

A COMPARISON OF HOSPITAL MATERNITY CHARGES
TO CONSUMERS OF CERTIFIED NURSE-MIDWIVES,
FAMILY PRACTITIONERS, AND OBSTETRICIANS

by

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ABSTRACT

The purposes of this research were to present descriptive data on the types of maternity charges for the low-risk maternity client in a community hospital, and to compare hospital maternity charges to consumers of certified nurse-midwives', family practitioners', and obstetricians' services. The researcher utilized the Delivery Log and billing records to collect demographic information and hospital charges.

The sample consisted of hospital bills of women having normal vaginal deliveries at a community hospital selected between December 1, 1981, and March 31, 1982, resulting in 60 certified nurse-midwives', 39 obstetricians', and 161 family practitioners' clients.

The results of the research identified six items with significant mean charge differences between provider groups. These were: electronic fetal monitoring, extra gowns, extra supplies, anesthesia, pharmacy, and intravenous equipment. This led to a significantly lower mean total hospital charge for the certified nurse-midwifery group. The findings indicated that numerous small charges, perhaps related to provider preferences and practices, resulted in the total hospital charge differences.

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CHAPTER I

INTRODUCTION

With rising costs of health care over the past ten years, consumers, third-party payers, and professionals have been looking for ways to contain expenditures without jeopardizing safety or quality of care. The public is becoming increasingly aware that they are paying the costs, if not directly, then through rising insurance premiums and tax dollars. The literature supports the contention that general containment of medical costs and the overall effectiveness of the health care delivery system are subjects of interest to consumers and third-party payers. Also supported is the impact of physicians on rising costs, as well as the willingness of consumers to seek alternatives to traditional medical procedures, particularly in the area of obstetrics and gynecology. Researchers have isolated areas in which costs have been reduced dramatically using alternative forms of health care, while providing care that is both of high quality and acceptable to patients.

It has been noted that escalating maternity charges are the origin of much concern and anxiety among consumers and have delayed or prevented people from seeking medical care (Cooper, Gray, Moriarity, & Field, 1979). Consumers also are looking for economical care that is safe as well as satisfying (Mather, 1980; Lubic, 1975; Stewart, 1976).

In addition to consumers, insurance companies and health maintenance organizations (HMOs) are examining information regarding medical costs and health care economics in an effort to find keys to containing expenditures. Cunningham (1979) stated that hospitals need to integrate and regionalize services, thus controlling costs through increased productivity, added efficiency, and better utilization of personnel and services. Earle (1981) noted that the Voluntary Effort (VE) has slowed the rise in health care costs through short-term solutions. An example is reduction of in-hospital stores such as paper supplies, suture, office supplies, and disposable gowns.

Lubic (1975) reported that no one really knows how much it costs to run an obstetrical unit, because charges are determined for the hospital as a unit and may not reflect expenses of individual departments. According to Fuchs (1974), before costs of health care can be reduced substantially, consumers and other payers must look at the nature of charges and sources of costs.

With more research of maternity charges incurred in hospitals, health professionals and hospital administrators can analyze areas for reduction of expenditures and develop schemes for cost containment. With comparative data about charges generated by patients of various providers, consumers can be educated to evaluate the quality and economics of various forms of obstetrical care. Data analyzed for this thesis may provide the basis for such comparisons.

Economic System

Economic and political policy have influenced trends in health

care and its costs. With increasing medical expenses, private insurance plans were created along with government aid for the poor. Freeland and Schendler (1981) reported that as insurance coverage improved, the cost of care escalated. These authors felt that insurance insulates consumers from feeling the direct impact of the costs of medical care, thus enabling the medical establishment to continue to raise costs without public resistance.

Social reform during the Kennedy administration imposed government regulations on health care as a quick solution to higher costs. The government provided funding to establish HMOs as an alternative to the fee-for-service system in an effort to stem rising costs, while distributing health care resources to underserved areas.

During the Nixon administration, physicians began to see HMOs as an economic threat because of the rapid growth and acceptance among consumers of the HMO concept. The feeling also existed that HMOs represented the first step toward a national health insurance system. The American Medical Association (AMA) lobbied against government support of the HMO system and from 1972 to 1977, there was a reduction in public funding for alternative medical care systems and an increase in regulation of health planning. Authors at that time, such as Cunningham (1979), wrote that the way to improve quality of health care and reduce hospital charges was through regionalization and integration of services, thus supporting regulation of medical services. Consequently, HMOs experienced slow growth from 1972 to 1977, due to a lack of funding and administrative bureaucracy that added to the cost of health care. Falkson (1979) reasoned that the fact

the HMOs survived demonstrated that they were a competitive system of care.

The trend toward regulation and socialization of medicine changed during the Carter administration, and a strong policy of devaluation took shape with "Reaganomics" (Appelbaum, 1980). Enthoven (1981), Hitt and Harristhal (1980), and Malcolm and Ellwood (1979) all supported deregulation as a means of promoting competition and reducing health care costs. These authors also applauded alternative forms of care. Physicians now view HMOs as an alternative system with which they must compete rather than as the beginning of socialized medicine (Malcolm & Ellwood, 1979).

An example of how the competition strategy works in an alternate system was reported by Lee (1980) at Kansas City University Hospital. A "One Day Maternity Care Program" was developed, costing \$395.00 compared to routine delivery in the Kansas City Hospital estimated at \$1,500.00-\$2,000.00. The program was advertised to include:

Six prenatal classes, all hospital charges and doctor's fees associated with an uncomplicated delivery and release within the 24-hour period, an at-home post-delivery visit for persons living within a 20-mile radius of the hospital, and a pediatric clinic visit. (Lee, 1980, p. 92)

In the first five months of 1979, there was a 61% increase in the number of deliveries at Kansas City University Hospital compared to the same period in 1978. The prenatal and gynecology clinics noted similar increases in visits. The increased obstetrical practice has sparked competition for patients among the other hospitals in the area, which should reduce maternity charges as well as improve the types of services offered in these hospitals.

Another way to reduce charges is through risk-sharing, a system by which the consumer is credited with a fixed amount of money, or subsidy, for health care insurance. Earle (1981) and Enthoven (1981) theorized that if consumers have more economic responsibility for the bills, they will demand the greatest return on the investment of their health dollars. Such action on the part of consumers may stimulate competition among physicians and hospitals to keep charges low.

The major shift in health economics has been from personal consumer responsibility to third-party paying, the latter through private insurance and government subsidy. Freeland and Schendler (1981) stated that ultimately to reduce the cost of medical care, which accounts for 9.7% of the Gross National Product, the free enterprise factors of competition and access to alternative systems of care must be widely introduced.

Professionals' Role in Charges

Many authors have noted that physicians, because of their influence in determining the level and types of medical care received, are the key to containing charges. Fuchs (1981), Lubic (1975), and Sibley (1979) reported that physicians monopolize the market, because they influence at least 70% of medical costs (Freeland & Schendler, 1981). In addition to the fees charged for services, physicians control the frequency and length of appointments, quantity and types of tests performed, basis of service (outpatient or inpatient), recommendation of referrals or consultations, and the number and types of medications. Fifer (1981) stated that the buffering effect of costs by insurance companies and government health programs has fostered

overutilization of services. He believes that this is due to a lack of incentives for physicians to be cost conscious. The increased incidence of malpractice suits also has promoted the liberal use of tests and procedures to document diagnoses. Unfortunately, the generous use of equipment, expensive treatment modalities, and proliferation of extravagant technology does not ensure quality care (Lubic, 1975; Newhouse & Friedlander, 1977). In fact, Slayton (1981) stated that the added technology diverts knowledge, expertise, and money from the main flow of obstetrical care.

Hospitals may need to become "resource allocators" to reduce excessive use of technology by weighing the cost-benefit ratio, as noted by Fifer (1981) and Hitt and Harristhal (1980). Fuchs (1981) viewed the research emphasis as changing in response to decreased funding. The new accent will be on expense justification of advanced technology and its impact on improving the quality of medical care (Almy, 1981).

Blue Cross' refusal to pay for routine standing orders or non-essential tests is a step toward individualized care with less waste (Earle, 1981). Both Fifer (1981) and Fuchs (1981) referred to reimbursement systems utilizing a fixed payment, based on the average cost per case. Under this system, a physician would be motivated to reduce test expenses and hospitalization in order to maintain a high personal income.

Consumers' Role in Maternity Charges

As part of the growing consumer movement in health care, families are seeking safe, family-centered, quality care at a reasonable cost.

Mather (1980) in a study of women of childbearing age found that 67% of the women in the sample were interested in an alternative to the traditional delivery, such as a birthing room, birthing center, or home delivery. In response to consumer requests, a number of alternative maternity concepts have been developed (Hickey, DeRoeck, & Shaw, 1977; Lubic, 1975; Rising, 1975; Scupholme, 1981; Sigmond, 1981; Yanover, Jones & Miller, 1976).

An example is a birth-room approach developed and implemented in a Phoenix, Arizona hospital (Faxel, 1980). The program was designed to accommodate low-risk pregnancies and has the philosophy of family-centered care and personal participation. The labor, birth and postpartum periods are spent in a two-room suite. The suite is decorated in a home-style atmosphere and, if desired, family and friends may be present. The family usually goes home within the first 24 hours after delivery. On the first and third days after the delivery, a nurse makes home visits to assess the mother's and baby's status. The outcome of the pregnancy and delivery were the same for women electing the birth-room alternative and those choosing the traditional delivery-room birth and three-day hospital stay (Kieffer, 1980). To evaluate consumer satisfaction, a questionnaire was sent to women using the birthing-room during the first year of the experiment. The questionnaire response was 89.3%, with 98.2% feeling positive about their experiences. A total of 33% would have considered home delivery as an alternative had the birthing-room service not been available (Kieffer, 1980). A home delivery may have caused unnecessary risk for some of those women if untrained personnel were

used, as documented by Cameron, Chase, and O'Neal (1979). Hazell (1975), Mehl, Peterson, Whitt, & Hawes (1977), and Cameron et al. (1979), found the most frequently cited reasons for choosing home births were: control over environment; family-oriented and personalized care; no intervention; and low cost. In the health belief model, developed to explain health-related behavior, Becker, Brachman, and Kirscht (1974) noted that the perceived costs of medical services are barriers to obtaining care.

Consumers have a growing concern about the iatrogenic complications associated with hospitalization, resulting from an activity or attitude of a physician or treatment (Stedman, 1976). Steel, Gertman, Crescenzi, and Anderson (1981) found that on a medical unit, 36% of patients developed one or more iatrogenic illness and that length of stay was positively correlated with iatrogenic events. A number of authors, the best known being Caldero-Barcia (1975) have questioned certain obstetrical practices and interventions such as amniotomy, episiotomy, anesthesia, forceps, inductions, limitations of fluids, lack of ambulation, and electronic fetal monitoring. Conversely, each of these practices also has been documented to improve perinatal outcomes when used appropriately.

Target Areas for Charge Reduction

In efforts to contain costs, HMOs have substantially reduced the number of clients admitted to hospitals and shortened their lengths of stay. Earle (1981) and Marks (1980) found that outpatient surgery leads to better utilization of hospital beds. It has been documented that maternity care with early discharge from the hospital, usually

within the first 24 hours, is as safe as the traditional three-day stay, at two-thirds to one-half the cost. (Hickey, DeRoeck, & Shaw, 1977; Lubic, 1975; Reid & Morris, 1979; Scupholme, 1981; van Arkel, Ament, & Bell, 1980; Yanover et al., 1976). The charge to patients released early took into account the cost of home visits, including transportation; of home supplies; and of a newborn physical examination. In some programs five hours of homemaker services were offered for five days, as were a pediatric visit at one week and laboratory fees for phenylketonuria (PKU), hematocrit, and bilirubin. Rising (1975) found a high satisfaction rate among women discharged early, resulting from involvement of significant others and an increased ability to relax.

Cunningham (1979) and Sigmond (1981) felt that the family is one of the nation's largest resources for combating rising charges. By augmenting family-centered care, the system bolsters major factors in health: loving, caring, and support. Willing family volunteers are a means of cutting costs and relieving the overworked, understaffed system, while maintaining humanistic care.

Some private insurance companies have supported hospital efforts to provide early discharge services. In a suburb of Boston, Major Medical is offering a \$200.00 rebate to clients who go home within the first 24 hours following delivery (Short Hospital Stays, 1980).

Cunningham (1979) pointed out that another way to reduce hospital charges is to promote self-care, such as the self-administration of medications: Nursing time is reduced while promoting patient independence. The unit dose medication dispensing system can be expensive

because, in addition to the wholesale cost of the medications prescribed, a standard fee is charged for pharmacy and nursing services. Clients could eliminate those charges by bringing routine drugs (Tylenol, iron, prenatal vitamins) to the hospital, or providers might reduce costs by ordering medications in set quantities, eliminating numerous handling charges. At the same time, staff would be utilized more effectively and economically. The consumer would have more control over his/her care, thus increasing consumer satisfaction.

Haire (1981) questioned whether medications have been substituted for personalized, quality care. Almy (1981) also viewed personalized care as being exchanged for technology. Unfortunately, such replacements are made at the expense of consumers. Epidural anesthesia usually escalates a bill in excess of \$200.00, and there may be an additional anesthesiologist's charge. Supplemental safety equipment is recommended: intravenous line, continuous electronic fetal monitoring, resuscitation equipment, and access to an operating room, each with its own costs.

In a small sample, Yanover, Jones, and Miller (1976) investigated patients on the basis of receiving epidurals. Compared to a control group who delivered without epidurals, four times as many women having epidurals were not ready for release from the hospital within 24 hours after delivery. The longer stay was attributed to the woman's inability to ambulate as quickly, which decreased self-help skills. There were no correlations between the use of analgesics and length of stay. A longer hospitalization increases the bill; thus it follows that one decision, such as performing an epidural, can have a

snowball effect on hospital delivery charges.

Fuchs (1974) viewed better utilization of mid-level practitioners, such as certified nurse-midwives, as a means of containing costs and increasing productivity.

A certified nurse-midwife (CNM) is an individual educated in the two disciplines of nursing and midwifery, who possesses evidence of certification according to the requirements of the American College of Nurse-Midwives (ACNM). Nurse-midwifery practice is the independent management of care of essentially normal newborns and women, antepartally, intrapartally, postpartally and/or gynecologically. This occurs within a health care system which provides for medical consultation, collaborative management, or referral and is in accord with the "Functions, Standards and Qualifications for Nurse-Midwifery Practice" as defined by the ACNM. (American College of Nurse-Midwives, 1978, n.p.)

It has been documented that utilization of certified nurse-midwives has not jeopardized the quality of care. In fact, the infant and maternal morbidity statistics have improved at Booth Maternity Center (Ernst & Forde, 1975), Frontier Nursing Service (Brown & Isaacs, 1976), Mississippi Medical Center (Slome, Wetherbee, Daly, Christensen, Meglen, & Thiede, 1976), rural Georgia (Reid & Morris, 1979), and Maternity Center Association (Lubic & Ernst, 1978) with the utilization of nurse-midwives.

The most striking statistics are from retrospective studies done in Madera County, California. There was a unique opportunity to analyze data prior to, during and after a two-and-one-half-year nurse-midwifery service experiment. In a rural California hospital, researchers assessed the use of nurse-midwives in giving antepartal, intrapartal, and postpartal care to an indigent population. The implementation dates were January 1961 to June 1962, and data collected from 1959 were used for comparison (Montgomery, 1969). The

major findings were an increase in prenatal care, begun during the first trimester of pregnancy, a rise in the number of prenatal visits per pregnancy and an increase in the number of women returning for postpartum care. The prematurity rate dropped from 11.0% to 6.4%, and the neonatal death rate dropped from 23.9/1,000 births to 10.3/1,000 during the project. Levy, Wilkinson, and Marine (1971) conducted a follow-up investigation using both hospital and county data during, as well as after, the project. The investigators found that after the project ended, the number of women who received prenatal care in the first trimester of pregnancy dropped to one quarter, and twice as many women received no prenatal care. The prematurity rate increased from 6.6% to 9.8% after the termination of the project. The neonatal death rate increased from 10.3/1,000 to 32.1/1,000, which was higher than the pre-program level. They found no such changes elsewhere in the county. The findings of both studies indicated that the quality and increased manpower of nurse-midwifery services were responsible for the improved perinatal outcomes.

Lubic (1975) pointed out that consumers do not see quality only in terms of technology, but also from the perspective of humanistic care. Research of consumer satisfaction of nurse-midwifery services has been positive (Ernst & Forde, 1975; Hickey, DeRoeck, & Shaw, 1977; Reid & Morris, 1979; Rising, 1975; Slome et al., 1976; Yanover, Jones, & Miller, 1976). The majority of women sampled selected their providers and felt that family-centered care, control over their experiences and humanistic treatment were important qualities in their choice of the nurse-midwife alternative.

Nurse-midwives have been characterized as viewing childbirth as a normal process. Slayton (1981) noted that certified nurse-midwives use less intervention, fewer risky procedures, less medication, and require less expensive equipment and technology. Haire (1981) also described nurse-midwives as noninterventionists and stated how expansion of nurse-midwifery services can improve maternity outcomes. The improved maternity outcomes of nurse-midwives were stated to be a result of the high quality of care they provide, with fewer iatrogenic complications.

The Kaiser Health Plan hired nurse-midwives for less than half the salary of physicians (Record & Cohen, 1972), making nurse-midwives extremely cost effective. They also noted that utilization of an obstetrician only for high-risk pregnancies was more efficient and economical. The high-risk mother has better access to in-depth medical attention, and the physician can spend more time meeting her unique needs (Haire, 1981). Fuchs (1974) and Mechanic (1974) both noted that there is a high level of satisfaction among consumers who use mid-level practitioners within health teams.

Little has been written about the types of hospital charges, but many authors have hypothesized about factors that influence costs. It has been shown that politics, professionals, and consumers all play a role in hospital charges. Awareness of these factors and research into hospital maternity charges and services can lead to strategies for containing costs, for which nurse-midwives offer attractive alternatives. One such study was reported by Cherry and Foster (1982).

Cherry (1981) completed a comparative, retrospective study of

hospital charges generated by certified nurse-midwives' and physicians' clients in a tertiary medical center. The mean hospital bill for the certified nurse-midwife group was \$419.64 compared to the physician provider group mean of \$533.31. This was a mean difference of \$114.00 ($p < .009$). The physician group included deliveries by house staff, residents, and medical students.

The certified nurse-midwives' deliveries were matched in the Delivery Log to a physician client with a similar delivery. The result was 48 certified nurse-midwives' and 45 physicians' clients.

The groups were well matched in parity, type of delivery, labor and delivery usage time, infant weight, Apgar scores, infant outcomes, and ward charges. The mean age of the certified nurse-midwives' clients was significantly older (26.1 years) than the physicians' clients (23.1 years). The certified nurse-midwife group used less electronic fetal monitoring, with only 8% of the women internally monitored compared to 33% of the physician group. Cherry also noted that 52% of the certified nurse-midwife group had no anesthesia compared to 18% of the physician group. Epidural anesthesia was used by 8% of the certified nurse-midwives' patients and by 22% of the physicians' patients. Payment data were available on 27 of the certified nurse-midwifery group. Payment consisted of 17 private insurance, 4 self-pay, 2 private insurance and self-pay, 2 bank notes, 1 Medicaid, and 1 sponsoring agency. Of the 25 available payment types for the physician group, 7 were private insurance, 3 self-pay, 1 private insurance and self-pay, 1 bank note, 4 Medicaid, and 9 with a variety of sponsoring agencies, charities, and bad debts.

The mean hospital stay for the certified nurse-midwife group was 1.5 days compared to the physician group mean of 2.1 days. The length of the postpartum hospitalization ranged from 12 hours to 5 days. The shortened hospital confinement of the certified nurse-midwife group was positively correlated to the reduced mean hospital bill.

The major limitation of the study was a lack of homogeneity between the provider groups. Cherry (1981) noted that the certified nurse-midwife group may have represented a more mature and stable population because the clients were older and contained a greater percentage of private insured and self-pay clients. Conversely, the physician group had a greater variety of payment types with a greater percentage of clients receiving payments by Medicaid, charity, sponsoring agencies or incurring bad debts.

Another possible limitation of the study was the use of a tertiary medical center with a clinic population comprising some of the physician provider group. The clinic patients see a variety of staff obstetricians, residents, and medical students throughout their antepartum, intrapartum, and postpartum care. One would hypothesize that a consumer choosing this type of care would differ from a consumer who primarily sees one certified nurse-midwife for her antepartum, intrapartum, and postpartum care.

Therefore, the purposes of the present research were:

1. To present descriptive data on the types of maternity charges for the low-risk client in a community hospital.
2. To compare hospital maternity charges to consumers of certified nurse-midwives', family practitioners' and obstetricians' services.

CHAPTER II

METHODOLOGY

Site

A community hospital was selected due to its low-risk maternity population and delivery privileges for obstetricians, family practice physicians, and certified nurse-midwives. The clients were predominantly private and each received maternity care from only one provider group. Added features of the facility were its philosophy of family-centered care and dedication to research.

Subjects

The sample consisted of hospital bills of all women who had normal vaginal deliveries at the community hospital selected between December 1, 1981, and March 31, 1982. For the purpose of this study, normal vaginal delivery was defined as all vaginal deliveries which met the "Eligibility for Admission Criteria to the Community Hospital" (Appendix) and which were not recorded in the Delivery Log as difficult or needing high forceps assistance. Women also were required to have had their antepartum, intrapartum, and postpartum care managed by only one provider group. A client delivered by a nurse was coded into the provider group that managed her antepartum, intrapartum, and postpartum care. A client managed by a certified nurse-midwife or family practitioner requiring a forcep delivery by an obstetrician was coded into the certified nurse-midwife

or family practice group.

Design

The design utilized was a retrospective, cross-sectional, comparative study analyzing hospital charges incurred by maternity clients with different types of providers. The sample group was selected from the Delivery Log and coded into one of the three provider groups: certified nurse-midwife, obstetrician, or family practitioner. Obstetrical data and medical records numbers were obtained for each subject at that time. If there was a question about whether the subject met the sample criteria, her medical record was reviewed.

Names of the subjects were given to the billing department, which supplied the requested bills. Later in the data collection process, the researcher personally collected the appropriate bills. The charges were recorded on computer analysis sheets along with the obstetrical data from the Delivery Log. Hospital charge categories were determined by Cherry's (1981) previous research and bill categories. Subjects were identified by code numbers, never by name.

Limitations

From the beginning of the study the following limitations were recognized:

1. Subjects selected their own provider, thus differences between groups may reflect the type of consumer who seeks the services of a particular provider.
2. The design was retrospective, utilizing available records which were assumed to be complete and accurate.

3. A low percentage of deliveries by obstetricians resulted in a small comparison group.

CHAPTER III

RESULTS AND DISCUSSION

Data gathered were analyzed at the University of Utah using Statistical Package for the Social Sciences (SPSS) procedures: frequencies, chi-square, t-test, F-test, and analysis of variance using the method of Duncan. The significance level for relationships among groups was set at the .05 level.

Description of the Sample

Of the 305 deliveries between December 1, 1981, and March 31, 1982, a total of 45 maternity clients were eliminated for the following reasons: Cesarean birth (19), elevated infant bilirubin (6), postpartum tubal ligation (2), transfer of infant to tertiary medical center (2), infant less than 36 weeks (1), documented problems in maternal medical history (3), documented problems in obstetrical history (3), or missing hospital bills (10). Of the 45 maternity clients eliminated, 11 received care from a certified nurse-midwife (CNM), 13 from an obstetrician (OB), and 21 from a family practitioner (FP). The sample consisted of 260 maternity bills divided among the provider groups as follows: 60 certified nurse-midwives', 39 obstetricians', and 161 family practitioners' clients.

The groups were well matched demographically, as illustrated in Table 1. The mean age for the combined group was 25.78 years with ages ranging from 17 to 43 years. There were no significant

Table 1
 Comparison of Demographic Data Between Clients of
 Certified Nurse-Midwives, Family Practitioners,
 and Obstetricians

	Combined N=260		CNM N=60		Obstetricians N=39		Family Practitioner N=161		p
	N	%	N	%	N	%	N	%	
<u>Age in Years</u>									
Mean	25.78		26.09		25.10		25.86		NS
St. Dev.	4.39		4.51		3.83		4.61		
Range	17-43		17-39		20-41		18-43		
Missing Data	13		2		0		11		
<u>Gravidity in Weeks</u>									
Mean	3.23		3.22		2.16		3.24		NS
St. Dev.	2.17		2.29		2.09		2.15		
Range	1-12		1-11		1-10		1-12		
Missing Data	2		1		1		0		
<u>Number of Living Children</u>									
Mean	1.96		1.93		1.68		2.04		NS
St. Dev.	1.90		1.85		1.80		1.95		
Range	0-12		0-6		0-9		0-12		
Missing Data	2		1		1		0		
<u>Miles from Residence to Facility</u>									
<10	220	85.3	47	78.4	33	84.6	140	88.1	NS
10-50	30	11.4	10	16.6	4	10.3	16	10.1	
>50	8	3.3	3	5.0	2	5.1	3	1.8	
	258	100.0	60	100.0	39	100.0	159	100.0	
Missing Data	2		0		0		2		

differences between groups in mean age, which does not support Cherry's (1981) finding of an older certified nurse-midwife group. Gravidity and the number of living children were obtained from the Delivery Log. Gravidity, the number of pregnancies, included the present pregnancy. Parity also was listed in the Delivery Log, but according to the nurses who recorded the information, parity refers to the number of living children prior to delivery. Billing records showed a total of 24 cities, however, for more than 75% of the sample, Orem or Provo, Utah, was listed as the home address.

Data for Maternal Status

The maternal status variables for the three groups are presented in Table 2. To be included in the sample group, clients were required to have had a normal vaginal delivery. The type of delivery included spontaneous and forcep deliveries, excluding high forceps. Certified nurse-midwives do not perform forcep deliveries, so women who were managed by nurse-midwives and delivered by another practitioner, for the purpose of this investigation, would have been included in the nurse-midwives group. No such cases were encountered, however. Information also was recorded in the Delivery Log if the deliverer was not the patient's main care giver. This situation occurred only within one provider group. Women who were delivered by nurses were coded into the provider group from which they received care (4, obstetrician; 4, family practitioner). As shown in Table 2, there was a significantly ($p = .0083$) higher incidence of forceps deliveries in the obstetrician group (15.4%) and the family practitioner group (13.7%), compared to the certified nurse-midwife group (0.0%).

Table 2
 Comparison of Delivery Variables Between Clients of Certified Nurse-Midwives,
 Obstetricians, and Family Practitioners

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Type of Delivery</u>									
Spontaneous	232	89.2	60	100.0	33	84.6	139	86.3	.0080
Forceps	28	10.8	0	0.0	6	15.4	22	13.7	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Delivery Site</u>									
Birth Room	226	86.9	55	91.7	30	76.9	141	87.6	NS
Delivery Room	34	13.1	5	8.3	9	23.1	20	12.4	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Rupture of Amniotic Sac</u>									
Spontaneously	85	35.7	32	39.3	18	54.6	45	30.2	.0247
Artificially	153	64.3	34	60.7	15	45.5	104	69.8	
Totals	238	100.0	56	100.0	33	100.0	149	100.0	
Missing Data	22		4		6		12		
<u>Electronic Fetal Monitoring</u>									
None	89	34.2	29	48.3	6	15.4	54	33.5	.0032
External &/or Internal	171	65.8	31	51.7	33	84.6	107	66.5	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	

Table 2 -- Continued

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Perineum</u>									
Intact	46	17.7	12	20.0	6	15.4	28	17.4	NS
Episiotomy	214	82.3	48	80.0	33	84.6	133	82.6	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Placenta</u>									
Spontaneous	235	91.4	56	94.9	34	89.5	145	90.6	NS
Manual	22	8.6	3	5.1	4	10.5	15	9.4	
Totals	257	100.0	59	100.0	38	100.0	160	100.0	
Missing	3		1		1		1		
<u>Maternal Complications</u>									
None	213	82.2	51	84.9	27	69.1	135	83.9	--
Augmentation	26	10.0	6	10.0	6	15.4	14	8.7	
Induction	9	3.5	1	1.7	4	10.3	4	2.5	
Postpartum Hemorrhage	7	2.7	1	1.7	1	2.6	5	3.1	
Abruption	2	.8	--	--	--	--	2	1.2	
Pregnancy-Induced Hypertension	1	.4	--	--	--	--	1	.6	
Hypotension	1	.4	1	1.7	--	--	--	--	
Hypotension & Postpartum Hemorrhage	1	.4	--	--	1	2.6	--	--	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	

The delivery site was either a delivery room or a labor room equipped with a birthing bed. Forcep deliveries and difficult repairs were done in the birthing rooms as well as in the delivery rooms. There was no significant difference in the site of delivery, but it is interesting to note that fewer nurse-midwifery clients (8.3%) used the delivery room, compared to those of the FP group (12.4%) and OB group (23.1%).

Electronic fetal monitoring was used by 84.6% of the OB group, 66.5% of the FP group, and 51.7% of the CNM group. This represents a significantly ($p = .0032$) greater use of external and/or internal monitoring by obstetricians.

Rupture of the amniotic sac showed a significance at the $p = .0247$ level. An amniotomy, artificial rupture of the amniotic sac, was performed in 69.8% of the FP cases and 60.7% of the CNM group, compared to 45.5% in the OB group, showing that obstetricians did significantly fewer amniotomies.

The groups were matched on the perineum status (Table 2). The episiotomy group included all women who had second-, third-, and fourth-degree lacerations, as well as women who had episiotomies. There were no significant differences between groups in delivery of the placenta, although the certified nurse-midwifery group had fewer manual removals.

There were minimal maternal complications in all groups, as the sample represented a low-risk population, with augmentation and induction of labor and postpartum hemorrhage the most frequently cited problems. A chi-square analysis could not be done because of the lack

of a significant volume of complications. It is interesting to note that the obstetrician group had a greater percentage of augmentations and inductions.

The use of anesthesia is shown in Table 3. A chi-square analysis was performed on the data, with all groups showing significance. Because of low cell frequency in three variables, the p value's significance could not be interpreted, and, thus, was omitted from Table 3.

The most frequently used anesthesia by all three provider groups was the local. In the CNM group, 81.7% used local anesthesia, compared to 51.3% of the OB group and 57.1% of the FP group. The use of local anesthesia was significant at the .0199 level.

The use of epidural anesthesia also was significantly ($p = .0081$) different among the three provider groups. Epidural anesthesia was used by 38.5% of the OB group, 23.6% of the FP group, and 11.7% of the CNM group. The greater use of epidural anesthesia by obstetricians may be explained by the fact that, at the hospital studied, epidural placement and management are done by an obstetrician or an anesthesiologist, and, thus, are readily accessible to obstetricians' clients. This does not explain the relatively high use of epidural anesthesia by the family practitioner group, however. Research by Cherry (1981) documented a relatively low use of epidural anesthesia by certified nurse-midwives. Pudendal and paracervical anesthesia were most frequently used by the FP group.

Some women had more than one type of anesthesia during labor and delivery. A breakdown of the types used is shown in Table 3. The

Table 3
 Comparison of Anesthesia Use Between Clients of Certified Nurse-Midwives,
 Obstetricians, and Family Practitioners

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Local</u>									
With	161	61.9	49	81.7	20	51.3	92	57.1	.0199
Without	99	38.1	11	18.3	19	49.7	69	42.9	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Pudendal</u>									
With	27	10.4	1	1.7	3	7.7	23	14.3	a
Without	233	89.6	59	98.3	36	92.3	138	85.7	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Paracervical</u>									
With	22	8.5	3	5.0	0	0.0	19	11.8	a
Without	238	91.5	57	95.0	39	100.0	142	88.2	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Epidural</u>									
With	60	23.1	7	11.7	15	38.5	38	23.6	.0081
Without	200	76.9	53	88.3	24	61.5	123	63.3	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	

Table 3 -- Continued

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Anesthesia Use</u>									
None	20	7.7	6	10.0	3	7.7	11	6.8	a
Anesthesia	240	92.3	54	90.0	36	92.3	150	93.2	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Types of Anesthesia</u>									
None	20	7.7	6	10.0	3	7.7	11	6.8	a
Local	137	52.7	44	73.3	18	46.1	75	46.6	
Pudendal	16	6.1	--	--	1	2.6	15	9.3	
Paracervical	6	2.3	4	6.7	--	--	2	1.2	
Epidural	56	21.5	3	5.0	15	38.5	38	23.6	
Pudendal & Local	5	1.9	--	--	2	5.1	3	1.9	
Paracervical & Local	12	4.6	--	--	--	--	12	7.5	
Paracervical & Pudendal	3	1.2	--	--	--	--	3	1.9	
Paracervical & Pudendal & Local	2	.8	--	--	--	--	2	1.2	
Epidural & Local	2	.8	2	3.3	--	--	--	--	
Epidural & Pudendal	1	.4	1	1.7	--	--	--	--	
Totals	260	100.0	60	100.0	39	100.0	161	100.0	

^aCell size was too small to be interpreted.

choice of anesthesia used may be due to the preferences of the patient or the provider.

Data for Infant Status

The groups were well matched for all the infant status variables, as illustrated in Table 4. Gestation, weeks from the last menstrual period, was omitted on one page of the Delivery Log, resulting in 16 instances of missing data. Infant weight was the datum most frequently omitted, probably because the delivery room nurse records data in the Delivery Log and is not necessarily the nurse who weighs the baby.

Apgar scores at one-minute ranged from 2 to 9. All infants with Apgar scores of less than 6 were reviewed. If the score had the potential of increasing the mother's maternity charges (for instance, if an elevated bilirubin was present, requiring a longer hospitalization), that patient was omitted from the sample. The most frequently cited reason for the low Apgar score was nuchal cord or meconium stained fluid. The five-minute Apgar scores ranged from 6 to 10, with all but one greater than 6.

The groups had similar infant outcomes with 77% of the combined groups having no complications recorded. A nuchal cord was present in 10.8% of the deliveries and meconium stained amniotic fluid in 7.3%, representing the two most frequently cited infant complications.

Summary of Delivery Variables

There were minimal maternal and infant complications in all groups, representing a well-matched, low-risk sample. The groups were

Table 4
Comparison of Infant Status Between Clients of
Certified Nurse-Midwives, Obstetricians, and
Family Practitioners

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Gestation in Weeks</u>									
Mean	40.05		39.95		40.21		40.05		NS
St. Dev.	1.21		1.11		1.32		1.21		
Range	36-43		38-42		36-43		37-43		
Missing Data	16		5		1		10		
<u>Infant Weight in Grams</u>									
Mean	3581.4		3503.4		3576.3		3612.2		NS
St. Dev.	412.2		425.1		357.8		419.2		
Minimum	2550.0		2550.0		3090.0		2865.0		
Maximum	5215.0		4225.0		4225.0		5215.0		
Missing Data	98		22		15		61		
<u>Apgar Score</u>									
<u>One Minute</u>									
Mean	7.21		7.44		7.21		7.12		NS
St. Dev.	1.36		1.24		1.21		1.43		
Range	2-9		4-9		5-9		2-9		
<u>Five Minute</u>									
Mean	3.78		8.80		8.74		8.78		NS
St. Dev.	.64		.58		.65		.65		
Range	6-10		7-10		7-10		6-10		
Missing Data	6		1		1		4		
<u>Infant Complications</u>									
None	199	76.5	47	78.3	32	82.0	120	74.5	--
Meconium	14	5.5	2	3.3	3	7.7	9	5.6	
Nuchal Cord	24	9.3	6	10.0	2	5.1	16	10.0	
Posterior	4	1.5	--	--	--	--	4	2.5	
Decelerations	4	1.5	1	1.7	1	2.6	2	1.2	
Shoulder Dystocia	4	1.5	--	--	1	2.6	3	1.9	
Tachycardia	1	.4	--	--	--	--	1	.6	
Resuscitated	4	1.5	3	5.0	--	--	1	.6	
Meconium & Nuchal Cord	4	1.5	1	1.7	--	--	3	1.9	
Meconium & Shoulder Dystocia	2	.8	--	--	--	--	2	1.2	
	260	100.0	60	100.0	39	100.0	161	100.0	

similar in weeks of gestation, delivery site, episiotomy rate, management of the placenta, infant weight and Apgar scores. Significant differences noted were fewer forcep deliveries and less electronic fetal monitoring in the CNM group. The obstetricians did fewer amniotomies. Local was the most frequently used type of anesthesia in all groups, with the greatest percentage done by certified nurse-midwives. Obstetricians used a greater percentage of epidural anesthesia. The FP group was in the middle in percentage of local and epidural anesthesia used. The family practitioners used pudendal and paracervical blocks more frequently than did obstetricians and certified nurse-midwives.

Labor and Delivery Charges

At the time of admission, clients had the option of an alternative birthing center service or traditional hospital service. The only differences are that the alternative birthing center service allows clients to follow through on an early discharge scheme and charges are figured differently. Clients choosing the alternative birthing center service were charged a fee of \$225.00. Clients opting for the traditional hospital service were charged a flat fee for labor service (\$69.00), delivery service (\$124.00), and recovery service (\$33.00). Interestingly, both routes total \$225.00, which brings up the question of whether the charge is a reflection of the hospital's true cost. Table 5 gives the mean charges for the provider groups. December, January, February, and March were chosen for data collection because there were no rate increases during those months. Due to errors in billing, women delivering in December occasionally were charged the previous rate. In the combined groups, one woman was

Table 5
 Comparison of Labor and Delivery Room Charges Between
 Consumers of Certified Nurse-Midwives, Obstetricians,
 and Family Practitioners

	Combined N=260	CNM N=60	OB N=39	FP N=161	p
<u>Labor Service Charge</u>					
Mean	\$ 67.98	\$ 68.00	\$ 68.00	\$ 67.97	NS
St. Dev.	.27	.00	.00	.37	
Minimum	64.10	68.00	68.00	64.10	
Maximum	68.00	68.00	68.00	68.00	
Number Charged	181	37	30	114	
<u>Delivery Service Charge</u>					
Mean	\$122.50	\$122.71	\$122.67	\$122.38	NS
St. Dev.	3.12	2.97	2.87	3.22	
Minimum	116.05	116.05	116.05	116.05	
Maximum	124.00	124.00	124.00	124.00	
Number Charged	180	37	30	113	
<u>Recovery Service Charge</u>					
Mean	\$ 33.23	\$ 33.00	\$ 33.56	\$ 33.18	NS
St. Dev.	2.25	.00	3.98	2.02	
Minimum	33.00	33.00	33.00	33.00	
Maximum	55.00	33.00	55.00	55.00	
Number Charged	190	39	32	119	
<u>Alternate Birthing Center Service Charge</u>					
Mean	\$223.54	\$224.03	\$223.70	\$223.26	NS
St. Dev.	3.89	3.30	3.71	4.21	
Minimum	213.30	213.30	213.30	213.30	
Maximum	225.00	225.00	225.00	225.00	
Number Charged	80	24	9	47	

charged \$64.10 for labor service, 34 women were charged \$116.05 for delivery service, and 10 women were charged \$213.30 for alternative birthing center service. Even with those errors, the group mean charges for the services were within cents of each other.

There was a charge of \$33.00 for 1-2 hours of recovery service. Two women were charged \$55.00 for recovery service of 2-5 hours. Their records were reviewed to determine that they met the sample criteria, which they did: one of these women was even discharged within 12 hours of delivery.

The most common billing error was a \$33.00 recovery service charge for 11 women using the alternative birthing center service. One client of a certified nurse-midwife was billed for labor, delivery, recovery, and an alternative birthing center service, resulting in an overcharge of \$225.00. A family practitioner's client was charged only for labor and recovery service.

Other labor and delivery charges were for electronic fetal monitoring, anesthesia, extra linen, and extra supplies, all of which showed significance differences between the provider groups (Table 6). The charges for electronic fetal monitoring were \$11.05 for external monitoring and \$6.10 for an internal scalp electrode lead. Anesthesia charges were for equipment only, resulting in \$5.55 for local anesthesia, \$11.05 for a pudendal block, \$16.60 for a paracervical block, and \$28.00 for epidural anesthesia. At the time this study began, epidural management and placement charges were billed directly to the patient by the physician. After data collection had commenced, the hospital began including charges for epidurals in the bill. To

Table 6
 Comparison of Labor and Delivery Charges Between Consumers of
 Certified Nurse-Midwives, Obstetricians, and
 Family Practitioners

	Combined N=260	CNM N=60	OB N=39	FP N=161	p
<u>Electronic Fetal Monitoring Charges</u>					
Mean	\$ 9.33	\$ 6.56	\$ 12.04	\$ 9.71	.0009
St. Dev.	7.46	7.19	6.20	7.56	
Range	0-29.35	0-29.35	0-25.45	0-29.35	
<u>Anesthesia Charges</u>					
Mean	\$ 12.58	\$ 8.90	\$ 14.45	\$ 12.58	.0074
St. Dev.	10.58	9.26	11.28	10.60	
Range	0-39.05	0-39.05	0-28.00	0-38.75	
<u>Extra Linen Charges</u>					
Mean	\$ 1.91	\$.20	\$ 2.54	\$ 2.39	.0006
St. Dev.	3.95	1.58	4.01	4.39	
Range	0-18.30	0-12.20	0-14.10	0-18.30	
<u>Extra Supplies Charges</u>					
Mean	\$ 16.98	\$ 14.86	\$ 20.08	\$ 17.03	.0409
St. Dev.	10.07	10.35	9.93	9.86	
Range	0-49.80	0-38.85	0-41.35	0-49.80	
<u>Total Labor and Delivery Charges</u>					
Mean	\$271.93	\$261.77	\$277.06	\$274.48	.0168
St. Dev.	31.94	40.27	21.71	29.84	
Minimum	208.80	225.00	230.55	208.80	
Maximum	524.95	524.95	341.75	386.50	

prevent inconsistencies, placement and management fees were subtracted from the bills. Fees ranged from \$19.50 to \$282.00 with the mean charge for the 35 women receiving extra epidural charges being \$186.67.

There was an extra charge of \$6.10 for each additional gown or set of leggings needed. Family practitioners and obstetricians ordered extra linen more often than certified nurse-midwives. In Table 6, "Extra Supplies" summarizes several infrequently used charges. Items within this category included oxygen (\$7.20), gift pack (\$18.80), intravenous equipment (\$1.25-\$16.60), x-ray sponges (\$15.50), and items like catheters and snacks. Interestingly, charges for such items individually were not significant, but when the charges were totaled, the mean charge for the FP group and the CNM group was significantly ($p = .0409$) less than for the OB group.

Table 6 gives the total labor and delivery charge means. The mean charge for the OB group was \$277.06, for the FP group, \$274.48, and for the CNM group, \$261.77. The mean difference between the CNM group and the OB group was \$15.29 and between the FP group and the CNM group, \$12.71 ($p = .0168$).

In summary, the differences between the groups in labor and delivery charges were related to equipment and supplies used, which may reflect provider preferences. Differences noted were use of electronic fetal monitoring, anesthesia, and extra supplies.

Laboratory Charges

Laboratory charges were similar among the groups (Table 7). The total laboratory charge mean for certified nurse-midwives' clients

Table 7
 Comparison of Laboratory Charges Between Consumers of
 Certified Nurse-Midwives, Obstetricians, and
 Family Practitioners

	Combined N=260	CNM N=60	OB N=39	FP N=161	p
<u>Total Laboratory Charges</u>					
Mean	\$ 34.66	\$ 33.25	\$ 43.46	\$ 33.06	NS
St. Dev.	42.99	45.21	66.08	34.33	
Minimum	0.00	8.30	0.00	8.30	
Maximum	401.05	338.20	401.00	258.25	
<u>Urinalysis Charges</u>					
Mean	\$ 7.25	\$ 7.33	\$ 7.49	\$ 7.17	NS
St. Dev.	3.85	3.77	3.71	3.93	
Minimum	0.00	0.00	0.00	0.00	
Maximum	24.90	24.90	16.60	16.60	
<u>Hematology Charges</u>					
Mean	\$ 14.25	\$ 14.90	\$ 15.01	\$ 13.82	NS
St. Dev.	5.80	6.69	7.42	4.93	
Minimum	0.00	0.00	0.00	0.00	
Maximum	64.85	44.25	53.75	64.85	
<u>Serology Charges</u>					
Mean	\$ 3.64	\$ 3.07	\$ 3.88	\$ 3.80	NS
St. Dev.	8.24	6.36	9.14	8.65	
Minimum	0.00	0.00	0.00	0.00	
Maximum	48.85	21.00	34.00	48.85	
<u>Blood Bank Charges</u>					
Mean	\$ 8.89	\$ 7.95	\$ 17.12	\$ 7.25	NS
St. Dev.	35.11	39.32	58.40	24.41	
Minimum	0.00	0.00	0.00	0.00	
Maximum	339.00	290.00	339.00	230.00	

was \$33.25; obstetricians' clients, \$43.46, and family practitioners' clients, \$33.06. The mode for each provider group was \$21.60, which included a urinalysis (\$8.30) and complete blood count (\$13.30). In addition to the complete blood count (CBC), the hematology charges were: hematocrit (\$6.65), hemoglobin (\$6.65), and call back fees.

The mode for serology and blood bank was zero. Blood cord analysis (\$13.85), Rhogam analysis (\$21.00) made up the serology charges. Blood bank charges included ABO and Rh typing (\$8.85), cross-match (\$21.00), antibody screen (\$12.15), whole blood (\$34.00), packed cells (\$34.00), Rhogam (\$48.00), and miscellaneous blood bank services (\$25.00, \$50.00). Similar charges in serology and blood bank suggest that the groups were matched in the number of women who were Rh negative and who required blood products. The similarities support Cherry's research (1981).

Pharmacy Charge

The pharmacy charge included all medications and drugs used during the entire hospitalization (Table 8). Intravenous fluids and equipment were charged elsewhere. Analysis using the F-test showed a significantly ($p < .0001$) higher pharmacy charge for the obstetricians' clients. The OB group mean was \$38.69 compared to the CNM group mean of \$26.88 and the FP group mean of \$27.13. One client of a certified nurse-midwife had a charge of \$106.35, recorded at \$99.99 because the coding allowed only for a four-digit number. Adding the difference (\$6.56) increased the certified nurse-midwives' mean to \$26.99, eleven cents more than the mean cited previously. The difference in pharmacy charges was \$11.70 between the OB group and the

Table 8
 Comparison of the Pharmacy Charge and Central Service Charges
 Between Consumers of Certified Nurse-Midwives,
 Obstetricians, and Family Practitioners

	Combined N=260	CNM N=60	OB N=39	FP N=161	p
<u>Pharmacy Charge</u>					
Mean	\$ 28.77	\$ 26.88	\$ 38.69	\$ 27.13	.0001
St. Dev.	15.13	15.13	18.63	11.14	
Minimum	0.00	0.00	0.00	0.00	
Maximum	99.99	99.99	98.40	73.75	
Missing Data	2	1	1	0	
<u>Total Central Service Charge</u>					
Mean	\$ 30.87	\$ 24.76	\$ 51.84	\$ 27.99	.0001
St. Dev.	26.94	23.37	34.97	23.49	
Minimum	6.55	6.55	6.55	6.55	
Maximum	177.15	104.60	177.15	115.45	
Missing Data	2	2	0	0	
<u>Cart Exchange Charges</u>					
Mean	\$ 13.00	\$ 11.97	\$ 14.09	\$ 13.11	NS
St. Dev.	6.31	6.39	5.53	6.44	
Minimum	6.55	6.55	6.55	6.55	
Maximum	39.30	32.75	26.20	39.30	
Missing Data	2	2	0	0	
<u>Charges for Intravenous Equipment</u>					
Mean	\$ 16.97	\$ 11.85	\$ 35.42	\$ 14.40	.0001
St. Dev.	23.82	21.26	28.50	21.43	
Minimum	0.00	0.00	0.00	0.00	
Maximum	99.99	87.50	99.99	99.99	

CNM group, and \$11.56 between the FP group and the OB group.

Central Service Charges

Central service charges were for equipment and supplies for the postpartum hospitalization (Table 8). For the majority of the sample, this was a charge of \$6.55 per day for a supply cart exchange. Two patients had no charge, which was an error in billing, and for the purpose of this study, was coded as missing data. In addition to the cart exchange charge, some patients had charges for intravenous equipment and miscellaneous supplies. The latter consisted of charges for urethral catheters, x-ray sponges, and nursing pads. The mean charge for the 21 patients using miscellaneous supplies was \$6.41, and no difference was noted between the provider groups.

Intravenous equipment consisted of extension tubing (\$1.25), blood administration set (\$3.05), and 1000cc solution bottles (\$13.30). Solution bottles for the entire hospitalization appear to be included here. The OB group intravenous equipment charge mean was \$35.42 compared to the CNM group mean of \$11.85 and FP group mean of \$11.40. The significantly ($p < .0001$) higher OB group mean may reflect the increased utilization of inductions, augmentations, and epidural anesthesia by this group, all of which necessitate an intravenous line. The differences between provider groups in the total central service charge appears to be a reflection of the charge differences for intravenous equipment.

Postpartum Hospital Charge

The groups were well matched in the mean number of days

Table 9
 Comparison of Postpartum Hospitalization and Room Charge
 Between Consumers of Certified Nurse-Midwives,
 Obstetricians, and Family Practitioners

	Combined N=260		CNM N=60		OB N=39		FP N=161		p
	N	%	N	%	N	%	N	%	
<u>Number of Days Hospitalized</u>									
Mean	1.97		1.80		2.15		1.99		NS
St. Dev.	.95		.97		.87		.96		
Range	1-5		1-5		1-4		1-5		
<u>Type of Postpartum Hospitalization</u>									
Routine Stay	183	70.4	37	61.7	30	76.9	116	72.0	NS
Short Stay Option	77	29.6	23	38.3	9	23.1	45	28.0	
	260	100.0	60	100.0	39	100.0	161	100.0	
<u>Semi-Private Room Charge</u>									
Mean	\$359.19		\$346.08		\$375.01		\$359.28		NS
St. Dev.	130.41		140.48		102.34		134.08		
Minimum	150.00		150.00		150.00		150.00		
Maximum	900.00		750.00		600.00		900.00		
Number Changed	183		37		30		116		
<u>Birthng Short Stay Charge</u>									
Mean	\$125.00		\$125.00		\$125.00		\$125.00		NS
St. Dev.	0.00		0.00		0.00		0.00		
Charge	125.00		125.00		125.00		125.00		
Number Changed	77		23		9		45		

hospitalized, as demonstrated in Table 9. The mean for the CNM group was 1.80 days, for the OB group, 2.15 days, and for the FP group, 1.99 days. This conclusion was contrary to Cherry's (1981) findings: that the major difference in bills related to a shorter mean length of stay by clients of certified nurse-midwives. Women who chose the short-stay option, with 12-hour discharge, were coded as a one-day stay. The short-stay option was utilized by 29.6% of the sample, with no significant differences between groups (Table 9).

The postpartum hospital charges are shown in Table 9. The routine postpartum hospitalization was in a semi-private room, charged at \$150.00 per day. For the sample as a whole, charges ranged from \$150.00 to \$900.00. Women choosing the birthing short stay were charged a flat fee of \$125.00. This fee included a 12-hour hospital stay and a home visit by a nurse on the second day postpartum. The groups appeared well matched in the number of days hospitalized and postpartum hospital charge.

Total Hospital Charges

The mean charge for the sample group was \$654.53, with significant differences between provider groups, as illustrated in Table 10. The mean charge for the OB group was \$728.78, for the FP group, \$653.95, and for the CNM group, \$607.49. The mean charge for the OB group was \$121.29 greater than that of the CNM group. The FP group mean was \$74.83 less than that of the OB group.

Comparing all provider groups, the differences in total hospital bills resulted from an accumulation of numerous small charges, rather than from any single, significant charge. Charges that showed

Table 10
 Comparison of the Total Hospital Charge Between Consumers of
 Certified Nurse-Midwives, Obstetricians, and
 Family Practitioners

	Combined	CNM	OB	FP	p
<u>Total Hospital Charges</u>					
Mean	\$ 654.43	\$ 607.49	\$ 728.78	\$ 653.95	.0078
St. Dev.	190.45	187.52	183.74	188.56	
Minimum	381.50	381.50	415.25	398.20	
Maximum	1,466.55	1,221.45	1,248.10	1,466.55	
Number Charged	260	60	39	161	

significant differences between groups were electronic fetal monitoring, anesthesia, extra supplies, pharmacy, and intravenous equipment. All these charges related to client choices and provider preference and practices.

Payment Method

The groups were well matched by payment method, as shown in Table 11. The most frequent type of payment for the three provider groups was by private insurance with Deseret Mutual Benefit Association (DMBA) and Blue Cross listed most often. Private insurance accounted for 69.1% of the sample, with 171 patients using some type of insurance. Patients without insurance who paid their own bills comprised the next biggest category. Such self-paid bills accounted for 33.3% of the CNM group, 23.1% of the OB group, and 25.5% of the FP group. The rest of the sample included four Champus and five Medicaid patients.

ERRATUM

Page 43 was not assigned in this manuscript.

CHAPTER IV

SUMMARY AND RECOMMENDATIONS

Summary

The present study was designed to increase the amount of data available about hospital maternity charges and to determine whether there were significant differences in hospital charges to clients of certified nurse-midwives, obstetricians, and family practitioners. With the identification of specific hospital charges influenced by different types of providers, efforts can be made to analyze areas for reduction of costs.

The sample included all normal vaginal deliveries at a community hospital between December 1, 1981, and March 31, 1982; pregnancies were not complicated by any factors listed in Appendix A. The researcher utilized the Delivery Log and billing records to collect demographic information and hospital charges for the three provider groups.

The sample was fairly homogenous with respect to age, gravidity, number of living children, miles from residence to facility, method of payment, and maternal-infant status. The groups were well matched in weeks of gestation, site of delivery, episiotomy rate, delivery of the placenta, maternal complications, infant complications, infant weight, Apgar scores, use of the short-stay option, and length of hospitalization.

Differences noted were fewer forcep deliveries, less electronic fetal monitoring, and a greater use of local anesthesia in the CNM group. The OB group had a lower rate of amniotomy and used more epidural anesthesia. Findings indicate that the FP group tended to rate between the CNM and OB groups in mean variable outcomes.

The groups had similar mean charges for the labor and delivery room, laboratory usage, and postpartum room. There was a significantly ($p = .0078$) lower mean total hospital charge for the CNM group (\$607.49) than for the FP group (\$653.95) and the OB group (\$728.78). The data indicates that numerous small charges rather than any singular large charge were responsible for making the mean charge for the OB group \$121.29 greater than that of the CNM group. The FP group mean was \$74.83 less than that of the OB group.

Items that showed significant mean charge differences between groups were: electronic fetal monitoring ($p = .0009$), extra gowns ($p = .0006$) and supplies ($p = .0409$), anesthesia ($p = .0074$), pharmacy ($p = .0001$), and intravenous equipment ($p = .0001$). The CNM group had consistently lower charges than the OB group and the FP group tended to rate between the other two in mean charges.

Findings of the research indicate that management modalities and practices make the certified nurse-midwife a cost-effective alternative and the similarity of outcomes among the three groups implies that the certified nurse-midwives' care is at least comparable in quality to that provided by the obstetricians and family practitioners.

Recommendations

The recommendation for further research are based on the

limitations of this study, which used a retrospective design, utilizing only available records, some of which were incomplete. The small obstetrician and certified nurse-midwife groups made analysis of data difficult. Therefore, duplication of this research should be done using a prospective design, insuring complete record keeping and the ability to add variables not normally recorded. Such variables might include education, income, and childbirth preparation. A sample with a larger group of certified nurse-midwives' and obstetricians' clients would demonstrate more validity.

Another limitation encountered by the researcher related to obtaining the requested bills. Even with permission of the hospital administrator and billing department head, difficulties were encountered until the researcher was allowed to pull bills. The researcher recommends having a written agreement with the hospital administrator, specifying each party's expectations. The written commitment should be updated periodically, if necessary.

Future research projects should be concerned with the following findings of this study. First, the significant differences in mean total hospital charges between groups should be analyzed further. Are differences related to client need, professional training, or some other factor? As a continuation of this study, it would be interesting to look at total maternity charges to clients. This would include antepartum, intrapartum, and postpartum provider fees, laboratory and test charges as well as the hospital charges.

The significant differences in the use of electronic fetal monitoring and amniotomy should be examined further. Are these

differences associated with philosophies of care, availability of the provider, or the patient's access to the provider?

The variations in the types of anesthesia used by the different providers deserves special consideration. Are these dependent on consumer preferences, provider training and/or accessibility, support by the provider in labor, or childbirth preparation?

The greater use of intravenous equipment by the OB group may be related to other practices such as use of epidural anesthesia or pitocin augmentation. Such correlations would expand the knowledge of what effect management decisions have on maternity charges.

The significant differences in pharmacy charges suggest that this is an area for potential cost reduction. A study of specific pharmacy charges would determine if differences were related to provider preferences, routine use of medication orders, or variations in patient population between groups.

The \$225.00 charge for routine labor and delivery service as well as the alternative birthing center service may not reflect the cost of these two types of services. Research into how the \$225.00 charge was determined and the actual cost of the supplies and equipment used would enable correlations between hospital costs and charges to be developed.

Implications for Practice

The research suggests that management choices and modalities affect the maternity patient's bill. The increased use of services such as electronic fetal monitoring, intravenous equipment, anesthesia, and pharmacy do not necessarily improve maternal and infant

outcomes, but they do increase costs to the patient. Perhaps a better awareness by maternity care providers of specific hospital charges would lead to improved cost-effective utilization of services. In a consumer population with little or no health insurance, the maternity provider might reduce consumer anxiety by discussing ways the professional-client team can work together to reduce charges.

APPENDIX

ELIGIBILITY FOR ADMISSION TO THE COMMUNITY HOSPITAL

1. Prenatal care beginning prior to 22 weeks gestation under supervision of family practitioner, obstetrician, or nurse-midwife CNM, with attending supervision.
2. Families are required to have attended prepared childbirth education classes of their choice.
3. Families are required to have attended Alternative Birth Orientation program provided by the birthing room staff.
4. A specific plan for family participation and consent forms will be completed and signed prior to admission.
5. Each mother desiring an alternative birth is expected to be accompanied by a support person of her choice who has participated in prepared childbirth education classes and the Alternate Birth Room Orientation.
6. No findings suggestive of increased risk of complications during pregnancy, labor, delivery or immediate postpartum period should be present.

REFER means this condition precludes management at the community hospital.

1. Initial Data Base

Socio-Demographic Factors

- | | |
|-------|---|
| Refer | 1. Chronological Age: 35 & over, primigravida,
40 & over |
| Refer | 2. Minimum age 16 at onset of pregnancy. |

Documented Problems in Maternal Medical History

A. Cardio-vascular

- | | |
|-------|---------------------------------|
| Refer | 3. Chronic hypertension |
| Refer | 4. Heart disease (classes 1-4) |
| Refer | 5. History of pulmonary embolus |

B. Urinary System

- Refer 6. Acute renal disease, moderate to severe
 Refer 7. Chronic renal disease with abnormal 24^o creatine.

C. Psycho-Neurological

- Refer 8. Current mental health problem adjudged significant by psychiatric evaluation and/or required use of drugs related to its management.
 Refer 9. Seizure disorder and/or use of anticonvulsant drugs.
 Refer 10. Drug addiction (heroin, barbiturates, alcohol, etc.), current use of addicting drugs, or current therapy related to these addictions.

D. Endocrine

- Refer 11. Diabetes mellitus, including gestational diabetes
 Refer 12. Thyroid disease
 a. Evidence of metabolic dysfunction related to thyroid
 Refer 13. Previous endocrine ablation for thyroid--see Number 11
 Refer 14. Other endocrine disorders requiring medical management

E. Respiratory

- Refer 15. a. Asthma requiring medication and/or chronic bronchitis
 Refer b. TB active or taking medications

F. Other Symptoms

- Refer 16. Bleeding disorder and/or hemolytic disease

Documented Problems in Maternal Obstetrical History

- Refer 17. Previous Rh sensitization
 Refer 18. Para 9 or more
 (Para 5 or above requires IV therapy and if history of ante, intra or postpartum complications, requires obstetrical and chief of staff consultation.)
 Refer 19. a. Previous uterine surgery, including C-section, or uterine malformation
 b. Incompetent cervix or cone biopsy
 Refer 20. Previous placenta abruptio
 Refer 21. Previous retained placenta

Documented Problems in Previous Infants

- Refer 22. Major congenital malformations
 Refer 23. Major metabolic disorder

Maternal Physical Findings

- Refer 24. First prenatal visit after 22 weeks with no prenatal care
 Refer 25. Clinical evidence of uterine myoma or malformations, or abdominal or adenexal masses
 Refer 26. Hydraminos or oligohydraminos
 Refer 27. Cardiac diastolic murmur, systolic murmur grade 3 or above and/or cardiac enlargement
 Refer 28. Hct less than 28% or Hbg less than 9.0
 Refer 29. SS hemoglobin
 Refer 30. Evidence of active tuberculosis

II. Antepartum Referral Factors

- Refer 31. Multiple gestation
 Refer 32. Evidence of fetal abnormality
 Refer 33. Development of hypertensive disorder
 Refer 34. Intrauterine growth retardation
 Refer 35. Thrombophlebitis
 Refer 36. Acute renal disease
 Refer 37. Development of gestational diabetes
 Refer 38. Non-vertex presentation, persisting past 37th week of gestation
 Refer 39. Laboratory evidence of sensitization in Rh negative women
 Refer 40. Postmaturity (greater than 42 weeks gestation)
 Refer 41. Development of any other severe obstetrical, medical or surgical problems
 Refer 42. Development of a TORCH disease

III. Intrapartum/Postpartum Transfer Factors

- Refer 43. Premature labor (less than 37 weeks gestation)
 Refer 44. Non-vertex presentation
 Refer 45. Estimated fetal weight less than 2500 grams
 Refer 46. Development of other severe medical, obstetrical or surgical problems
 Refer 47. Placenta previa
 Refer 48. Abruptio placenta
 Refer 49. Hydraminos or oligohydraminos

Transfer requirements are decided upon by the primary care provider with the development of any of the following conditions or factors.

IV. Infant Transfer Factors

Refer	50.	Apgar score less than 7 at 5 minutes (may stay after pediatric consultation)
Refer	51.	Weight less than 2200 grams
Refer	52.	Respiratory problems--including apnea, tachypnea, dyspnea, stridor either continuous or intermittent, sternal and/or intercostal retraction. pallor and/or cyanosis
Refer	53.	Jaundice (bilirubin level determined per pediatrician)
Refer	54.	Skin and mucous membrane manifestation such as petechia, ecchymosis, pallor, cyanosis (excluding acrocyanosis), plethora, especially any of the above associated with hepatomegaly and/or splenomegaly
Refer	55.	Cardiac problems-- Bradycardia (< 100), tachycardia (> 160), tachypnea (> 45-50), murmur that presents in 24 hours, heart sounds best heard on the right sides, muffled heart sounds, lethargy, dyspnea, feeds poorly, pallor or cyanosis, weak or absent peripheral pulses, palpable liver
Refer	56.	a. Gastrointestinal problems - abdominal distention, persistent vomiting, blueness of abdominal wall, hepatomegaly, splenomegaly
Refer	57.	a. Neurological problems - seizures including those manifesting only as intermittent hyper-tonicity with eye deviation or jerking of the limb or twitching of the fingers or toes, lethargy, hypotonia (floppy baby), paroxysmal eye-blinking or nystagmus, sudden loss of muscle tone and/or consciousness, defect of skull bones
Refer	58.	Eye problems--i.e., cloudy cornea, cataract, discharge from eye not due to silver nitrate
Refer	59.	Hematological problems--extreme pallor, hemorrhage from orifice, purpura, petechiae, marked plethora, hepatomegaly and/or splenomegaly

Definitions of Hypertension:

The following pressures must be present on at least two occasions 6 hours or more apart:

1. Diastolic blood pressure of at least 90 mm Hg; or
2. Systolic pressure of at least 140 mm Hg; or
3. A rise in diastolic pressure of at least 15 mm Hg, or
4. A rise in systolic pressure of at least 30 mm Hg.

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