Obstetric Outcomes in a Rural Family Practice: An Eight-Year Experience

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There has been debate in some quarters of whether family physicians should do obstetrics and of whether rural hospitals should provide obstetric services. Forks, Washington, is a remote logging town where family physicians and midlevel practitioners have been the sole providers of labor and delivery services. Forks offers an opportunity to evaluate the quality of an isolated rural family practice obstetric service.

A retrospective audit of all labor and delivery patient charts at Forks Community Hospital from 1975 to 1983 was undertaken; 1,052 charts were abstracted with 36 factors of morbidity, mortality, and intervention examined. The results, when compared with similar studies in the literature, provide evidence of good performance. In addition, a relatively high-risk obstetric population was served with favorable outcomes. Family physicians and rural hospitals can provide high-quality obstetrical services.

Whether family physicians should do obstetric deliveries has been a subject of some controversy in developed countries.[1–4] Likewise, whether small hospitals should have obstetric services is a question that plagues planners and physicians.[5–7] Rapid changes in training, technology, communications, transportation, liability law, and regionalization have forced changes, mostly for the better, in perinatal care. Family physicians provide a distinct style of service, often desperately needed, to pregnant patients. The continuity of high-quality medical care by a single health care provider from conception through infancy must be preferable to equally high-quality care subject to interruption and change.

Forks, Washington, is a remote logging town in northwest Washington State. The local 25-bed hospital is 60 miles from a secondary referral center and 120 miles from a tertiary care center. Estimates from local patient-origin studies show that about two thirds of the area newborns were delivered at Forks Community Hospital during the study period. The remaining cases were self-referred to other centers.

The Forks Community Hospital medical staff is made up of primary care physicians, with family physicians and midlevel practitioners (nurse practitioners and physicians' assistants) providing all obstetric services. During the study period the active medical staff consisted of a maximum of three family physicians and five midlevel practitioners. All physicians had broad-based family practices including emergency room duty. One nurse practitioner limited her practice to obstetrics, gynecology, and newborn care. External fetal monitoring and obstetric ultrasound were available only during the latter half of the study period. Other technologies were felt to be typical for a community hospital. All physicians were trained in full obstetric intervention, including cesarean section, vacuum extractor, and forceps delivery. Pediatric and obstetric consultants were not available on site.

METHODS

A retrospective audit was done on all labor and delivery patients at the Forks Community Hospital from 1975 to the end of 1983. The data were abstracted manually and verified for accuracy. Emergency room and ambulance logbooks were also reviewed to include any labor cases in which decisions were made without a formal hospital admission. The following factors were assessed: mother's age, gravidity, parity, hypertension, postmaturity, prematurity, malpresentation, Apgar scores, prolonged labor, maternal hemorrhage, fetal distress, meconium presence, anesthesia, use of oxytocin, delivery intervention (cesarean section,

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forceps, vacuum extraction), birthweight, multiple birth, stillbirth, neonatal death, analgesia, premature rupture of membranes, prolonged rupture of membranes, and transfer to another facility of mother or infant.

A population-based study or a local control group were beyond the scope and means of the study. A literature search was therefore performed to find reliable data for comparison. Criteria for selecting comparison data were data from a similar period in time, data with a similar number of patients, data based on family physicians, and data based on the majority of factors in the present study. Since criteria for assessing quality of care are now generalized across developed countries, geographic origin of comparison data was not considered essential. The study was designed to look at quality of care primarily, with any data generated on disease incidence being an interesting further benefit of the study.

RESULTS

The population profile of women in the study reveals an average age of 24.2 years, an average parity of 1.1, and an average gravidity of 2.5. As a general rule, the patients were a working-class population with an estimated 10 percent on public assistance and an additional 10 percent uninsured without means of payment. Maternal and infant morbidity statistics are based on 1,026 deliveries performed at the Forks Community Hospital. Of these deliveries 53 percent were performed by local family physicians, 36 percent by local midlevel practitioners, and the remainder by a local general practitioner and a locum tenens physician. Perinatal mortality figures are based on the total of deliveries plus maternal and infant transfers or 1,052 cases.

Data were compared with a study from the United Kingdom by Taylor et al.[8] and a study from the United States by Craig et al.[9] Overall, Forks data seem to be relatively similar to the other two studies. Prenatal factors are displayed in Table 1. There are noticeable differences between Forks study data and the Taylor et al data. Compared with the results of Taylor et al, results from the Forks study showed hypertension to be considerably lower, premature rupture of membranes to be considerably higher, and prenatal hemorrhage to be lower. Any explanation for these differences would be entirely speculative.

Morbidity in labor is displayed in Table 2. Compared with the Taylor et al data, results from Forks show noticeably less fetal distress, and the rates for hemorrhage and malpresentation are closer to those of their reported consultant service. When comparing intervention practices (Table 3), use of conduction anesthesia is noticeably lower for the Forks group, but there is a higher use of the vacuum extractor and lower use of forceps compared with the study results of Craig et al. These differences seem to be mostly a matter of style. Any independent effect on the outcome is not evident and would not be statistically discernible in the study.

TABLE 1. PRENATAL: PERCENTAGE OF CASES WITH COMPLICATIONS LISTED BY TYPE OF PROBLEM, WITH COMPARISON FIGURES

Prenatal Complication	Forks Community Hospital (N = 1,026) No. (%)	Taylor et al[8] General Practitioner (N = 1,686)	Taylor et al[8] Obstetric Consultant (N = 1,271)
Hypertension	4.1 (42)	6.5	13.2
Premature rupture of membranes	3.3 (34)	1.7	0.4
Postmaturity	10.1 (103)	8.9	12.1
Malpresentation	2.0 (20)	3.3	2.8
Hemorrhage	0.1 (1)	4.0	2.4

Regarding infant factors (Table 4), the percentage of twins in Forks is slightly above statistical norms. Average Apgar scores are comparable to those reported by Craig et al. A slightly higher rate of prematurity was found in the Forks study than in the other two studies. Birthweight distribution was closer to that defined as a level II hospital using a three-level system as in Rosenblatt's data from New Zealand.[10] The mortality data are based on deliveries plus transfers to another facility, so that all deaths are included in the Forks data. The total for the mortality figures, therefore, is 1,052. There were no maternal deaths, not an unexpected finding, since current maternal mortality in the United States is about 9 per 100,000.[17] A comparison of selected perinatal mortality rates from a variety of industrialized nations is shown in Table 5. These figures include both urban and rural and large and small populations. Rates seem to be comparable across studies.

A review of the ten perinatal deaths from Forks data is displayed in Table 6. Of these ten infants, exactly one half had no anatomic diagnosis. One infant was anencephalic, three were severely premature, and two had significant placental or cord abnormalities. One patient had no prenatal care, and several patients were admitted in advanced labor. None of the fetal deaths occurred after admission to the hospital.

There were five very low birthweight infants (Table 7). Every attempt was made to transport patients with suspected prematurity to a tertiary care facility before delivery. As noted, however, many patients presented too advanced in labor. Transport times averaged two hours from the time of decision to transfer to the time of arrival at a secondary or tertiary care facility.

TABLE 2. LABOR: PERCENTAGE OF CASES WITH COMPLICATIONS LISTED BY PROBLEM, WITH COMPARISON FIGURES

Labor Complication	Forks Community Hospital (N = 1,026)	Taylor et al[8] General Practitioner (N = 1,686)	Taylor et al[8] Obstetric Consultant (N = 1,271)	Craig et al[9] Family Practitioner (N = 125)
Malpresentation	4.9 (50)*	0.9	3.6	6
Prolonged labor (0.36 hours)	0.8 (8)	1.9	0.2	NA
Prolonged second stage (>2 hours)	3.1 (32)	5.2	4.9	16
Hemorrhage	3.0 (32)	0.2	3.8	NA
Fetal distress	1.8 (18)	4.5	4.9	1
Prolonged rupture of membranes (>24 hours)	0.6 (9)	2.6	0.2	1
Transfer prior to delivery (not part of N)	3.1 (33)	NA	NA	NA
Premature labor	2.6 (27)	1.7	3.5	NA

** Numbers in parentheses*
NA—data not available

TABLE 3. INTERVENTION: PERCENTAGE OF CASES, LISTED BY TYPE OF INTERVENTION WITH COMPARISON FIGURES

Intervention	Forks Community Hospital (N = 1,026)	Taylor et al[8] General Practitioner (N = 1,686)	Taylor et al[8] Obstetric Consultant (N = 1,271)	Craig et al[9] Family Practitioner (N = 125)
Local anesthesia	61.5 (629)*	NA	NA	NA
Conduction anesthesia	13.6 (139)	23	73	NA
Episiotomy	54.2 (553)	47	61	NA
Oxytocin	14.3 (147)	33	31	NA
Forceps	1.8 (18)	NA	NA	13.6
Vacuum extractor	3.1 (32)	NA	NA	0.8
Cesarean birth	8.9 (91)	NA	NA	16.8
Total instrumented delivery	10.8 (141)	14	10	31.2
Analgesia	19.4 (198)	71	90	NA
General anesthesia	0.3 (3)	NA	NA	NA
Physician delivery	63.7 (654)	NA	NA	NA
Midlevel delivery	36.2 (372)	NA	NA	NA

** Numbers in parentheses*
NA—data not available

DISCUSSION

These data show high-quality outcome and performance of medical care in a level II obstetrical service at a level I hospital. Conditions such as preeclampsia, twins, and malpresentation and interventions such as cesarean delivery, oxytocin administration, and forceps delivery are usually considered high-risk situations. It is interesting to note that, in general, labor complication data in Forks (Table 2) tend to parallel the Taylor et al consultant data, suggesting a fairly high level of problem cases in Forks. These complications were handled with relative confidence in Forks. The difficulties in providing this kind of service are great, but the training and technology can be brought to rural areas.[14] Low birthweight babies are clearly better delivered near a neonatal intensive care unit, but prevention of premature labor and delivery is still an elusive goal. Neonatal transport teams have, however, reduced the risk of delivery distant from a tertiary care center.

TABLE 4. INFANTS: PERCENTAGE OF CASES BY TYPE OF PROBLEM WITH COMPARISON FIGURES

Infant Characteristics	Forks Community Hospital (N = 1,026)	Taylor et al[8] General Practitioner (N = 1,686)	Taylor et al[8] Obstetric Consultant (N = 1,271)	Craig et al[9] Family Practitioner (N = 125)
Twins (number of infants)	2.2 (22)*	NA	NA	NA
Average Apgar score, 1 min	8.0	NA	NA	7.7
Average Apgar score, 5 min	9.1	NA	NA	8.8
Premature	5.1 (52)	2.8	2.8	3
Infant transfer (not part of N)	0.8 (9)	NA	NA	NA
Birthweight < 1,500 g	0.5 (5)	NA	NA	NA
Birthweight 1500 to 2500 g	4.6 (47)	NA	NA	NA
Birthweight > 2500 g	94.9 (970)	NA	NA	NA

** Number in parentheses*
NA—data not available

TABLE 5. PERINATAL MORTALITY: COMPARISON OF EIGHT STUDIES, RATE PER 1,000 BIRTHS

Study	Rate
Forks Community Hospital, current study (8 stillborn, 2 neonatal deaths)	9.5
Washington State, USA, 1984[11]	7.6
Taylor et al, United Kingdom, 1980[8]	13.0
Ohlsson and Fohlin, Stockholm, Sweden, 1983[12]	9.4
Ontario, Canada, 1983[12]	14.9
Scurletis and Bostrom, Iowa, USA, 1978[13]	16.5
Elder, Tuatapere, New Zealand, 1977–84[14]	4.0
MacLean and Collett, Southland, New Zealand, 1978–83[15]	10.3
Stanley and Waddell, Western Australia, 1981[16]	14.6

TABLE 6. PERINATAL DEATHS: DESCRIPTION OF CASES

Case	Gestation (weeks)	Birthweight (grams)	Cause of Death
1	26	880	Transferred in utero, delivered in tertiary care facility, died at one hour of complications of severe prematurity
2	31	800	Admitted completely dilated, breech delivery, died in transport at one hour
3	Full term	3,720	Stillborn, dead on admission prior to labor, no anatomic diagnosis
4	Full term	4,404	Stillborn, died prior to admission, in labor, velamentous cord, normal fetus
5	Full term	3,295	Stillborn, died prior to admission, no anatomic diagnosis
6	26	832	Stillborn, died prior to admission, velamentous cord with placental infarcts
7	Full term	2,741	Stillborn, died prior to admission, no anatomic diagnosis
8	Unknown	2,245	Stillborn, no prenatal care, died prior to admission, no anatomic diagnosis
9	32	1,989	Stillborn, died prior to admission, no anatomic diagnosis
10	32	1,761	Stillborn, anencephalic

The gross similarities of all data across the three studies tend to support the notion of a single standard of care in developed countries. The comparison studies had the most complete list of morbidity and mortality factors in all the reviewed literature, yet several important factors, such as general anesthesia, birthweight, and twins, were missing from their summaries. The two comparison studies complemented each other by providing for absent data. A full audit of an obstetric service should review all of the factors included in the Forks data. Precise and universally accepted definitions of such complications as hypertension, prolonged labor, and prolonged membrane rupture will make audits more effective.

In rural areas, family physicians are in great demand because they are versatile. They can provide a wide variety of primary care services and still substitute fully for each other after hours and during absences. The multispecialty practice model has great difficulty with backup needs in small-scale medical care systems. Each of the family physicians in Forks elected extra obstetric training during residency. Because recruiting physicians to rural areas is difficult, midlevel practitioners can also play an important role in providing an obstetric service. Midlevel practitioners performed a large number of low-risk, uncomplicated, spontaneous vaginal deliveries in this study. These deliveries were carried out under local anesthesia. Data on in-

TABLE 7. LOW BIRTHWEIGHT: DESCRIPTION OF INFANTS WEIGHING LESS THAN 1,500 g

Case	Gestation (weeks)	Birthweight (grams)	Outcome
1	31	1,400	Full dilation at admission, Apgars 3 and 5, transferred to tertiary facility
2	33	1,373	Toxemia, breech, cesarean birth, labor too rapid for in utero transport, transferred to tertiary facility
3	28	909	Labor too rapid for in utero transport, Apgars 3 and 9, transferred to tertiary facility
4	31	800	Neonatal death (see case No. 2, Table 6)
5	26	832	Stillbirth (see case No. 6, Table 6)

dividual practitioner performance were collected but are not presented, since the emphasis of this report is on overall quality of the service. Suffice it to say, the whole obstetric service would have been in jeopardy without midlevel obstetric support. A physician was present at the delivery or in the maternity unit for all deliveries performed by midlevel practitioners.

The philosophy of the Forks obstetric unit is to be prepared for all complications and possibilities. Quantitative assessment of prenatal risk factors is helpful to predict complications, but it is not reliable.[18] In addition, noncompliant patients bring a special challenge by often presenting with totally unpredictable complications. Data reported here support the contention that family physicians can and should do obstetrics, and family physicians can do relatively high-risk obstetrics under the right circumstances. Likewise, good obstetric care can be provided in remote sites.

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Commentary

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The excellent performance by family physicians and midlevel practitioners in the delivery of obstetric care to their community in Forks, Washington, provides the reader with an opportunity once again to reflect on the importance of family practice obstetrics. In exploring the significance of this paper within the work to date on family practice obstetrics, the following discussion will return to the same basic questions that continue to trouble our dis-

cipline: (1) Can family physicians practice quality obstetric care? (2) If so, should family physicians practice obstetrics? (3) What should be the research agenda in obstetrics, and does this require a new methodology?

QUALITY CARE IN OBSTETRICS

One of the most troubling questions for family physicians is whether they can deliver high-quality obstetric care to their patients in this advanced technological age. Neither the extensive review on this topic by Mengel and Phillips[1] nor the case-control study by Franks and Eisinger[2] could conclude more than that physician specialty was not a risk factor for adverse perinatal outcome. Perhaps the failure of these studies to confirm quality of obstetric care occurs precisely because the majority have been compared with studies by obstetricians. These comparative studies will remain inconclusive because of the inability to randomize subjects into the two systems of obstetric care. As such a study is unlikely to occur, the question of quality of care may best be assessed through some direct measurement of its elements within a single obstetric population.

In 1984, the Council on Medical Service identified the following eight important elements that could be used to identify care of high quality[3]:

1. Care that produces optimal improvement in patient status
2. Care that emphasizes prevention and health promotion
3. Care provided in a timely manner
4. Care that seeks patient participation in the care process
5. Care based on accepted principles of medical science with proficient use of technology
6. Care provided with sensitivity for the patient's welfare
7. Care that makes efficient use of technology and other health resources
8. Documentation sufficient to enable continuity of care and peer evaluation

If the delivery of a healthy, full-term infant can be substituted for care that produces optimal improvement in patient status, the data from Forks demonstrate high-quality care based on the low perinatal mortality rate (Table 5)[4] and low percentages of both premature (5 percent vs 7 to 8 percent nationally)[5] and low-birthweight infants (5.1 percent vs 6.3 percent nationally).[6] That care was provided in a timely manner is also confirmed by observing that 97.5 percent of the women received prenatal care and delivery within their community with successful transfer of the remainder prior to delivery.

Although data on maternal morbidity were not reported for the Forks sample, the use of a complete range of obstetric interventions (ie, conduction anesthesia, instrumented deliveries, and use of oxytocin) combined with the excellent perinatal outcomes suggest that care based on accepted principles of medical science with proficient use of technology was achieved. In fact, this demonstration that training and technology can be brought to rural areas by family physicians working with midlevel practitioners has strong implications for the survival of small, isolated hospitals that must be capable of managing the full range of obstetric emergencies including stabilization and transportation of infants.

While efficiency can be interpreted in many contexts, two applications of the term can be observed within these data. First, the limited use of technology combined with excellent outcome statistics suggests cost-effective care with respect to the limited use of oxytocin compared with rates reported in other retrospective cohort studies[7–9] and the low cesarean section rate compared with rates for other small hospitals over similar years (8.9 percent vs 12.3 to 18.5 percent).[10] Second, efficiency in the use of "other health system resources" is clearly demonstrated by the integration of midlevel practitioners (36 percent of deliveries) into an active obstetric practice. This effective use of a team approach clearly stands in contrast to the bleak outlook presented by Christianson[11] for such cooperative delivery systems because of increasing competition among health care providers. Finally, the criterion of sufficient documentation is also met by the careful recording of pregnancy outcomes for their community.

While the remaining criteria for high-quality care (that is, care that emphasizes prevention and health promotion, care that seeks patient participation in the care process, and care that is provided with sensitivity for the patient's welfare) cannot be addressed within the data presented, one might argue that these concepts are integral to the practice of family medicine. Future family medicine research should be encouraged to measure the degree to which these principles are incorporated into daily practice and the resultant impact on health care.

THE LEGACY OF GENERAL PRACTICE

The answer to the question of whether family physicians should practice obstetrics may be found in reviewing our beginnings in general practice. The concept of the general practitioner had its first appearance in England in the second and third decades of the 19th century.[12] The evolution from the apothecaries, surgeons, and men-midwives of the late 18th century was largely a reaction to scientific advances that created a shift from domiciliary based whole-person medicine to consultant medicine dependent on both physical signs and laboratory investigations. In an era of overcrowding of the profession, general practitioners were quick to perceive their patient's ambivalent attitudes toward the new scientific medicine

and adopted a whole-person, antitechnological style that eventually became their hallmark. The practice of obstetrics was seen as a means of building a reputation that would attract more patients and their families to the physician.

In the scant 20 years since the metamorphosis of family medicine from general practice, startling changes have once again occurred within the health care system. The rapid development of powerful methods for diagnosis and a pathophysiologic basis for treatments have forced a shift of physicians into specialty practice largely confined to urban settings. As the cohort of general practitioners in the United States aged and were not replaced, the lack of availability of and access to medical care in many communities became a major source of public complaint. Thus similar forces of advanced technology and unmet public need have created an entrance for the modern-day family physician.

In the attempt by this new family physician to combine scientific competency and caring, options such as specialization (ie, concentration on certain types of patients by problem) or exclusivity (ie, limiting the number and kinds of patients seen) threaten the integrity of family medicine.[13] Both approaches would create medical needs that would either go unmet or be filled by other practitioners. If family medicine is to continue to flourish, its practitioners must uphold the principle of primary care. As obstetrics is a common entry point for care for individuals and families, as well as a key factor in the establishment of a comprehensive family practice,[14] family physicians must begin to recognize the importance of obstetrics to their role as primary care physicians. As a final and perhaps more important point, there is evidence in the literature that low-risk patients have better outcomes in primary care settings.[15–18] If this finding is true, the continued practice of obstetrics by family physicians makes an important contribution to the medical care delivery system.

IMPLICATIONS FOR FUTURE RESEARCH

The relevance to family medicine of the data from Forks can be seen as a "coming of age"—a movement beyond the battle between disciplines to one of introspection. In documenting and reflecting on experiences of family physicians with matching resources to patient need, they will come closer to meeting the research agenda outlined by Rosenblatt.[19] In fact, family physicians may be in the best position to investigate the application of technologies to pregnant women precisely because their style of practice does not assume that technology is necessarily beneficial. To meet such an agenda, a new methodology is needed, one involving networks of community-based family physicians reporting their obstetric experiences in a quantitative manner. If accepted, such an approach will make available a large community database that is integral to the assessment of poor outcomes, which have a small incidence. Such an approach will allow for the recognition of regional differences in pregnancy complication rates and aid epidemiologic investigations in the association of risk factors with pregnancy outcomes. These investigations are crucial before meaningful preventive strategies can be designed.

In summary, interdisciplinary comparisons have lost their usefulness and do not meet the needs of improving pregnancy care. What is desperately needed is a research focus on the appropriate application of technology to primary care practices. For example, the limited use of oxytocin and good outcomes reported in the Forks data should cause physicians to question the applicability of tertiary care protocols on induction and augmentation of labor prior to their becoming a common standard of care. Family practice obstetric care, including the use of midlevel practitioners, can deliver excellent results. The congruence with family practice ideals is compelling. Family physicians, through community-based models, should meet the challenge of investigating high-quality care and the use of technology in hopes of preventing iatrogenic morbidity caused by unlimited use of interventions with inherent risks to emotional and physical health.

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