and cesarean birth.
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INTRODUCTION

Doulas are trained to provide continuous, nonmedical emotional and physical support during labor, birth, and the immediate postpartum period. Review of recent and classic research reveals that women who receive doula support are less likely to have cesarean births,[1,2] operative vaginal birth,[3] induction with oxytocin,[2] or epidural anesthesia[1,2,4] compared to women without doula care. They also are more likely to have shorter total length of labor,[1,5,6] shorter second stage of labor,[3] early breastfeeding initiation,[7] and to express satisfaction with their birth experiences and report positive feelings about themselves as women.[4,8] These results have been demonstrated for clients across a spectrum of racial and socioeconomic backgrounds.

Despite the many benefits of doula care, hiring a doula can be cost-prohibitive for many women.[5] Some may be fortunate enough to give birth to their newborns at institutions where professional doula services are available as a standard of care,[9] but organizations such as these are relatively rare. One method for increasing access to doula care is training student nurses to serve in this role. Saxell et al[10] discuss student satisfaction in 3 innovative programs in British Columbia involving medical, nursing, and midwifery students in labor support. No literature has been found examining maternal and neonatal outcomes related to the care provided by health care professional students serving as doulas. The purpose of this article is to describe a program in which nursing students are trained as doulas and the specific interventions provided by the student nurse doulas and their associations with birth outcomes.

THE BIRTH COMPANIONS PROGRAM

The Birth Companions Program (BCP) at the Johns Hopkins University School of Nursing was developed by faculty member Marion D'Lugoff in 1999 at the suggestion of student nurses who desired to provide free, continuous labor support to low-income women in East Baltimore. Over the past decade, the program has been further developed by faculty members Dr. Elizabeth Jordan and Shirley Van Zandt. Sixty students are trained annually, serving women throughout the greater Baltimore metropolitan area.

All students at the Johns Hopkins University School of Nursing have the opportunity to participate in the BCP, which is offered as an elective course titled Community Perspectives on the Childbearing Process. Students receive 24 hours of training, including 20 hours of instruction from an educator certified by the doula association DONA International and 4 hours of didactic instruction focusing on the role of the doula in the health care team. After completing the training, birth companions must complete a prenatal visit with a client, attend the labor and birth, complete a postpartum visit, and document the outcomes in a client record to receive course credit. Students then may continue working as birth companions in a voluntary capacity. Some students go on to become certified doulas, and many pursue graduate studies in

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women's health, training to become nurse-midwives or nurse practitioners.

Women in the community self-enroll in the BCP after being referred by their providers, friends, childbirth educators, or because of previous experience with the program. Student leaders for the BCP speak with potential clients and match them with 2 birth companions. This is done to increase the likelihood that at least 1 birth companion will be available for the labor and birth, because birth companions must balance their role as doulas with other school obligations.

The records collected by the birth companions are entered into a database that was developed for statistical purposes in order to monitor program outcomes and apply for program support through grant funding. Several trends have been noted over the years of the program. Although initiated as a program for women of lower socioeconomic status, the income and education level of the clients has increased over the years. For the first several years of the program, African American women comprised approximately 50% of clients. There has been an increase in Latina and white clients since 2004 and 2008, respectively. Over the years, the only trend noted in doula care has been an increase in the number of birth companions reporting that they provide water, juice, or other beverages for their clients. No trends have been seen in fetal monitoring, intravenous (IV) analgesia use, epidural rate, vaginal birth after cesarean, or rate of cesarean birth. The data from the BCP were previously analyzed to find factors associated with epidural use among clients.[11] In adjusted analysis, women with shorter labors and those who received 6 or more complementary interventions (eg, massage, cold/hot packs, counter pressure) from birth companions were less likely to have an epidural during labor.

Over the course of 10 years, the program has provided doula care for 724 clients. This article describes a program evaluation initiated to provide feedback to birth companions about the program, identify differences in the type of doula care they provide to their clients with respect to attending provider, and determine areas of need for additional training and changes to the program. The specific aims for this evaluation were 1) to describe the care provided by the birth companions in terms of specific interventions, 2) to determine whether the number or types of interventions provided by birth companions during labor differed by provider type, and 3) to determine whether the number or types of interventions provided by birth companions during labor impacted the rate of IV analgesia, epidural anesthesia, or cesarean birth.

METHODS

Design

A secondary analysis of the BCP data was conducted using a convenience sample of records from the BCP database. Inclusion criteria for the evaluation were records of births in which a birth companion was both present for the labor and birth and completed an intervention checklist, and the birth was attended by a midwife or obstetrician. The investigators were granted an opinion of exemption for use of existing data without subject identifiers by the Joint Committee on Clinical Investigation at the Johns Hopkins University.

Data Collection and Management

Birth companions interview clients during a prenatal visit and record current pregnancy risk factors and obstetric history on a data collection form. During labor and birth, birth companions record additional information about labor progress and observe medical interventions and document doula interventions using a checklist of common labor support activities; the birth companions do not have access to client medical records. Data for each client are kept in a separate folder and entered into the program database by student leaders. Client confidentiality is maintained by de-identifying client records and keeping paper records in a locked cabinet. In 2008, a student leader reviewed all the paper records, verifying consistency with the database and addressing discrepancies. Prior to initiating the current analysis, we explored variables of interest for outliers and missing data, which were recovered by checking the original records. Additionally, 10 records were selected randomly and checked for consistency with the database to ensure data quality.

Variables

The variables selected for this evaluation include type of provider, interventions used by the birth companions, IV analgesia use, epidural use, and mode of birth. These variables were selected to meet study goals and because many clients of the BCP express a desire for an unmedicated vaginal birth. Type of provider was defined as either certified nurse-midwife (CNM) or obstetrician. Birth companions have been present at births attended by a family practice physician, but this represented less than 3% of the birth records. This small size was insufficient to achieve adequate power when results were stratified by provider type; therefore, these records were not included in the analysis.

There are 22 commonly used interventions that birth companions can record on the checklist, plus space to document other labor support provided. The birth companion records on the checklist that she either did or did not use the intervention with the client at some time during the labor and birth. For example, a birth companion who reports that she used eye contact and the double hip squeeze and eased the client's fears during labor provided a total of 3 interventions. The mean number of interventions is an average of the tallies of the total number of different interventions used by birth companions with their clients. Interventions are further categorized as either physical or emotional/informational. Descriptions of the interventions are provided in Appendix 1.

Pain medication was assessed by examining IV analgesia and epidural use; both variables are dichotomous. Intravenous analgesia includes medications administered during labor for pain relief. Epidural anesthesia includes any type of epidural administered for pain relief. For clients using IV analgesia, the client may have received the medication once or in multiple doses.

Mode of birth was classified as vaginal or cesarean. Although the database includes information on use of forceps or vacuum, only 36 births involved a vacuum, and 25 births involved forceps. These low numbers did not provide adequate power to stratify vaginal births into operative vaginal

and nonoperative vaginal; therefore, both operative and nonoperative vaginal births were coded as vaginal births for the analysis.

Sample Size and Power

Post hoc power analysis revealed that the sample size (N = 648) was adequate to detect the odds ratios (OR) that were found in the statistical analysis with at least 80% power at the 0.05 alpha level for all analyses.

Analysis

Statistical software package STATA version 11.0[12] was used to analyze the data. Descriptive statistics were used to characterize the sample by age, education level, income level, race, and obstetric risk factors, including gestational hypertension, gestational diabetes, intrauterine growth restriction, multiple pregnancy, preterm labor, smoking, and drugs/alcohol. For aims 1 and 2, differences by provider type were analyzed using *t* tests and chi-square statistics. Data exploration revealed that the number of interventions used per birth was normally distributed across the sample, but that variances were unequal when the 2 provider groups were compared ($P = .01$). Therefore, a *t* test for unequal variances was used to examine the difference in mean total number of interventions comparing the obstetrician and CNM groups. Analysis of dichotomous outcome variables for aim 3 (ie, IV analgesia, epidural, cesarean birth) was completed with logistic regression. In bivariate analysis, the relationship between mean number of interventions and outcomes of interest was examined. To account for the number of statistical tests, a Bonferroni correction was used to determine statistical significance. Mode of birth, type of provider, history of previous cesarean birth, vaginal birth after cesarean, obstetric risk factors, and parity were then tested separately in regression models for their individual impact on outcome variables. Those that were found to be significant predictors of the outcome variables were retained in multivariate analyses, along with age, race, income, and education.

RESULTS

Of the 724 records in the database, 20 were excluded because the clients were attended by a family practice physician, and another 20 were excluded because the record contained no information about provider type. Further exploration revealed that birth companions were not present for 13 of the births. Reasons for not being present included not receiving notification from the client that she was in labor, educational obligations, and emergency cesarean birth. After we excluded these records, 671 records remained. For 23 of these records, the intervention checklist was not among the records provided by the birth companion. These records were removed from the analysis, resulting in a final sample size of 648 birth records. Of the 648 births in the sample, CNMs attended 226 (35%) and obstetricians attended 422 (65%). To determine sociodemographic and obstetric similarity across groups, characteristics of the clients in each group were compared; findings are presented in Table 1. Maternal age ranged from 14 to 45 years with a mean age of 28.7 years. There were no differences with respect to age ($t = 1.77$; $P = .08$), race (chi-square = 4.18; $P = .52$), or income level (chi-square = 4.92; $P = .18$) across groups. Education level was significantly different (chi-square = 11.78; $P = .02$), with obstetrician clients more highly educated compared to midwife clients. The groups were obstetrically similar with the exception of gestational hypertension and gestational diabetes, both of which were more prevalent in the obstetrician group.

Specific interventions provided by birth companions are presented in Table 2. Birth companions were significantly more likely to report incorporation of hydrotherapy, providing water or juice, and using double hip squeeze, ambulation, and/or a labor ball with CNM clients as compared to obstetrician clients. They were significantly more likely to report answering the client's questions with obstetrician clients as compared to CNM clients. There were no statistically significant differences in use of the remaining interventions by group, including following the client's wishes, which was reported by only 59% of the birth companions overall.

Overall, the mean (standard deviation [SD]) total number of interventions used per birth was 11.9 (3.7), with a range of 1 to 21. Birth companions used a mean (SD) of 12.5 (4.0) interventions with CNM clients and 11.6 (3.5) with obstetrician clients, a statistically significant difference ($t = -3.06$; $P = .002$). The mean (SD) number of physical interventions provided per birth was 4.7 (2.4). An average of 5.5 (2.6) physical interventions were used with CNM clients and 4.3 (2.2) with obstetrician clients; this difference was statistically significant ($t = -2.64$; $P = .009$). The mean (SD) number of emotional/informational interventions per birth was 7.2 (1.99), with an average of 7.0 (2.1) for CNM clients and 7.3 (1.9) for obstetrician clients. This difference was not statistically significant ($t = 0.83$; $P = .41$).

Pharmacologic pain management was used by 477 clients (73.6%). Only IV analgesia was used by 35 women (5.4%), only an epidural by 334 women (51.5%), and both IV analgesia and an epidural by 108 women (16.7%). A total of 143 women used IV analgesia, and 444 received an epidural. Birth occurred by cesarean for 141 women in the sample (21.8%).

Odds ratios (ORs) and adjusted odds ratios (AORs) depicting the relationships between increasing number of interventions and IV analgesia use, epidural use, and cesarean birth are presented in Table 3, with 95% confidence intervals (CIs). An increase in the total number of interventions used by birth companions did not significantly influence the likelihood of IV analgesia use among women in the sample; stratifying by physical or emotional/informational interventions also showed no difference. In bivariate analysis, decreased epidural use was significantly associated with an increase in total number of interventions (OR = 0.95; 95% CI, 0.91-0.99) and physical interventions (OR = 0.83; 95% CI, 0.78-0.90). After we adjusted for cesarean birth, provider type, parity, and demographic variables, the total number of interventions (AOR = 0.92; 95% CI, 0.86-0.98) and physical interventions (AOR = 0.85; 95% CI, 0.78-0.92) remained significantly associated with decreased epidural use.

In univariate analysis, increased total number of interventions (OR = 0.91; 95% CI, 0.87-0.96) and physical interventions (OR = 0.82; 95% CI, 0.75-0.89) were significantly associated with decreased odds of cesarean birth. Total

Table 1. Demographic and Obstetric Characteristics of Birth Companions Program Clients

	Overall (N = 648)	CNM (n = 226)	OB (n = 422)	Statistic	*P* Value
Maternal age, mean (SD), y	28.7 (6.4)	28 (6.2)	29 (6.5)	$t = 1.77$	.08
Maternal race, n (%)					
African American	251 (38.7)	85 (37.6)	166 (39.3)	$\chi^2 = 4.18$	.52
Hispanic	112 (17.3)	42 (18.6)	70 (16.6)		
White	145 (22.4)	56 (24.8)	89 (21.1)		
Asian	66 (10.2)	24 (10.6)	42 (9.9)		
Other	28 (4.3)	7 (3.1)	21 (5.0)		
Unknown	46 (7.1)	12 (5.3)	34 (8.1)		
Annual income, n (%), $					
<20,000	183 (28.3)	71 (31.4)	112 (26.5)	$\chi^2 = 4.92$	.18
20,000-50,000	116 (17.9)	39 (17.3)	77 (18.3)		
>50,000	236 (36.4)	71 (31.4)	165 (39.1)		
Unknown	113 (17.4)	45 (19.9)	68 (16.1)		
Education level, n (%)					
<12 years	107 (16.5)	49 (21.7)	58 (13.7)	$\chi^2 = 11.78$	.02
High school graduate	83 (12.8)	21 (9.3)	62 (14.7)		
Some college	105 (16.2)	39 (17.3)	66 (15.6)		
College graduate or more	314 (48.5)	100 (44.2)	214 (50.7)		
Unknown	39 (6.0)	17 (7.5)	22 (5.2)		
Obstetric risk factors, n (%)					
Gestational hypertension	45 (7.0)	6 (2.7)	39 (9.3)	$\chi^2 = 10.48$	.005
Gestational diabetes	34 (5.3)	5 (2.2)	29 (6.9)	$\chi^2 = 7.00$	.03
IUGR	5 (0.8)	1 (.5)	4 (.95)	$\chi^2 = 1.01$	.60
Multiple pregnancy	13 (2.0)	2 (.89)	11 (2.6)	$\chi^2 = 2.77$	.25
Preterm labor	41 (6.4)	9 (4.0)	32 (7.6)	$\chi^2 = 3.79$	.15
Smoking	28 (4.4)	11 (4.9)	17 (4.1)	$\chi^2 = 0.78$	.68
Drug and/or alcohol use	26 (4.0)	12 (5.3)	14 (3.3)	$\chi^2 = 5.69$	.06
Vaginal birth after cesarean	22 (3.4)	12 (5.3)	10 (2.4)	$\chi^2 = 3.86$	.05
Previous cesarean	35 (5.4)	13 (5.8)	22 (5.2)	$\chi^2 = 0.10$	.76

Abbreviations: CNM, certified nurse-midwife; IUGR, intrauterine growth restriction; OB, obstetrician.

number of interventions (AOR = 0.90; 95% CI, 0.85-0.95) and physical interventions (AOR = 0.80; 95% CI, 0.73-0.88) continued to be significant after we adjusted for provider type, parity, history of previous cesarean birth, vaginal birth after cesarean, and demographic variables. The number of emotional/informational interventions did not significantly impact epidural use or cesarean birth.

DISCUSSION

This analysis examined types of interventions used by birth companions, differences in the number and types of interventions stratified by attending provider, and the impact of the number of interventions on IV analgesia use, epidural, and cesarean birth. In this study, birth companions used an average of 12.5 interventions with CNM clients and 11.6 interventions with obstetrician clients. Birth companions provided approximately 1 more physical intervention per birth for CNM clients compared to obstetrician clients (5.5 vs 4.3). This difference was statistically significant and may have clinical implications. Physical interventions include activities such as ambulation, position changes, and hydrotherapy, which can positively impact labor by reducing pain, length of labor, and risk for operative birth.[13–15]

Birth companions reported using verbal encouragement, eye contact, continuous presence, easing the client's fears, answering the client's questions, and position changes with more than 80% of clients, but knee press and stomp-squat were used with less than 5%. This might indicate lack of comfort with or understanding of these techniques on the part of the birth companions. Birth companions reported following their client's wishes with only 59% of clients. Although an important role of the doula is to assist the client in achieving a fulfilling birth experience,[16] the ability to do so may be restricted by policies specific to the hospital or institution where the client gives birth. Focus groups with birth companions may be of use in further understanding why they report high use of certain interventions and low use of others.

Table 2. Types of Interventions[a] Used by Birth Companions by Attending Provider (N = 648)

Intervention, n (%)	Overall (N = 648)	CNM (n = 226)	OB (n = 422)	χ^2	*P* Value[b]
Verbal encouragement	638 (98.5)	222 (98.2)	416 (98.6)	0.12	.73
Continuous presence	592 (91.4)	210 (92.9)	382 (90.5)	1.07	.30
Eye contact	551 (85)	189 (83.6)	362 (85.8)	0.54	.46
Ease fears	546 (84.3)	178 (78.8)	368 (87.2)	7.9	.005
Answer client's questions	527 (81.3)	167 (73.9)	360 (85.3)	12.63	<.001
Position changes	518 (79.9)	184 (81.4)	334 (79.2)	0.47	.49
Breathing techniques	495 (76.4)	175 (77.4)	320 (75.8)	0.21	.65
Massage	493 (76)	174 (77)	319 (75.6)	0.16	.69
Discuss client's options	400 (61.7)	122 (54)	278 (65.9)	8.81	.003
Support client's partner	399 (61.6)	137 (60.6)	262 (62.1)	0.13	.72
Provide water/juice	383 (59.1)	161 (71.2)	222 (52.6)	21.14	<.001
Follow client's wishes	383 (59.1)	129 (57.1)	254 (60.2)	0.59	.44
Counter pressure	323 (49.9)	131 (58)	192 (45.5)	9.15	.002
Take photographs	304 (46.9)	107 (47.4)	197 (46.7)	0.03	.87
Cold/hot packs	292 (45.1)	96 (42.5)	196 (46.5)	0.94	.33
Reinforce birth ritual	216 (33.3)	90 (39.8)	126 (29.9)	6.58	.01
Ambulation	180 (27.8)	106 (46.9)	74 (17.5)	63.27	<.001
Double hip squeeze	126 (19.4)	66 (29.2)	60 (14.2)	21.10	<.001
Labor ball	113 (17.4)	64 (28.3)	49 (11.6)	28.53	<.001
Other	103 (15.9)	36 (15.9)	67 (15.9)	0.0003	.99
Hydrotherapy	88 (13.6)	71 (31.4)	17 (4)	94.07	<.001
Knee press	30 (4.6)	11 (4.9)	19 (4.5)	0.04	.83
Stomp-squat	20 (3.1)	10 (4.4)	10 (2.4)	2.08	.15

Abbreviations: CNM, certified nurse-midwife; OB, obstetrician.
[a] Types of interventions are described in Appendix 1.
[b] $P < .002$ used to determine statistical significance based on Bonferroni correction of $\alpha/23$.

Several of the interventions used by birth companions differed by provider type, and there are many possible explanations for this. Birth companions were more likely to report using hydrotherapy, water/juice, double hip squeeze, ambulation, and the labor ball with CNM clients. Freedom of movement in labor and unrestricted intake of food and fluids are considered to be part of normal birth,[17] and midwives traditionally embrace normal birth without routine interventions.[18] Birth companions may have been aware of this and, therefore, more likely to suggest these options to CNM clients.

Table 3. Odds Ratios of IV Analgesia, Epidural, and Cesarean Birth by Total Number of Interventions, Number of Physical Interventions, and Number of Emotional/Informational Interventions (N = 648[a])

	Total Interventions		Physical Interventions		Emotional/Informational Interventions	
Variable	OR (95% CI)	AOR[b] (95% CI)	OR (95% CI)	AOR (95% CI)	OR (95% CI)	AOR (95% CI)
IV analgesia	0.99 (0.94-1.04)	–	0.96 (0.89-1.04)	–	1.02 (0.93-1.12)	–
Epidural[c]	0.95 (0.91-0.99)	0.92 (0.86-0.98)	0.83 (0.78-0.90)	0.85 (0.78-0.92)	1.07 (0.99-1.16)	–
Cesarean birth[d]	0.91 (0.87-0.96)	0.90 (0.85-0.95)	0.82 (0.75-0.89)	0.80 (0.73-0.88)	0.98 (0.89-1.07)	–

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; IV, intravenous; OR, odds ratio.
[a] Twenty-nine records were missing parity data; sensitivity analysis demonstrated no difference in results when these records were excluded from analysis; therefore, all 648 records were retained.
[b] Only results found to be significant in univariate analysis were analyzed in adjusted analysis.
[c] Epidural adjusted for mode of birth, health care provider, parity, age, race, education, and income.
[d] Cesarean birth adjusted for health care provider, parity, history of previous cesarean birth, vaginal birth after cesarean, age, race, education, and income.

If fetal monitoring was performed intermittently, birth companions may have had more opportunity to incorporate hydrotherapy, ambulation, and hands-on techniques such as the double hip squeeze. Additionally, use of the labor ball may be a reflection of its availability at the facility where the birth took place. Labor balls are accessible to birth companions through the Johns Hopkins University School of Nursing, but it may not be convenient for the birth companion to obtain the ball prior to meeting her client in labor.

Birth companions were more likely to report answering the client's questions when working with obstetrician clients as compared to CNM clients; the reason for this result is unclear and may be an area for future research. The results presented are a reflection of the birth companions' assessments of their work, which may be subject to error and does not necessarily reflect the client's views or those interventions the client found to be helpful. Birth companions are encouraged to ask the client and her partner or other support provider to rate the helpfulness of the birth companion's interventions, but these data are not available for all births and, therefore, were not incorporated as part of the present analysis.

An additional explanation for differences in birth companion interventions by group may be a reflection of differences in the birth companions themselves and their philosophies of birth. Birth companions select the clients with whom they want to work but often without information as to the provider. The birth companions also come from a wide range of ages, backgrounds, and professional experiences. Also, although they have been referred to in the female sex throughout this article for the sake of convenience, there have been male birth companions. It would be interesting to see if differences in the birth companions accounted for variation in doula care. To date, these data have not been collected, but it may be valuable to add this information to the database in the future.

Odds of epidural use and odds of cesarean birth decreased with an increase in the total number of interventions and physical interventions in multivariate analysis. These findings suggest that as birth companions provide more interventions to their clients, the risk of epidural use and cesarean birth goes down, particularly when additional physical interventions are incorporated. Emotional/informational interventions did not impact IV analgesia, epidural use, or cesarean birth in this sample, but this result does not mean that these interventions are not important to clients. Qualitative interviews with clients of the BCP may help explain the impact and personal meaning of the physical, emotional, and informational interventions experienced during labor and birth.

This study provides useful information but has limitations. The accuracy of the data depends on careful documentation by each and every birth companion who attends a birth and by student leaders who enter the client records into the program database. Length of labor was not reported consistently enough to be of analytic use. Because length of labor may affect a client's decision to relieve pain with medication, a provider's decision to move forward with a cesarean birth, and the number of interventions used by the birth companions, the addition of this variable into the analysis could be important. This speaks to a need to educate newly trained birth companions about the purpose of data collection and to consider including definitions of the variables with the data collection forms. Additionally, the obstetric risk factors presented are based on client self-report. Lack of access to client medical records makes it impossible to verify risk status and events in labor such as induction or augmentation that could influence the findings of this study.

Finally, it is important to recognize that doula care for the women in the sample was provided by student nurses who are new to both the nursing and doula roles. Although students receive clinical and didactic training as doulas, the results may not be generalizable to care provided by more experienced professional doulas. This analysis also used a convenience sample of women from 1 geographic area. Trends in doula care, midwifery, and obstetric care may be different in other areas of the country, as may relationships between these team members.

CONCLUSION

The BCP has thrived for more than a decade thanks to the vision and support of student nurses and faculty coordinators. Student nurses trained as doulas have the opportunity to provide many interventions for laboring clients. Future studies like this may reveal additional benefits of doula care and provide greater insight into the effectiveness of training student clinicians to provide doula care. From this analysis, it appears that some doula interventions are more frequent among midwifery clients, perhaps because of a shared goal of woman-centered care to achieve a satisfying birth experience. Programs like the BCP may be a means of achieving a complementary relationship between doulas and providers in order to achieve the best outcome for women.

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CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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Appendix 1. Description of Birth Companions Program Interventions

Type of Intervention	Description
Physical interventions	
Massage	Directly touching or kneading the muscle to improve comfort and facilitate relaxation
Hydrotherapy	Assisting the client into a shower or bathtub
Water/juice	Providing water, juice, or other beverage
Position changes	Assisting the client in moving to improve comfort
Counter pressure	Physical pressure applied to alternate areas, often the lower back
Breathing techniques	Coaching the client in breathing during contractions
Double hip squeeze	Pressing on sacroiliac joints while the client is in a hands and knees or upright position
Knee press	Pressing the client's knees toward the pelvis while she sits upright or is side lying
Stomp-squat	Having the client stomp around during onset of contractions and squat at the peak
Ambulation	Having the client get out of bed and walk
Labor ball	Having the client use a labor ball to redistribute weight or alleviate pain by sitting or leaning on it
Cold/hot packs	Applying cold or heat to areas of discomfort
Emotional/informational interventions	
Eye contact	Establishing eye contact to assist the client in focusing during contractions
Take photographs	Taking photographs during labor and birth
Ease fears	Providing verbal information or encouragement to decrease the client's concerns
Verbal encouragement	Speaking encouraging words to the client
Continuous presence	Remaining in the room during most of labor and birth
Support client's partner	Encouraging the client's primary support person verbally
Reinforce birth ritual	Encouraging the client to follow through on planned rituals or decisions
Discuss client's options	Talking about options as they are presented
Follow client's wishes	Supporting the client's choices during labor
Answer client's questions	Providing information in response to the client's questions