Perinatal Outcomes In Obstetric And Family Medicine Services In A County Hospital

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Abstract: The relations between perinatal outcomes and physician specialty were examined in a retrospective study. Data pertaining to demographics, labor and delivery events, and maternal and neonatal outcomes were examined for 125 family medicine and 125 obstetric patients. Bivariate analyses showed no differences between the groups for demographics. Significant differences were found for two of 13 labor and delivery events: episiotomy and degree of lacerations. However, when multivariate analyses were conducted to control for possible confounding effects, differences between the groups for episiotomy or degree of lacerations were no longer significant. The only significant difference between the groups on perinatal outcomes was that family medicine newborns had a significantly higher mean birth weight (3364.9 grams) than obstetric newborns (3147.1 grams). Stepwise multiple regression analysis showed that smoking and specialty account for approximately 10 percent of the variance in birth weight. Overall, the results suggest that, regardless of physician specialty, obstetric and family medicine patients had similar outcomes. (J Am Bd Fam Pract 1989; 2:82-6.)

Obstetric care is the seventh most common reason for office visits to family physicians.[1] Family and general physicians provide 25 percent of the prenatal and postnatal care and deliver 18 percent of infants born in the United States.[2] During the past decade, controversy over the quality of obstetric care by family physicians has led to a number of systematic studies to assess differences in prenatal and perinatal care provided by obstetricians and family physicians.[3-9] This issue affects both the hospital privileges and malpractice insurance rates of family physicians.[10-13]

To date, researchers have found only small differences in the quality of care provided by the two specialties.[4,6] While statistically significant differences in population risk factors have been identified,[4] few formal attempts have been made to control for risk factors in patient populations that may affect quality-of-care outcomes.[9,14]

In this study, retrospective data were collected from medical records of obstetric (OB) and family medicine (FM) patients seen at a Southern California county hospital with large Hispanic and medically indigent populations. It was hypothesized that there were no differences in perinatal outcomes for patients cared for by the obstetric and family medicine services at the hospital. In order to evaluate the effect of specialty on quality of obstetric care, multivariate analyses were used to control for possible confounding population risk factors.

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Methods

The San Bernardino County Medical Center (SBCMC) has a large FM training program (60 residents, 11 full-time and 9 part-time physician faculty) and a smaller OB training program (2.5 residents, 3 full-time and 6 part-time physician faculty). The FM department manages five outpatient health centers in which provider continuity is a high priority. At the centers, patients are seen by FM residents. The OB department has one clinic, open 3 days per week. Patients in the obstetric clinic are seen by either FM or OB residents, but no provider continuity is offered.

FM faculty members act as attending physicians for labor and delivery of patients from FM centers. OB faculty serve as attending physicians for patients managed by the OB department. It is the expectation of both physicians and patients that

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Table 1. *Analyses of Interspecialty Differences for Patient Demographic Factors.*

	FM (percent*)	OB (percent*)	Chi-Square Statistic	One-Tailed *P*-Value
Maternal age (years)			2.7	0.44
<21	35	34		
21–25	41	34		
26–30	15	19		
30+	9	14		
Marital status			1.6	0.45
Married	57	52		
Single	30	38		
Other	13	10		
Ethnicity			3.6	0.30
White	46	41		
Black	9	12		
Hispanic	42	47		
Other	2	—		

*Percentages may not sum to 100 due to rounding.

the physician providing prenatal care will attend the delivery. OB physicians are available for consultation during FM deliveries. OB physicians, OB residents, or first-year FM residents on rotation through the OB department may attend the delivery for OB patients. For FM patients, most of the deliveries are attended by second- and third-year FM residents.

A patient is classified in the service of OB or FM on the basis of which service provides prenatal care. For most patients, service choice is not random. In most instances, patients are automatically referred to OB if they initiate prenatal care after 20 weeks' gestation. Additionally, if a patient is judged by some other criterion (e.g., high appointment fail rate, patient age) to be at high risk, she may be referred to the OB department at the discretion of her FM physician.

Between November 1, 1982, and July 31, 1984, 2221 deliveries occurred at SBCMC: 249 were attended by the FM service and 1972 were attended by the OB service. One hundred twenty-five cases were randomly selected from each service. These patients' hospital records were audited for patient demographics, labor and delivery events, and measures of maternal and neonatal outcomes (Tables 1–3). In addition, information was collected on a variety of potential covariates (Table 4). Information in the records was charted by physicians and nurses.

Data were analyzed using BMDP biomedical statistical programs for the personal computer.[15] Analyses were conducted in two stages.

At the first stage, bivariate analyses of FM and OB patient groups on demographic factors (i.e., age, marital status, and ethnicity) were completed to determine whether these factors differed significantly by physician specialty group. Bivariate analyses of outcome measures assessed potential quality-of-care differences between specialty groups. The Pearson chi-square statistic was used to test association of categorical variables. Student's t-test was used to test for interspecialty differences on normally distributed continuous variables.[16]

The purpose of the multivariate analyses at the second stage was to test the hypothesis of no relations between specialty (OB versus FM) and perinatal outcome when controlling for confounding effects from covariates. If a difference in outcome measure was related to subgroup characteristics, any significant difference between specialties would not hold when the covariates were introduced into the analysis. The multivariate analyses used were multiway frequency tables for categorical variables and stepwise multiple regression for interval-level, dependent variables with continuous and dummy independent variables.

Results

Bivariate Analysis

No interspecialty differences were found for the patient demographic factors of age, marital status, and ethnicity (Table 1). Interspecialty differences for labor and delivery events and maternal

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Table 2. *Analysis of Interspecialty Differences for Labor and Delivery Factors.*

Factor	FM (percent*)	OB (percent*)	Chi-Square Statistic	One-Tailed *P*-Value†
Premature rupture of membranes	5	10	2.0	0.16
Induction	13	11	0.3	0.56
Augmentation	18	13	1.2	0.27
Abruptio placentae	—	2	1.4	0.24
Placenta previa	1	1	0.0	0.99
Cephalopelvic disproportion	2	5	1.0	0.33
Meconium staining	15	21	1.9	0.17
Delivery type			3.7	0.06
Vaginal	92	84		
Cesarean	8	16		
Fetal presentation			1.5	0.23
Vertex	100	98		
Other	—	2		
For vaginal delivery				
Laceration	54	46	1.3	0.25
Degree of laceration			9.6	0.02
First	13	32		
Second	42	24		
Third	23	37		
Fourth	23	8		
Episiotomy	84	70	5.9	0.01
Forceps	7	15	3.5	0.06

*Percentages may not sum to 100 due to rounding.

†$P<0.05$ indicates statistical significance.

and neonatal outcomes were then examined (Tables 2, 3). Statistically significant differences were found for two of the 13 labor and delivery events tested: performance of episiotomy and degree of laceration. For mothers delivering vaginally, episiotomies were performed more often on FM patients (84 percent) than on OB patients (70 percent). OB patients were more likely to have first- and third-degree lacerations. The only significant difference between FM and OB services on perinatal outcomes (Table 3) was that FM infants had a significantly higher mean birth weight (3364.9 g) than OB infants (3147.1 g).

Multivariate Analysis

Episiotomy and degree of laceration were the first outcome measures to be reconsidered using multivariate analysis. For these two measures, parity was selected as the controlling variable, because primiparas and multiparas differ in both their need for episiotomy and the extent to which they suffer lacerations. There was no significant interspecialty difference for either episiotomy or degree of laceration when parity was controlled for in the multivariate analysis.

A stepwise multiple regression was computed with infant birth weight (in grams) as the dependent variable. The independent variables were medical specialty, maternal age, mother's ethnicity, insurance type, gestational age at first prenatal visit, smoking, alcohol, and illicit drug use during pregnancy. Maternal smoking behavior was the first variable to enter into the regression equation, accounting for 6.3 percent of the variance (R^2) in birth weight. The effect of not smoking was positive: infants of nonsmoking mothers had higher birth weights than those of smoking mothers. After controlling for smoking, medical specialty accounted for an additional 4 percent of the variance (R^2) in birth weight, with OB infants having lower birth weights than FM infants. Together, smoking and specialty accounted for approximately 10 percent of the variance (R^2) in birth weight. The other variables did not meet the F-to-enter limit set for 5 percent significance (Table 5).

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Table 3. *Analysis of Interspecialty Differences for Maternal and Neonatal Outcome Factors.*

Factor	FM	OB	Statistic	*P*-Value*
Maternal outcomes				
Postpartum infection	2%	7%	$\chi^2 = 2.6$	0.11
Neonatal outcomes				
1-minute APGAR	$\bar{x} = 7.6$	$\bar{x} = 7.2$	$t = 1.8$	0.08
5-minute APGAR	$\bar{x} = 8.8$	$\bar{x} = 8.5$	$t = 1.8$	0.07
Birth weight (grams†)	$\bar{x} = 3364.9$	$\bar{x} = 3147.1$	$t = 2.9$	0.00

*$P<0.05$ indicates statistical significance; one-tailed *P*-value for chi-square, two tailed for others.
†Statistically significant interspecialty difference for bivariate and multivariate analysis.

Discussion

Both methods and results of this retrospective analysis of hospital charts are in large part similar to those of previous investigations.[4-7] This study is unique in its attempt to adjust for differences between FM and OB patient populations that may bias findings for interspecialty differences for perinatal quality of care as suggested by Rosenblatt.[1] Theoretically meaningful covariates have been controlled in order to learn whether detected differences in physician specialty are upheld. For example, differences detected between FM and OB patients for lacerations and episiotomy were no longer significant once parity was taken into consideration. The only interspecialty difference that remained after controlling for covariates in the multivariate analysis was for infant birth weight, though specialty accounted for less of the variation in birth weight than did maternal smoking behavior.

An examination of interspecialty differences for other population covariates (Table 4) indicated that mothers on the OB service were potentially at a higher risk for adverse outcomes because they had no medical insurance, no prenatal care or late initiation of such care, and a higher sexually transmitted disease rate. Statistically significant interspecialty difference in favor of FM prenatal care, mean gestational age at first prenatal visit, and mean gestational age at delivery may be attributed to SBCMC policy, which refers all patients with late initiation of prenatal care to the OB department. There were no interspecialty differences found for chronic conditions. (Patient problems with diabetes, hypertension, and pregnancy-induced hypertension were recorded in only six charts.) Interspecialty comparisons on other quality-of-care factors suggest that, regardless of medical service, obstetric and family medicine patients had similar outcomes. Most labor and delivery factors (Table 2) and maternal and neonatal outcomes (Table 3) were not different between groups, possibly indicative of comparability in quality of obstetric care. Results suggest that communication and cooperation between the two medical services help physicians to provide better patient care.

A limitation of conducting this study at only one medical center is that it is difficult to generalize the results to other institutions, which may have different policies, procedures, and clientele. This study center, like most county-based medical centers, has

Table 4. *Population Covariates.*

Insurance type (Medi-Cal [Medicaid], private, none/self)
Prepregnant weight
Risk due to prepregnant weight (<100 or >200 pounds)
Number of pregnancies
Number of live births
Multiparous women with previous preterm/ low-birth-weight birth, stillbirth, or Cesarean section
Number of abortions
Prenatal care
Gestational age at first prenatal visit (weeks)
Smoking cigarettes
Alcohol abuse
Drug abuse
Sexually transmitted diseases
Infectious diseases (rubella, hepatitis, urinary tract infection, pyelonephritis, chorioamnionitis)
Chronic conditions (anemia, sickle cell disease, sickle cell trait, cardiac disease, renal disease, pelvic inflammatory disease, hypertension, diabetes)
Pregnancy-induced conditions (eclampsia, pre-eclampsia, gestational diabetes)
Gestational age at delivery (weeks)

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Table 5. *Stepwise Multiple Regression Coefficients with Birth Weight as the Dependent Variable.*

Independent Variable*	Regression Coefficient	Standardized Coefficient	Adjusted R^2	t Statistic	Two-tailed *P*-Value†
Smoking	301.4	0.3	0.06	3.40	$P<0.01$
Service (OB/FM)	−230.5	−0.2	0.10	−2.81	$P<0.01$
y intercept	3121.4	—			

*Other variables included in this multiple regression model that did not meet the F-to-enter criterion ($P<0.05$) were maternal age, gestational age at first prenatal visit, alcohol use, illicit drug use, insurance type, and mother's ethnicity.

†$P<0.05$ indicates statistical significance.

a large number of medically indigent patients. Future research evaluating differences between private and county institutions would be helpful.

Conclusion

Clearly, more research needs to be conducted on factors (including specialty of obstetric care providers) that may affect maternal and neonatal outcomes. Studies may do well to focus on a limited number of variables. This study suggests that birth weight may be the most appropriate outcome variable. Degree of laceration and performance of episiotomy should be included as labor and delivery events. The multivariate analyses provided an opportunity to examine interactions with control variables; parity and maternal smoking appear to be relevant covariates. While chart audits such as this one provide basic information for the comparison of specialty groups, they have the inherent weakness of being restricted to preexisting measures. Future research comparing medical services should not only examine information from chart reviews, but should also have a prospective design that will permit collection of additional information such as psychosocial factors, social support, and how much the pregnancy was wanted. Such data will be useful for developing a risk-factor index for obstetric patients.

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