Is Maternity Care Different in Family Practice? A Pilot Matched Pair Study

Ellen E. Rosenberg, MD, CCFP, and Michael Klein, MD, CCFP
Montreal, Quebec

In this pilot study, 81 patients booked for delivery by family physicians were matched to patients booked for delivery by obstetricians. Patients in both groups were at low obstetric risk. They were matched by age, parity, blood pressure, gestational age at delivery, and socioeconomic status. Patients booked with family physicians experienced fewer artificial rupture of membranes, inductions of labor, episiotomies, and forceps deliveries than those booked with obstetricians. These patients also spent a shorter time in hospital in spite of longer second stages of labor. Infant outcomes were equivalent in the two groups.

A simple method of audit of maternity care that permits comparisons of the care provided by family physicians and obstetricians for obstetrically similar patients is described. This methodology employs matching within a given institution and facilitates the multicentered studies required to obtain the large populations needed to compare the process and outcome of infant and maternal care provided by these two types of physicians.

Family physicians in the United States and, to a lesser extent, in Canada are withdrawing from intrapartum care.[1,2] In both countries the cost of malpractice insurance and the fear of malpractice suits are important factors in the decision of many physicians not to do intrapartum obstetrics. Family physicians are particularly vulnerable to a personal concern or external implication that they are not as up to date on or as skilled in the latest technology for evaluation and management of high-risk or even normal pregnancies. They may fear that these deficiencies might lead to a less optimum outcome for their patients, compared with those followed by obstetricians. More important, however, there is concern that in the rare but inevitable case where the outcome is poor, they would be vulnerable to suit because of a failure to apply the latest technology.

On the other hand, many family physicians feel that the care they provide to pregnant women is different in style and to a certain extent in content from the care provided by obstetricians. Moreover, this kind of care can be more satisfying and as safe or safer for women at no apparent risk during their pregnancies.[3–5] In fact, it has been known that techniques that are appropriate to and beneficial for high-risk pregnancy may be inappropriate or even dangerous in the low-risk situation.[3–5] Not all family physicians who do obstetrics are of this school, however. There are family physician-obstetricians who have a high volume of obstetric patients and whose practices closely resemble those of the most interventionist of obstetricians.[6]

In most medium and large population centers, family physicians and obstetricians work alongside one another in the same hospitals. There is some evidence that management norms for intrapartum care are determined at least as much by the medical environment in which physicians work as by their specialty (family practice or obstetrics).[7,8] Physicians with different training and qualifications who work in the same hospital with the same nurses often manage labor in very similar ways. Thus family physicians' management of labor may resemble the practice of their obstetric colleagues in the same hospital more than those of fellow family physicians in another institution.

Several studies in the United States, United Kingdom, and New Zealand have compared general practitioner vs obstetrician care. They have examined newborn mortality and morbidity,[3–5,7,9–19] maternal complications,[3–5,7,9,10,12,16,17]

Submitted, revised, June 9, 1987.

From the Family Medicine Unit, Queen Elizabeth Hospital, and the Herzl Family Practice Centre and the Department of Family Medicine, The Sir Mortimer B. Davis—Jewish General Hospital, and the Department of Family Medicine, McGill University, Montreal, Quebec, Canada. Requests for reprints should be addressed to Dr. Ellen E. Rosenberg, Family Medicine Unit, Queen Elizabeth Hospital, 2100 Marlowe, Montreal, Quebec, Canada H4A 3L6.

and procedure rates.[3–5,7,10–14,16–18] The problem of potential noncomparability of the patients attended by the two types of practitioners applies to almost all of these studies. In the United States and Canada, random assignment of women to a family physician or an obstetrician is not possible, so most studies have collected demographic and obstetric risk data on the patients studied but have not been able to adjust the results for the existing differences in population risk or motivation regarding procedure use.

A notable exception is Klein's work in Oxford, England,[3–5] which benefited from the essentially random assignment of women to general practitioner-midwife or obstetrician-midwife care. Application to North America may be difficult, as Klein's work could be viewed as comparing two systems of care rather than solely two types of practitioners attending women in labor. Most important, the Oxford analysis was based on the booking policy of the general practitioner. Consequently, results were attributed to one system of care based on the original intention to follow, regardless of who in the end attended the delivery or where it took place. Thus there was no transfer bias.

The North American comparative studies assigned women to a family physician or obstetrician for purposes of analysis, based on the name of the physician to whom they were admitted when they entered hospital in labor, ie, the studies are delivery-based. This method of assignment ignores the patient's initial selection of physician; it also ignores the process of transfer of care from family physician to consultant obstetrician during the pregnancy. This transfer and patient selection process varies enormously from one setting to another, and in some settings, family physicians select only low-risk women to follow and transfer women who develop a complication during pregnancy. In other settings, family physicians follow women at all degrees of risk, consult obstetricians freely, but retain responsibility for all patients. These two types of delivery-based studies are, therefore, noncomparable. In the former, the general practitioner's group of patients is highly selected for its low-risk status, and in the latter, it is virtually unselected and may be high risk, indeed. In other settings, the population at risk is somewhere between those two extremes, and different philosophies governing transfer of care apply.

Because of all these issues, a North American study comparing family physician- and obstetrician-managed intrapartum care is needed. It should have the following characteristics: (1) have booking-based assignment of patients (comparisons are made based on the kind of practitioner the woman first sees for her pregnancy care), (2) employ a matched-pair design to control for differences in obstetrician and psychosocial risk and to increase statistical power for a given sample size, (3) require that both women of a matched-pair give birth in the same hospital, and (4) assess safety (maternal and infant mortality and morbidity) and intrapartum medical interventions.

A pilot project for such a study was undertaken. This project is reported here for the purpose of describing the methodology. Only pregnant women at apparently low risk were chosen for the study to eliminate those for whom transfer of care from general practitioner to obstetrician would be extremely frequent in the practice environment studied. The methodology described, however, can be applied to all pregnant women.

METHODS

Patients at two Montreal teaching hospitals were studied. Hospital A is a tertiary care center where 16 obstetricians and four family physicians attend births, and 93 percent of the women are cared for by obstetricians. The delivery area contained a birthroom that women could request, but at the time of this study, criteria for birthroom admissibility were very restrictive (very low risk). The hospital has a level 3 neonatal intensive care unit. Hospital B is a secondary care hospital where 22 obstetricians and three family physicians deliver babies, and 93 percent of the women are attended by obstetricians. This center has no birthroom and has a level 2 nursery. Residents in obstetrics and family practice are trained in both hospitals.

The files of all patients enrolled for prenatal care by all of the family physicians at hospital A and one family physician at hospital B in 1983 and 1984 were reviewed. Women with the following characteristics were eliminated: (1) previous cesarean section, (2) previous perinatal death or stillbirth, (3) previous infant less than 2,500 g at birth, and in the present pregnancy (4) Rh antibodies, (5) diabetes other than class A, (6) malpresentation, (7) multiple gestation, (8) long-term drug therapy, and (9) gestation less than 37 weeks at delivery. There were 106 patients, of whom 82 (77 percent) met the inclusion criteria (50 from hospital A and 32 from hospital B). Data from the files of each of the 83 women were abstracted onto a single form. In addition, an index card for each subject listed her characteristics for the six matching criteria:

1. Age: less than 16 years, 16 to 30 years, over 30 years
2. Parity: 1, more than 1
3. Blood pressure: less than 140/90 mmHg, over 140/90 mmHg
4. Duration of pregnancy: 37 to $40\frac{3}{7}$ weeks, $40\frac{4}{7}$ to $41\frac{3}{7}$ weeks, over $41\frac{3}{7}$ weeks
5. Social class: in one hospital census tract information was used; in the other, census information was not available, so the following three categories were used:

(1) social welfare, (2) no private insurance, or (3) private insurance.

6. Birth setting: delivery room, birth room (for hospital A only)

The ratio of family practice to obstetric patients was 1:80 at one hospital and 1:100 at the other. Therefore, files of obstetricians' patients were randomly selected in these ratios. For each of the selected files, the exclusion criteria were applied, and each eligible patient's characteristics for the six matching criteria were abstracted onto an index card. Each family practice patient was then matched to an obstetric patient identical in all six variables. For some patients no match was found, so another random 80 obstetric patients were selected and the process repeated. Two of the family practice patients giving birth in the birthroom could not be matched to obstetric patients because, using non-stress testing, they were allowed to go beyond 42 weeks' gestation, a condition not accepted by the obstetricians. For the remaining 81 of the obstetric patients, chart abstraction was done onto the same form used for the family practice patients. Because of the small size of the sample, no formal statistical analysis was performed.

RESULTS

Seventy-three of the patients (59 pairs) were aged between 16 and 30 years. The remaining 27 percent (22 pairs) were older than 30 years. Primiparas made up 63 percent (51 pairs) of the sample. Because the work reported here was a feasibility study, the time involved in data collection and analysis was recorded. All data collection and collation was done manually. Data recording took 20 hours, matching 20 hours, collation and analysis another 5 hours; this constitutes 34 minutes per pair of patients.

It should be noted that special care baby unit admissions were routine for babies with low one-minute Apgar scores even if the five-minute Apgar scores were normal. In fact, true asphyxia was present in only one of the 162 babies. This baby was in the family practice sample, is now aged 24 months, and is developmentally normal.

Selected therapeutic approaches and outcomes of care for the two study groups are summarized in Table 1. Induction of labor and artificial rupture of membranes were less commonly performed in the family practice group. Episiotomy and forceps were utilized less often as well. An interesting trend was observed toward arrival at hospital at a more advanced stage of labor (greater cervical dilatation) and a correspondingly shorter time from arrival to delivery in patients of family physicians.

TABLE 1. OUTCOME OF LABOR IN WOMEN FOLLOWED BY TWO TYPES OF ACCOUCHEURS

	Family Physicians No. (%)	Obstetricians No. (%)
Induction	10 (12.4)	29 (35.8)
Artificial rupture of membranes	29 (35.8)	45 (55.6)
Electronic fetal monitoring	58 (71.6)	65 (80.2)
Stimulation labor with oxytocin	28 (34.6)	28 (34.6)
Epidural anesthesia	39 (48.2)	38 (46.9)
Narcotic analgesia	13 (16.1)	9 (11.1)
Cesarean section	8 (9.9)	9 (11.1)
Forceps	16 (19.8)	22 (27.2)
Episiotomy	39 (48.2)	50 (61.7)
Mean cervical dilation on arrival (cm)	3.6	2.7
Mean time: arrival to delivery (hr)	8.05	8.36
Mean length second stage (min)	54.5	35.8
5-min Apgar <6	0	0
Special care baby unit admission (asphyxia related)	1	0
Birthweight <2,000 g	0	2
Breastfeeding	63 (77.8)	60 (74.1)
Total deliveries	81	81

DISCUSSION

As this was a pilot study, and the number of patients was small, it is not reasonable to draw broad conclusions from the results. The phenomenon of family practice patients arriving at hospital later in labor and spending less time before delivery has been observed by other workers.[4,8,14–16] Some other studies have also found lower intervention rates among family practice patients.[5,12,13,18]

The importance of this work is that it demonstrates the feasibility of the method described. The time required is not unreasonably long for a hospital with a small obstetric volume. As a first attempt in a pilot study, it is likely that the time required for selection and matching was greater than would be required by others who could learn from this experience. Record rooms in hospitals with large numbers of deliveries are usually computerized, and selection and matching with proper programming could be performed by the computer at great time saving per pair.

The method is not without problems. Because data collection is performed from hospital medical records, certain information may be unobtainable or difficult to find. The necessary assigning of patients to the type of physician first consulted may be difficult in some locations. Many

physicians keep a roster of their prenatal patients, however, and an improved prospective study (or a retrospective study based on prospectively acquired data) could begin there rather than in the hospital. In other locations, the physician of record at the time of early prenatal blood testing can be identified. Socioeconomic data are often lacking in hospital charts, but in some locations census tract information,* which is always available, is a good measure of social class.

Motivation, difficult to address in a retrospective study, is important because some women may choose a particular type of physician (usually a general practitioner) because of their wish for a delivery with minimal intervention. In locations where women can choose a birth room as opposed to a standard delivery room, one can match for this indicator of preference for a certain kind of delivery, but in many sites no such indicator exists. In these other sites women motivated to have a low-intervention delivery may be unequally distributed to the two kinds of practitioner. Therefore, if the family physician group were found to undergo fewer interventions, it would be impossible to determine whether this behavior was instigated by patients, physicians, or both. This issue may be important in certain locations. In some sites in Canada, however, over 50 percent of deliveries are performed by family physicians, and the total number of deliveries is large (more than 5,000 per year). In those situations family physicians care for a very mixed group of women whose wishes in obstetric care are equally mixed.

The matching aspect of the design permits the use of the pairs as the unit of analysis, thus improving statistical power for any given sample size. The study described excluded patients at enhanced risk, but the methodology is compatible with their inclusion. Maternal and infant mortality and even morbidity cannot be studied meaningfully at only one site because a very large sample size is needed. Therefore, a multicenter design is essential and is being organized now. The method described is easy to apply to many types of settings and would permit a comparison of interventions during labor, controlling for variations in local norms. This large multicentered study will also permit an assessment of the relative safety of the two systems of care (family physician with or without consultation vs obstetrician).

While methodological problems may exist locally, the annual comparative audit of care over time provides a useful approach for quality assurance. Even delivery-based comparisons can be useful if the described low-risk selection criteria are applied. Such selection assures that both family physicians and obstetricians have obstetrically comparable patients, as it eliminates the transfer bias that might exist if all women were studied.

* *Family income by census tract is available from Statistics Canada.*

Acknowledgments

Dr. Joan Macken assisted in the design and participated in data collection. Naomi Klein collected data and matched patients.

References

1. Klein M, Reynolds JL, Boucher F, et al: Obstetrical practice and training in Canadian family medicine: Conserving an endangered species. Can Fam Physician 1984; 30:2093–2099
2. Klein M: The Canadian family practice accoucheur. Can Fam Physician 1986; 32:533–540
3. Klein M, Lloyd I, Redman C, et al: A comparison of low risk women booked for delivery in two different systems of care. Part I. Obstetrical procedures and neonatal outcomes. Br J Obstet Gynaecol 1983; 90:118–122
4. Klein N, Lloyd I, Redman C, et al: A comparison of low risk women booked for delivery in two different systems of care. Part II. Labour and delivery management and neonatal outcome. Br J Obstet Gynaecol 1983; 90:123–128
5. Klein M, Elbourne D, Lloyd I: Booking for maternity care: A comparison of two systems. Occasional paper No. 31. Exeter, United Kingdom, Royal College of General Practitioners, 1985, pp 1–17
6. Koning JH: The obstetrical experience of 20 years in one family practice. J Fam Pract 1982; 14:163–171
7. Meyer BA: Audit of obstetrical care: Comparison between family practitioners and obstetricians. Fam Pract Res J 1981; 1:20–27
8. Klein M, Papageorgiou A, Westreich R, et al: Care in a birthroom versus a conventional setting: A controlled trial. Can Med Assoc J 1984; 13:1461–1466
9. Caetano DF: The relationship of medical specialization (obstetricians and general practitioners) to complications in pregnancy and delivery, birth injury, and malformation. Am J Obstet Gynecol 1975; 123:221–227
10. Ely JW, Ueland K, Gordon MJ: An audit of obstetric care in a university family medicine department and an obstetrics-gynecology department. J Fam Pract 1976; 3:397–401
11. Reeves BD, Anderson ER: Perinatal mortality rate at a community hospital, 1956–1975. Am J Obstet Gynecol 1977; 128:677–683
12. Phillips WR, Rice GA, Hayton RH: Audit of obstetrical care and outcome in family medicine, obstetrics and general practice. J Fam Pract 1978; 6:1209–1216
13. Wanderer MJ, Suyehira JG: Obstetrical care in a prepaid cooperative: Comparison between family practice residents, family physicians, and obstetricians. J Fam Pract 1980; 11:601–606
14. Taylor GW, Edgar W, Taylor BA, Neal DG: How safe is general practitioner obstetrics? Lancet 1980; 2:1287–1289
15. Black N: Do general practitioner deliveries constitute a perinatal mortality risk? Br Med J 1982; 284:488–490
16. Richards TA, Richards JL: A comparison of cesarean section morbidity in urban and rural hospitals: A three-year retrospective review of 1,177 charts. Am J Obstet Gynecol 1982; 144:270–275
17. Roseveare MP, Bull MJV: General-practitioner obstetrics: Two styles of care. Br Med J 1982; 284:958–960
18. Shear CL, Gipe TG, Mattheis JK, Levy MR: Provider continuity and quality of medical care: A retrospective analysis of prenatal and perinatal outcome. Med Care 1983; 21:1204–1210
19. Rosenblatt RA, Reinkin J, Schoemack P: Is obstetrics safe in small hospitals? Evidence from New Zealand's regionalized perinatal system. Lancet 1985; 1:429–443

Commentary

Howard Brody, MD, PhD, and Kenneth R. Howe, PhD
East Lansing, Michigan

One might as well shower abuse upon motherhood and apple pie as to suggest any criticism of the randomized clinical trial, which is generally taken to be the gold standard against which all other forms of medical inquiry are to be compared. But the present pilot study by Rosenberg and Klein, illustrating as it does an important alternative strategy, provides an opportunity to stress the often-unappreciated limitations of randomized trials generally, and particularly their application to management of obstetric care by family physicians.

Clearly medical knowledge took a great leap forward when physicians began to rely increasingly on controlled trials and to look with skepticism on the results of anecdotal reports and uncontrolled trials of therapy. The immensity of this advance has, however, had unfortunate side effects—the elevation of the double-blind, randomized controlled trial to a status beyond question or criticism, as if its results could be accepted automatically without the need for any further inquiry or reflection, and as if no other research designs could yield credible results. While we clinicians like to portray ourselves as hard and deep thinkers, we unfortunately take any opportunity that presents itself to put our brains on autopilot; and the randomized controlled trial, for the "modern scientific" physician, has been just one more opportunity.

Randomized controlled trials provide a way of detecting very small differences with a very high degree of certainty that the differences are causally related to the experimental factor. But the smaller the difference, the less likely it is to be of any real clinical importance. Thus, one of the particular problems of what might be called the tyranny of randomized controlled trials is that they tend to provide very precise answers to questions that have little clinical impact.

Physicians are gradually becoming more sophisticated in such matters; it is now more frequent to hear the comment, "I can see that the difference is statistically significant; but what I want to know is whether it's clinically important." The relationship, however, between statistical significance and clinical importance is not a precise, mathematical one. Many physicians still assume that the more subjects enrolled in the study, the more convincing the findings. Actually, for a study showing the presence of a difference, the relationship is quite the reverse. A difference that reaches statistical significance among a small subject sample is probably a very real and very important difference. On the other hand, if one enrolls thousands of subjects and performs enough measures on them, one is sure to turn up some difference or other that will reach statistical significance, even if it is completely meaningless. (All "statistical significance" means is that there is a less than 5 percent chance that the results are due to random variation rather than being caused by the experimental variable; this entails that for every 100 randomized studies that yield significant results, 5 are expected to be erroneous.)

That even highly skilled physicians are still blinded by the dazzle of randomized controlled trials is well illustrated by a claim advanced at a recent conference on AIDS research. One physician claimed that randomized controlled trials are urgently needed in the study of AIDS antiviral agents because the HIV virus mutates quickly and differs from one geographical location to another. But this problem is one that randomized controlled trials are powerless to remedy. No matter how secure the results of such a trial are with respect to the conditions and protocols used in one time and place, those results can never be safely generalized to populations where conditions may be different.

Regarding studies of obstetric practices among family physicians in particular, Rosenblatt[1] recently reviewed studies comparing the outcomes when births are attended by family physicians vs obstetricians. He noted that randomized trials are impractical, primarily because it is impossible to gather large numbers of women of comparable perinatal risk and then obtain their permission to be randomized among different physicians or different birth settings. Furthermore, the rarity of adverse outcomes in low-risk groups and the subtlety of differences (if any) attributable to different styles of obstetric practice strain the capacity of even randomized trials. For example, a large-scale study of the impact of fetal monitoring upon neonatal mortality raised the possibility that mortality might be slightly higher in the monitored when compared with the unmonitored group in the lowest-risk category; but results were not statistically significant.[2] When asked later to comment on this, the authors calculated that they would have to perform a randomized trial upon 126,000 women to resolve that question satisfactorily.[3]

Because of these practical problems with randomized

designs, many have agreed with Rosenberg and Klein that a case-control method is the best alternative.[1,4,5] The question is not whether a case-control method yields more credible results than a randomized controlled trial, but whether the method is good enough to advance knowledge where randomized controlled trials are impracticable.

An apparent shortcoming of Rosenberg and Klein's methodology is that it fails to control for self-selection by patients. The authors, however, offer an important rejoinder—real-world patients do self-select for birthing style; and if self-selection changes outcome in important ways, results of randomized controlled trial would be nongeneralizable to clinical practice for that reason alone. But the lack of control for self-selection does place additional limitations on the generalizations that can be made from a case-control study. Within these limits, however, the matching strategy is a statistically sensible one, which allows useful data to emerge from relatively small numbers of subjects.

Showing equal outcomes between family physicians and obstetricians is of little interest if the family physicians in question have uncritically adopted the obstetricians' practice style. The deeper question is whether a less-technological style, which family physicians have been shown generally but not universally to prefer,[1,4] can be shown to be as good as or better than the more interventionist obstetric style.[6] Skeptics have insisted that so-called natural childbirth, for example, cannot be accepted as causally related to good outcomes unless randomized, attention-placebo-controlled trials are conducted.[7] This argument, however, ignores two important points: first, there are practical limitations of randomized trials, as noted above; and second, the more-interventionist competitors to the "natural" approach have generally been adopted in the absence of any well-controlled studies proving their efficacy in low-risk populations.[6] Thus, to demand that a less-interventionist obstetric strategy prove itself by means of randomized trials is to apply an interesting double standard. Rosenberg and Klein have provided additional evidence to defend the use of alternative research techniques to answer those questions that legitimately ought to interest family physicians who care about the quality of obstetric care rendered to patients.

References

1. Rosenblatt RA: Perinatal outcomes and family medicine: Refocusing the research agenda. J Fam Pract 1987; 24:119–122
2. Neutra RR, Fienberg SE, Greenland S, et al: Effect of fetal monitoring on neonatal death rates. N Engl J Med 1978; 299:324–326
3. Neutra RR, Friedman EA, Greenland S: Fetal monitoring, letter. N Engl J Med 1978; 299:1371
4. Mengel MB, Phillips WR: The quality of obstetric care in family practice: Are family physicians as safe as obstetricians? J Fam Pract 1987; 24:159–164
5. Franks P, Eisinger S: Adverse perinatal outcomes: Is physician specialty a risk factor? J Fam Pract 1987; 24:152–156
6. Brody H, Thompson JR: The maximin strategy in modern obstetrics. J Fam Pract 1981; 12:977–986
7. Beck NC, Hall D: Natural childbirth: A review and analysis. Obstet Gynecol 1978; 52:371–379

Dr. Howard Brody is Associate Professor, Department of Family Practice and Medical Humanities Program; and, at the time of this writing. Dr. Kenneth Howe was Assistant Professor, Medical Humanities Program, Michigan State University, East Lansing, Michigan.