
A Comparison of Labor and Delivery Management Between Nurse Midwives and Family Physicians

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Background. Practice associations between family physicians and nurse midwives have been suggested as a means to increase the availability of obstetric care in rural areas. No evidence exists, however, that family physicians and midwives have comparable practice styles or achieve similar outcomes in obstetric patients.

Methods. The study examines patients cared for by a co-practice of nurse midwives and family physicians at a rural hospital. Data were collected through a retrospective chart audit for all patients whose prenatal care, labor, or delivery was managed by members of the practice in 1990 and 1991.

Results. Few differences were noted between nurse midwives and family physicians in the management of labor or delivery. The only consistent finding was that family physicians were more likely than midwives to use an episiotomy for delivery (40% vs 30% in primiparous women, $P = .02$; and 20% vs 10% in multiparous women, $P = .007$). Despite seemingly similar management styles, primiparous women managed by

family physicians were more likely to undergo cesarean section (14% vs 8%, $P = .05$) resulting from the diagnosis of dystocia. When practice specialty was included in a logistic regression model with parity and the number of preexisting risk factors, the effect of specialty on cesarean sections remained significant with a relative risk of 2.79 for cesarean section if patients had their labor managed by a family physician ($P < .001$).

Conclusions. Family physicians and nurse midwives managed patients in labor similarly, but nurse midwives were more likely to achieve a vaginal delivery in primiparous women and do so without an episiotomy. Although the differences found would not interfere with a collaborative practice, subtle differences in patient management do exist. Further exploration of these differences may be helpful in understanding the impact of these differences on mixed-specialty practices.

Key words. Pregnancy, physicians, family; nurse midwives; cesarean section, comparative study.
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Similarities in the obstetric philosophies of family physicians and nurse midwives have led some to suggest that a natural allegiance should exist between these health care professionals.^{1,2} Others have suggested that co-practices between family physicians and nurse midwives may be an economical means of delivering obstetric care in underserved areas.^{3,4} However, there are only a few descriptions of successful alliances of midwives and family physicians.³

Forming alliances or co-practices between nurse midwives and family physicians raises issues of possible

differences in decision-making and obstetric outcomes. Evidence suggests that obstetric decision-making is non-uniform and that provider-related factors have an important impact on the care given to a patient. The effect of clinician-related variations in obstetric outcome has been shown most clearly for cesarean section rates.⁵⁻¹¹ Additional evidence suggests that obstetric care and outcomes may differ depending on physician specialty.¹²⁻¹⁴ Although recent evidence with a relatively unselected inner-city population in an academic setting did not demonstrate differences in cesarean section rates between midwives and obstetric house staff, these data did show that obstetricians performed episiotomies more frequently, used oxytocin augmentation more often, and supervised longer labors during which an increased fre-

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quency of major lacerations in patients occurred.¹⁵ These findings raise the possibility that shared obstetric philosophies between family physicians and nurse midwives may not necessarily translate into similar obstetric practices.

The exploratory study reported here was undertaken to determine if any differences occur in the management of labor and delivery or obstetric outcomes between patients managed by family physicians and those managed by nurse midwives. This natural experiment takes advantage of a unique co-practice involving family physicians and nurse midwives that was originally developed to offer perinatal services to an indigent population in northeast Kentucky. In this practice, patients see both nurse midwives and family physicians as well as nurse midwifery students and family practice residents. When patients go into labor, they receive their intrapartum care at the same hospital under the direction of a nurse midwife or family physician, depending on who is on call that day. Because the family physicians and nurse midwives rotate call, some patients are managed by a nurse midwife or midwifery student and some by a family physician or family practice resident. In general, the family physicians served as the principal backup for the nurse midwives, with an obstetrician providing primary backup for the family physicians and surgical services for both groups. Patients had little chance to select which provider would be on duty when they went into labor.

Methods

A random sample of charts from patients who received their care from the St Claire Medical Center primary care group and gave birth between January 1, 1990, and December 31, 1991, were reviewed.

Patients were selected by choosing a fixed number of charts from the patients whose infants were delivered during each month of the sampling period. Individual charts were selected based on computer-generated random numbers corresponding to the order in which patients gave birth during that month. Patients who did not receive their care at the St Claire Medical Center primary care group or who received elective repeat cesarean sections were excluded from the study. A total of 913 charts were reviewed, which represents 84% of all patients whose infants were delivered by the group during the study period. Because this study was part of a larger multisite study, with a fixed sample size from each participating hospital, this sample of charts of 84% of the patients was used rather than reviewing the chart of every patient.

The following data were collected from each chart:

patient demographics, medical and obstetric history, labor and delivery results, and the identity of the person who supervised labor and performed the delivery. The number of preexisting or intrapartum risk factors was determined using the Holister prenatal form (Holister, Inc, Libertyville, Ill). Diagnoses leading to cesarean section were determined from the operative summary by the surgeon performing the cesarean section. Thus, these diagnoses were made independent of the person supervising the labor.

Patients were categorized into two groups based on the specialty of the person who admitted the patient and initially cared for her during labor. Thus, patients who were initially managed by a nurse midwife either alone or in conjunction with a nurse midwife student were classified as midwife patients, whereas those who were initially managed by a family physician or family practice resident were classified as family practice patients. All crossover patients, ie, patients admitted by a member of one specialty but delivered by a member of the other specialty, were excluded from analysis. Cases in which a nurse midwife consulted with a family physician about an instrument-assisted delivery were not considered crossovers, and outcomes were assigned to the midwife group. A total of 27 patients from the midwife group and 20 patients from the family physician group were considered crossovers and were thus excluded. This left a final sample of 850 patients for analysis, 400 in the midwife group and 450 in the family practice group. This sample size provided a statistical power of 80% with an alpha of .10 for detecting a 50% difference in variables with an incidence of 10%, which is the previously reported cesarean section rate for family physicians at the institution under study.

Data analysis was performed using two-tailed Student's *t* test for normally distributed data and the Kruskal-Wallis *H* test for data not normally distributed. A two-tailed chi-square was used for categorical variables, with Fisher's exact test used when expected cells were less than 5. Because of the strong effect of parity on labor, delivery, and outcomes, all bivariate analysis was performed separately for primiparous and multiparous patients. Additionally, to study the adjusted effects of individual variables, stepwise logistic regression was performed using computer-determined introduction of variables with Epistat software.¹⁶ Independent variables in the regression model included provider specialty (nurse midwife or family physician), parity, and the total number of preexisting risks. The dependent variable for the regression model was the route of delivery (vaginal vs cesarean section).

Statistical significance was defined as an alpha of <.05.

Table 1. Demographic and Obstetric Characteristics of Patients

Patient Characteristics	Cared for by Midwives (n = 400)	Cared for by Family Physicians (n = 450)
Demographic factors		
Mean age, y (\pm SD)	22.6 (\pm 5.2)	22.9 (\pm 4.9)
Insurance status, %		
Private insurance	11	8
Medicaid/public	87	91
None	2	2
Married, %	74	72
Patient employed, %	18	15
Spouse employed, %	41	34
Obstetric factors		
Primiparous, %	46	41
Gestational age, wk (\pm SD)	39.8 (\pm 1.6)	39.8 (\pm 1.7)
Birthweight, g (\pm SD)	3804 (\pm 478)	3772 (\pm 662)
Meconium-stained fluid, %	23	17
Risk factors, %		
None	22	18
One	30	35
Two	28	24
Three or more	20	22

SD denotes standard deviation.

Results

Patients of the two groups were similar in age, marital status, and socioeconomic background based on the number of patients with insurance status or who were employed or had a spouse who was employed (Table 1). Patients in the two groups were also equally likely to be primiparous, had infants of similar gestational ages and birthweights, and had the same incidence of meconium-stained fluid or other risk factors.

When the management of labor was examined, several differences were found between the two groups of patients (Table 2). Multiparous patients managed by

Table 2. Management of Labor by Midwives and Family Physicians in Primiparous and Multiparous Patients

Labor Characteristics	Primiparous Patients		Multiparous Patients	
	Midwives (n = 185)	Family Physicians (n = 186)	Midwives (n = 215)	Family Physicians (n = 264)
Labor induced	18	24	13	13
Prostaglandin ripening	10	15	6	8
Augmentation	28	22	9*	17*
Amniotomy	59†	46†	54	55
Labor anesthesia				
None	7	6	35	30
Narcotic analgesia	78	75	58	57
Epidural	7	11	1	2

*P = .02.

†P = .01.

physicians were twice as likely to be given oxytocin augmentation during labor ($P = .02$), whereas primiparous patients managed by midwives were more likely to have an amniotomy. Otherwise, no differences were noted in the frequency of labor induction, use of prostaglandin gel, or use of intrapartum analgesia or anesthesia.

Management of delivery also showed some differences between the two groups (Table 3). Nurse midwives were less likely to use episiotomies for the delivery of primiparous ($P = .02$) or multiparous patients ($P = .007$) and were less likely to encounter a third or fourth degree laceration in the delivery of a multiparous patient. However, no differences were found in the length of the first or second stages of labor or neonatal complications.

Midwives and family physicians differed most significantly in the method of delivery (Table 4). Primiparous patients cared for by family physicians were more likely to be delivered by cesarean section than patients of nurse midwives ($P = .05$). When the diagnoses leading to cesarean section were examined for primiparous patients, it was found that similar numbers of patients in both groups had cesarean sections for malposition, fetal distress, and cephalopelvic disproportion. Patients of the family physicians, however, received cesarean sections for dystocia or failure to progress in labor more than three times as often as patients of the midwives. Furthermore, patients who had cesarean sections in the group managed by family physicians did so at a lower average cervical dilatation than those in the midwife group. Because of the small number of multiparous patients in both groups who had cesarean sections, analysis of diagnoses leading to cesarean section was not pursued further.

To adjust for the effects of other factors that have been shown to influence cesarean section rates, logistic regression was performed using specialty as one of the independent variables. Bivariate analysis showed that a statistically significant association existed between parity and cesarean section ($P = .001$) and the number of risk factors and cesarean section ($P = .002$). When a logistic regression model that included specialty, parity, and the number of risks was performed, specialty remained significant with an adjusted relative risk of cesarean section of 2.79 (95% confidence interval [CI], 1.61 to 4.83, $P < .001$) for family physicians compared with midwives. Parity also remained statistically significant with an adjusted risk of 0.58 (95% CI, 0.43 to 0.78, $P = .004$) for cesarean section with increasing parity. When adjusted for parity and specialty, the number of risk factors was no longer a statistically significant predictor of cesarean section.

Table 3. Management of Delivery of Primiparous and Multiparous Patients by Midwives and Family Physicians

Delivery Characteristics	Primiparous Patients		Multiparous Patients	
	Midwives (n = 185)	Family Physicians (n = 186)	Midwives (n = 215)	Family Physicians (n = 264)
Labor length (min)				
First stage (\pm SD)	453 (\pm 272)	498 (\pm 364)	309 (\pm 210)	357 (\pm 258)
Second stage (\pm SD)	49 (\pm 46)	54 (\pm 54)	16 (\pm 18)	20 (\pm 30)
Episiotomy	31	42	11*	20*
Laceration	9	11	1†	5†
1 min Apgar <6	6	6	4	3
5 min Apgar <6	2	1	<1	1
Neonatal ICU	5	4	4	4

SD denotes standard deviation; ICU, intensive care unit.

*P < .02.

†P < .01.

Discussion

Differing clinical management strategies between specialties are becoming increasingly recognized and are believed to account for wide variation in costs of care and utilization of technology.¹⁷ Previous reports have suggested that family physicians and obstetricians differ in their management of labor and delivery.^{14,18,19} In general, these prior studies showed that family physicians tended to use oxytocin less frequently both for induction and augmentation^{18,19} and were less likely to perform invasive interventions such as amniotomy, episiotomy, and instrument delivery.^{14,18-20} Family physicians also have been reported to have cesarean section rates that were approximately 33% less than the rates of obstetricians in the same institution.^{12,13}

Observations that nurse midwives and family physicians differ in the incidence of episiotomies and third or fourth degree lacerations, but otherwise manage labor

and delivery similarly, are consistent with observations in a prior study comparing midwives and obstetric residents.¹⁵ Compared with that study, data from the present study suggest that family physicians fall between the higher episiotomy rates of obstetricians and the lower rates of nurse midwives.

This study also showed a difference in cesarean section rates, especially for cephalopelvic disproportion or dystocia, between nurse midwives and family physicians. Previous studies have shown that the diagnosis of failure to progress in labor or dystocia can account for significant variations in cesarean section rates.^{11,12} Specifically, nurse midwives were found to be more likely to achieve a vaginal delivery of infants of primiparous patients. The difference in cesarean section rates in primiparous patients remained when adjusted for other factors that have been shown to influence cesarean section rates. Nurse midwives also had a lower cesarean section rate in mul-

Table 4. Method of Delivery Used by Midwives and Family Physicians in Primiparous and Multiparous Patients

Delivery Method Variables	Primiparous Patients			Multiparous Patients		
	Midwives (n = 185)	Family Physicians (n = 186)	P Value	Midwives (n = 215)	Family Physicians (n = 264)	P
Route of delivery						
Spontaneous vaginal	86	76	.01	98	92	NS
Vaginal, assisted	6	10	NS	1	2	NS
Cesarean section	8	14	.05	1	3	NS
Diagnosis for cesarean						
Cephalopelvic disproportion or dystocia	4.3	12.4	.001	—	—	—
Malposition	0.5	0	NS	—	—	—
Fetal distress	2.7	1.6	NS	—	—	—
Cervical dilation, cm (\pm SD)	6.1 (\pm 2.6)	4.3 (\pm 2.8)	.04	7.0 (\pm 4.2)	4.6 (\pm 3.1)	NS

NS denotes not significant; SD, standard deviation.

tiparous patients, but because of the overall low cesarean section rate in this population, the power to detect a statistically significant difference was low.

Since the objective criteria comparing the management of labor and delivery suggest that nurse midwives and family physicians are similar, it is not immediately clear why nurse midwives had lower cesarean section rates for dystocia than their physician colleagues. It is possible that more subtle clinical differences that were not measured in this study exist in the management of dysfunctional labor. These would include such maneuvers as the use of position changes in labor or patient massage—clinical skills practiced by midwives but infrequently used by family physicians. Additionally, nonclinical factors have been recognized as important influences on cesarean section performance, especially for the diagnosis of dystocia.^{11,21} In particular, continual emotional support has been shown to have a salutary effect on labor and to result in decreases in cesarean section rates.²² It is possible that midwives and family physicians in this study may have differed in the amount of time spent with patients and the amount of emotional support offered in labor and that this factor contributed to differences in delivery routes. Finally, patients cared for by nurse midwives were seen by a family physician consultant before being referred to an obstetrician for cesarean section; therefore, the additional time required to complete these consultations may have afforded the patient enough time to progress in labor and obviate the need for a cesarean section. The implication is that a large number of cesarean sections for dystocia could be avoided if patients were allowed to labor longer. Additional study of dystocia, including how and why practitioners make this diagnosis, and greater attention given to the clinical management of this problem may help determine the reason for the variation in cesarean section rates between family physicians and nurse midwives in this study.

Although these data demonstrate differences in birth outcomes between the two types of practitioners, it must be stressed that the results are based on the practices of a small number of physicians and midwives. In addition, although most patients had little choice over the type of provider who cared for them, patients were not randomly allocated. Some patients, particularly those who had elective inductions, were able to schedule their labor to coincide with an individual provider who would be available. The data would not allow a determination of how often this might have occurred. The issue of random allocation would be difficult to address in other trials, but larger studies with multiple sites and numerous providers would be helpful to confirm whether these results are generalizable to family physicians and nurse midwives elsewhere.

In summary, this report shows that differences occur between family physicians and nurse midwives in the management of labor and delivery. Practicing family physicians were noted to have higher cesarean section and episiotomy rates. The higher cesarean section rate is primarily a result of a more frequent diagnosis of failure to progress in labor. Further study may help elucidate the reasons for these differences in cesarean section rates, but the differences alone should not be a major hindrance to associations between family physician and nurse midwives. In fact, previous evidence comparing obstetricians with family physicians suggests that the practices of these nurse midwives appear to be more similar to those of family physicians than to those of obstetricians. Similar studies using larger numbers of providers will be helpful in determining if these differences are generalizable to other groups of family physicians and nurse midwives.

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References

1. Feinbloom RI. A proposed alliance of midwives and family practitioners in the care of low-risk women. *Birth* 1986; 18:109-13.
2. Rosenblatt RA. The future of obstetrics in family practice: time for a new direction. *J Fam Pract* 1988; 26:127-9.
3. Hueston WJ, Murry M. A three-tier model of rural obstetric delivery using a nurse midwife-family physician co-practice. *J Rural Health* 1992; 8:283-90.
4. Rosenblatt RA, Detering A. Changing patterns of obstetric practice in Washington State: the impact of tort reform. *Fam Med* 1986; 20:100-7.
5. Govert GL, Bottoms SF, Treadwell MC, Nehra PC. The physician factor in cesarean birth rates. *N Engl J Med* 1989; 320:706-9.
6. Stafford RS. The impact of nonclinical factors on repeat cesarean section. *JAMA* 1991; 265:59-63.
7. Neuhoff D, Burke MS, Porreco RP. Cesarean birth for failed progress in labor. *Obstet Gynecol* 1989; 73:915-20.
8. Gould JB, Davey B, Stafford RS. Socioeconomic differences in rates of cesarean section. *N Engl J Med* 1989; 321:233-9.
9. DeMott RK, Sandmire HF. The Green Bay Cesarean Section Study. II. The physician factor as a determinant of cesarean birth rate for failed labor. *Am J Obstet Gynecol* 1992; 166:1799-1810.
10. DeRegt RH, Minkoff HL, Feldman J, Schwartz RH. Relation of private or clinical care to the cesarean birth rate. *N Engl J Med* 1986; 315:619-24.
11. McCloskey L, Petitti DB, Hobel CJ. Variations in the use of cesarean delivery for dystocia: lessons about the source of care. *Med Care* 1992; 30:126-35.
12. Hueston WJ. Specialty differences in primary cesarean section rates in a rural hospital. *Fam Pract Res J* 1992; 12:245-53.
13. Applegate JA, Wilhout MF. Cesarean section rate: a comparison between family physicians and obstetricians. *Fam Pract Res J* 1992; 12:255-61.
14. Rosenberg EE, Klein M. Is maternity care different in family practice? A pilot matched pair study. *J Fam Pract* 1987; 25:237-42.

15. Chambliss LR, Daly C, Medearis AL, Ames M, Kayne M, Paul R. The role of selection bias in comparing cesarean birth rates between physician and midwifery management. *Obstet Gynecol* 1992; 80:161-5.
16. True Epistat. 4th ed [computer program]. Richardson, Tex: Epistat Services, 1992.
17. Greenfield S, Nelson EC, Zubkoff M, Manning W, Rogers W, Kravitz RL, et al. Variations in resource utilization among medical specialties and systems of care: results from the Medical Outcomes Study. *JAMA* 1992; 267:1624-30.
18. Klein M, Lloyd I, Redman C, Bull M, Turnbull AC. A comparison of low-risk pregnant women booked for delivery in two systems of care: shared-care (consultant) and integrated general practice unit. II. Labour delivery management and neonatal outcome. *Br J Obstet Gynaecol* 1983; 90:123-8.
19. Reid AJ, Carroll JC, Ruderman J, Murray MA. Differences in intrapartum obstetric care provided to women at low risk by family physicians and obstetricians. *Can Med Assoc J* 1989; 140:625-33.
20. Klein M, Lloyd I, Redman C, Bull M, Turnbull AC. A comparison of low-risk pregnant women booked for delivery in two systems of care: shared-care (consultant) and integrated general practice unit. I. Obstetrical procedures and neonatal outcomes. *Br J Obstet Gynaecol* 1983; 90:118-22.
21. Fraser W, Usher RH, McLean FH, Bossenberry C, Thomson ME, Kramer MS, et al. Temporal variation in rates of cesarean section for dystocia: does "convenience" play a role? *Am J Obstet Gynecol* 1987; 156:300-4.
22. Kennell J, Klaus M, McGrath S, Robertson S, Hinkley C. Continuous emotional support during labor in a US hospital. *JAMA* 1991; 265:2197-2201.

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