

THE RELATIONSHIP BETWEEN EPIDURAL ANALGESIA
DURING CHILDBIRTH AND CHILDBIRTH OUTCOMES

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MASTER OF SCIENCE

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ABSTRACT

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Epidural analgesia has increased in usage dramatically in the United States as a means of comfort for labor pain. Prior studies have connected epidural analgesia to an increase in cesarean birth rate, an increase in use of instrumentation, an increase in length of labor, episiotomy rate, and maternal fever. Epidural analgesia has produced additional costs to the patient and society. The purpose of this study is to examine the relationship between epidural analgesia during childbirth and childbirth outcomes.

The data for this study were obtained from a retrospective patient record review of 200 systematically selected labor patients who delivered in 2002 at a midwestern hospital. The epidural analgesia rate was 72% at this facility in 2002, a significant increase from the previous 5 years. Using the Chi-square test of independence, a relationship was established between epidural analgesia and four of the variables examined. A statistically significant relationship was found to exist between epidural analgesia and cesarean birth rate, pitocin augmentation, and the first and second stages of labor with the total sample. The results of the study are important for healthcare providers who are relaying influential wellness information to childbearing women and their partners. The results indicate a need for further education for healthcare providers on alternative methods of pain relief for their patients during childbirth.

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Master's of Nursing Program. Graduate school has been a challenging and exciting time in my life.

I dedicate this thesis to the memory of my son, Jonathan James Ramstad, whose death led me to analyze my career and arrive at the decision to attend graduate school. I needed a new mission after his death and realized that teaching others is where I can fulfill my life purpose.

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CHAPTER ONE

INTRODUCTION

A major concern for childbearing women is the anticipated pain associated with childbirth and their limited knowledge of the methods available to relieve the pain. The pain-relief methods chosen have consequences for the childbearing woman and healthcare providers due to the effectiveness and safety of the methods. The increased cost of intrapartum care affects society at large. Childbearing women need to have the information necessary to make informed decisions regarding this important event in their lives. Do healthcare providers understand the consequences of their recommendations? During the researcher's 17 years of experience as a labor and delivery nurse, there has been a dramatic increase in the use of epidural analgesia.

Epidural analgesia is used 100% of the time in some areas as a method for labor pain management in the United States (Lothian, 2001). Prior studies have connected epidural analgesia to an increase in cesarean births, use of forceps or vacuum extraction, pitocin augmentation, increased length of labor, maternal fever, and increased cost to the patient (Apgar, 1998; Lieberman & O'Donoghue, 2002; Walker & O'Brien, 1999). Controversy surrounds the various methods available to decrease the pain associated with childbirth. Culture, myths, and rituals have influenced pain relief methods throughout history. Injectable narcotic analgesia was introduced in the early 1900s with negative results for the mother, such as confusion, sedation, nausea, or hallucinations, and respiratory depression in the baby. The 1950s brought the natural childbirth philosophy and the Lamaze method of childbirth, both of which advocated increased knowledge of the birth process, relaxation, and breathing exercises to reduce pain (Lamaze International, 2001). Continuous epidural anesthesia was introduced in the 1960s as a method to eliminate childbirth pain and was

considered by some to be the “gold standard” for childbirth (American Association of Nurse Anesthetists (AANA), 2002).

Nurses who provide antenatal education are in a position to offer information, including risks and benefits, of various methods to control labor pain. Nurses have the opportunity to empower women and their partners to make responsible health-related decisions. They are important patient advocates and, yet, have beliefs of their own in regard to labor pain and its management. Some nurses view labor pain as serving a purpose and something that can be managed with the proper labor support from the nurse, family members, and other support people such as a doula. Support can be given by encouraging the laboring women in a variety of ways, such as changing positions frequently, using relaxation and breathing techniques, utilizing hydrotherapy, and creating images to manage the pain. Other nurses view labor pain as an unwelcome and unnecessary phenomenon. They view medical intervention as the only answer for their patients. For nurses to provide women-centered care where women are encouraged to make educated choices for childbirth, the nurses must develop skills that advocate for and empower women (Giarrantano, 2003).

The American College of Nurse-Midwives (ACNM) adopted a model of childbirth that emphasizes pregnancy and birth as a normal developmental process and advocated non-medical intervention in the absence of complications. During 1999, in the United States, only 8% of all births were attended by midwives (Marmor & Krol, 2002). There are many physicians and nurses who regard the ACNM model as too idealistic since our society has grown accustomed to medical intervention. Technocratic birth, described as birth being an illness in need of fixing, is widespread in the western maternity care system today (Scaer, 2002).

Maternal satisfaction in childbirth is a complex psychological response. It has been assumed that satisfaction with labor means effective analgesia, but use of analgesia may lead to dissatisfaction. Kannan, Jamison, and Datta (2001) found that many women have expressed satisfaction with labor when they chose natural childbirth even though they may have had some pain with their labor. Specific non-epidural tools women found to be helpful during labor are rarely evaluated (Koehn, 2002).

The purpose of this study was to examine the relationship between epidural analgesia and intrapartum outcomes. The investigator examined if there was a relationship between epidural analgesia and the following variables: (a) length of the first and second stage of labor; (b) cesarean birth rate; (c) maternal fever during the labor, postpartum, or postoperative period; (d) episiotomy rate; (e) pitocin augmentation; and (f) instrumentation.

A differentiation between primipara women and the total sample was made in each category. The results of the study may serve as a guide for maternal-child nurses in determining the educational needs of the childbearing woman regarding childbirth pain relief methods. Results of this research may assist the client and healthcare workers in making a decision regarding whether to use epidural analgesia with laboring women.

Terms

Antenatal: before birth

Augmentation: use of the synthetic hormone pitocin to stimulate or increase uterine contractions in the pregnant female

Cesarean section delivery (cesarean birth): delivery of a fetus by incision through the abdominal wall and uterus

Doula: a labor support person for hire

Epidural analgesia: absence of the sensibility of pain, particularly the relief of pain, without loss of consciousness to the area of the spine that is situated upon or outside of the dura mater

Episiotomy: incision of the vulva, most often done during the second stage of labor, to avoid lacerations of the perineum as the infant is delivered

Fetal demise: a severe complication of pregnancy resulting in the death of the fetus in utero

First stage of labor: cervical dilatation from 0 to 10 centimeters

Hydrotherapy: the external use of water to relieve pain

Instrumentation: the use of instruments to assist in the delivery of a fetus with forceps or vacuum extraction

Intrapartum: period occurring during childbirth or during delivery

Maternal fever: oral temperature of 100 degrees Fahrenheit any time during labor, the first postpartum day, or the first postoperative day.

Multipara: a woman who has had two or more pregnancies resulting in a viable offspring

Natural childbirth: childbirth without the use of epidural analgesia

Primigravida: a woman pregnant for the first time

Primipara: a woman who has had one pregnancy that resulted in viable offspring

Pitocin: a hypothalamic hormone stored and released from the posterior pituitary that may be prepared synthetically to stimulate the pregnant uterus, causing contractions during labor

Rupture of membranes: tearing or disruptions of tissue in the bag of water surrounding the fetus

Second stage of labor: cervical dilatation of 10 centimeters to the birth of the baby.

Limitations

There are several limitations to this study. First, data were obtained from only one birth center in a midwestern city hospital utilizing chart review of 200 patients. Second, the sample was homogeneous due to a low minority population in the hospital and service area.

Third, the cesarean birth rate was artificially elevated at this facility compared to some hospitals because high-risk patients are air or ground transported from other healthcare facilities in the region to utilize the neonatal intensive care nursery. Fourth, the epidural rate was 72% at this facility, thus the number of non-epidural patients was disproportionately less. Fifth, nurse midwives did not practice at this facility, and midwives emphasize pregnancy and birth as a normal developmental process which does not need unnecessary interventions. Certain birth-related situations were not included in this study. These situations were (a) scheduled cesarean births, (b) the amount of pitocin or when augmentation with pitocin was initiated, (c) artificial rupture of membranes, and (d) fetal demise.

CHAPTER TWO

REVIEW OF LITERATURE

Childbearing women are concerned about the pain associated with childbirth and the safe options available for themselves and their unborn babies. It has been assumed that satisfaction with labor is dependent on a pain-free labor and delivery. Kannan et al.'s (2001) study, however, showed that women who chose natural childbirth have a satisfaction with their delivery even though they reported pain. Their study also revealed that women who wanted natural childbirth but did not succeed without an epidural believed their labor was less satisfying. There was a limited amount of information available about what American women prefer for pain management with childbirth or why they prefer a particular method (Marmor & Krol, 2002). Epidural analgesia has increased in popularity with women in our country in recent years and is used 100% of the time in some institutions (Lothian, 2001). However, there are complications that can occur with any form of medical intervention such as epidural analgesia, and many women are not making informed decisions regarding their choice of pain-relief management for childbirth (Lothian, 2001).

Theoretical Framework

Betty Neuman's Systems theory is wellness focused and fit well as the theoretical framework for this research. The Gate Control Theory, a comprehensive model used to describe the components of pain, was also used as a theoretical framework for the research (Sittner, Brage, & Gastron-Johansson, 1998).

A major strength of the Neuman Systems Model is its flexibility for use in all areas of nursing (Robinson & Wright, 1995). The Neuman Systems Model focuses on the wellness of the client system in relation to environmental stressors and reaction to stressors (Fawcett, 2001). The environment of the place of birth and attitude of the caregiver play a significant role in decreasing the stress of the laboring woman and her family. Nurses need to deal with the client as a whole when they are anticipating and dealing with stress (Meleis, 1997). Labor and delivery is a stressful and unforgettable time in a woman's life. Physiologically, it is a normal, natural process that childbearing women progress through to have a baby, and within this framework, the process is not considered an illness. According to Neuman, wellness and health are the same, and are defined as a condition where all subsystems are in balance and in harmony with the whole of the client (Neuman, 1989).

Nursing interventions are directed to counteract movement toward illness through primary, secondary, or tertiary prevention. Primary prevention is aimed at protecting the normal line of defense by increasing the flexibility of the line of defense to withstand environmental stress and to decrease risk factors. Childbirth education can prepare women for childbirth and, thus, decrease their anxiety of an unknown experience. Secondary interventions are used when the normal line of defense is disrupted, resulting in client symptoms. The labor room nurse, by providing support, will keep the client focused on the original childbirth plan. Tertiary prevention is used to assist the client in returning to wellness. The postpartum period is a time to analyze the experience the childbearing woman had in contrast to what she expected would happen. Analyzing the experience will

help resolve any discrepancy and create harmony between what she thought would occur and what actually did happen.

Environment is the force that surrounds the client with both positive and negative influences and can be internal, external, or created. Internal environment results from the relationships among the physiological subsystems of the human being. External environment refers to the influences of interpersonal or extrapersonal relationships that are outside the boundaries of the client. Created environment is the client's attempt to create a safe setting for functioning and is done when the client perceives a threat to the basic structure and function of the system (Neuman, 1989).

Gate Control Theory is a comprehensive model used by researchers to describe the components of pain (Sittner et al., 1998). This theory proposes that pain is a multidimensional, sensory phenomenon of discomfort that consists of sensory and affective qualities and is influenced by psychological and physiological variables. During labor, pain is further theorized to be regulated by a gating mechanism in the spinal cord that controls the flow of neural impulses to the brain. Any intervention that closes the gate, such as beta-endorphins, is thought to decrease the perception of pain. The beta-endorphin production does not keep up with the perceived level of pain, so the intensity of pain is perceived to increase as labor progresses. A comprehensive nursing assessment of pain must include sensory and affective components (Sittner et al., 1998).

Discussion of the Literature on Pain Relief in Labor

Women in the United States have fewer options for pain relief in the management of childbirth pain than women in many other countries, including Canada, France, The Netherlands, and the United Kingdom (Marmor & Krol, 2002). The reasons for lack of

pain relief options include professional training, economic rewards, staffing constraints, and understandable inclination to avoid pain. There are also deeper cultural forces at work that are less open to direction (Marmor & Krol, 2002).

Every year, four million women give birth, and all experience some level of pain during the process. There is a discrepancy between what women want and what we as healthcare providers think they want (Caton et al., 2002). Dr. Ellen D. Hodnett reviewed an extensive body of literature and concluded that four factors are consistent with childbirth satisfaction: (a) the amount of the support the woman receives from caregivers; (b) the quality of her relationship with her caregivers (e.g., good communication, rapport, and information); (c) her involvement with decision making; and (d) her personal expectations: higher satisfaction is associated with a childbirth experience that has high expectations and exceeds the expectations; lower satisfaction is associated with having and realizing low expectations (Hodnett, 2002).

The ACNM has adopted a model of childbirth that emphasizes pregnancy and birth as a normal developmental process, advocating non-intervention in the absence of complications (Marmor & Krol, 2002). The evaluation of pain management options varies across the provider groups as well as across cultures. While the full range of obstetrical healthcare includes the non-intervention style, the emphasis is on medical specialization and promotion of epidural analgesia. Pharmacological techniques used for labor analgesia have become increasingly safer. Attention has moved to maternal satisfaction (Pitter & Preston, 2001). Women who experienced painful labor utilizing natural childbirth, however, also reported satisfaction with the birth process. Analgesia alone does not

guarantee maternal satisfaction (Kannan et al., 2001). It is possible to be satisfied despite unfulfilled preference (Marmor & Krol, 2002).

The AANA reports that women fall into three categories when it comes to using analgesia in childbirth: (a) laboring women who are quite certain they will want pain relief, (b) laboring women who are unsure of their pain relief options and how these options will affect their labor and delivery, and (c) laboring women who would prefer to give birth without any pain relief. Because labor is unpredictable and everyone feels pain differently, women should not be made to feel guilty about asking for pain relief (AANA, 2002).

The American College of Obstetricians and Gynecologists (ACOG) defines two categories of pain-relieving drugs for childbirth, analgesia and anesthesia (Caton et al., 2002). Analgesia is the partial or total relief of pain without loss of other physical sensation. Anesthesia refers to a total loss of physical sensation, including loss of consciousness and respiration. Epidural blocks, pudendal blocks, and spinal blocks are all regional analgesia with the epidural block being preferred for labor. General anesthesia would anesthetize both mother and child, so it cannot be used for labor. However, it may be used for emergency cesarean births. People feel pain in different ways, and some experience more pain than others. Circumstances that affect feelings of pain include (a) being alone, (b) being overly tired, (c) feeling anxious and tense, (d) fear of pain from previous experiences, and (e) fear of the unknown and feeling of helplessness (Medical Library, 2002a).

Sittner et al.'s (1998) study used the Gaston-Johansson Pain-O-Meter as the instrument to measure and describe the quality and intensity of adolescent's pain during the progression of labor. The most frequently selected sensory words were cramping in phase

I and pressing in phases II and III. Miserable and killing were the most commonly chosen words during the three labor phases. There was no statistically significant difference in the intensity pain score during the progression of labor for primiparous and multiparous adolescents.

Maternal satisfaction is multifactorial and does not correlate with the birth of a healthy baby and effective pain management as healthcare professionals often assume (Kannan et al., 2001). Some laboring women who did not succeed with natural childbirth reported less pain after receiving an epidural but believed their experience of childbirth was less satisfying. Other laboring women perceive their request for pain relief as a failure. Natural childbirth is attractive to some, but not all, women. Women who had not experienced labor and delivery before and had a high pain rating during the latent stage of labor tended to request an epidural anesthetic.

An epidural block, a regional anesthetic, causes loss of feelings in the lower half of the body. The extent of numbness depends on the amount and type of medication used. The drug is placed through a catheter into the epidural space where nerve endings and blood vessels are bathed in the medication, causing a decrease in pain and other sensations. Clients report that the legs feel like they are sleeping and will not bear weight (Medical Library, 2002b).

Lamaze International affirms the normalcy of birth, acknowledging women's inherent ability to birth their babies and exploring all the ways that women find strength and comfort during labor and birth (Lamaze International, 2001). Lamaze training assists women to find ways to meet the challenge of birth and discover their inner strengths. The pain of labor is a part of a normal, physiologic process, unlike the pain associated with a

trauma. It can be compared to the pain of a challenging physical activity such as long distance running. Runners who push themselves to cross the finish line often report feelings of euphoria and increased self esteem. Research has shown that women who experience natural childbirth experience a similar feeling of exaltation and increased self esteem, and the experience has the potential to transform women's lives (Lamaze International, 2001).

Throughout history in nearly every culture, women have been surrounded and cared for by other women during their childbirth (Gerrish, 2002). Doulas are females trained and experienced in childbirth to provide physical, emotional, and informational support to women and their partners. They offer advice on comfort measures such as breathing, relaxation, movement, and positioning. Perhaps the most crucial role of the doula is that of continuous emotional reassurance and comfort. Doulas do not perform any medical skills, such as vaginal exams or fetal heart monitoring, nor do they make any decision for the women. The doula's goal is to help the woman have a safe and satisfying childbirth as the woman defines it.

Penny Simpkin, physical therapist (PT), doula, states, "Many simple, effective, low cost methods to relieve labor pain can be initiated by nurses, midwives, or physicians with the potential benefits of improved labor progress, reduction in use of riskier medications, patient satisfaction, and lower costs" (1991, p. 4). She believes nurses and other maternity caregivers can employ a broad range of effective and simple nonpharmacologic techniques to promote the laboring woman's physical comfort, psychological well-being, and labor progress. Unfortunately, many maternity caregivers do not have knowledge of alternative pain relief methods. Actions such as maternal movement, counter pressure, heat and cold,

hydrotherapy, touch and massage, acupuncture, intradermal injections of sterile water, transcutaneous electrical nerve stimulation, and the support of a doula offer tremendous relief to the laboring woman and result in a more satisfying outcome.

Researchers have reported an association between epidural analgesia and maternal fever during and after labor (Goetzl, Cohen, Frigoletto, & Ringer, 2001). It is theorized that the epidural block creates an imbalance between the heat-producing and heat-dissipating mechanism in the body, causing fever. The increase in maternal temperature during labor may lead to fetal tachycardia. Maternal fever may lead to a misdiagnosis of neonatal sepsis and a higher rate of neonatal sepsis treatment (Goetzl et al., 2001). The ramifications of treatment are financially and emotionally significant for the parents.

Another potential side effect of epidural analgesia is a significant increase in the length of labor (Goetzl et al., 2001). Goetzl et al.'s study found a statistically significant difference in the length of labor between women using epidurals and the non-epidural group, but no difference between how early in the labor the epidural was placed (Walker & O'Brien, 1999). The non-epidural group was more likely to have a spontaneous delivery and was less likely to have a cesarean birth than the women who were in the epidural group. Instrumentation was increased with the epidural group compared to the non-epidural group. There can be increased morbidity for the mother with forcep use as well as a potential for catastrophic neonatal injuries resulting from forceps rotation (Apgar, 1999). Maternal complications may occur with use of vacuum extraction as well. Neonatal complications such as subgaleal hemorrhage may be one of the most severe (Putta & Spencer, 2000). The use of augmentation with pitocin was greater with the epidural group than with the non-epidural group. All of these factors lead to more medical intervention

and increased cost to the client for a procedure that is a natural, physiological event.

However, the epidural rate continues to be high nationwide.

Satisfaction with childbirth is a key for healthcare providers to examine. The decrease in pain does not necessarily mean satisfaction for the woman with her birth experience. It is inappropriate for healthcare providers to project their view of childbirth pain onto their clients. The uterine muscle is a strong muscle that propels the fetus into life and, when contracting, causes pain; however, it is pain with a purpose. Educating women on the choices available to them is an important professional role for childbirth educators. Offering choices to clients will enable them to make well-informed decisions for their childbirth experience.

There is limited research on what women prefer, why they do so, and what influences those preferences. The reasons for the limited choices and status quo are professional training, economic rewards, staffing constraints, and inclinations to avoid pain. This research has provided insight into what could benefit the laboring woman.

CHAPTER THREE

METHODOLOGY

Research question: Does a relationship exist between the use of epidurals during childbirth and the negative outcomes of childbirth?

Design

The type of design used for this quantitative research project was a retrospective correlational design. The systematic investigation of the relationship among two or more variables that have been identified in practice was examined (Burns & Grove, 2001). If a relationship existed, a determination of a positive or a negative relationship was established.

Sample

The target population was obstetrical patients admitted to a midwestern hospital. A systematically selected sample of 200 patient records from the obstetrical patient population of this facility in 2002 was chosen for the study. This facility was a large medical center with a level three intensive care nursery and a maternal-child transport team. The facility serviced North Dakota (ND), South Dakota (SD), and northern Minnesota (MN). The birthing center had 22 birthing rooms as well as an over-flow post partum unit of 10 beds. There were approximately 150 births per month at this facility. The epidural rate was 72%, which was an increase from the previous 5 years. From the 2009 women who delivered at this hospital in 2002, one in every nine patient records was systematically selected from the population by the researcher. The researcher reviewed each patient record. Excluded from participation were all scheduled cesarean births, the

amount or when pitocin augmentation was used, artificial rupture of membranes, and fetal demise.

The patient records used for the study were numbered, and the names of the clients were not disclosed to protect human subject privacy. Permission from the Institutional Review Board (IRB) at the hospital had been granted as well as approval from North Dakota State University's IRB department.

Limitations

One limitation of the study was the homogeneous population of patients admitted at this facility. The majority of patients were Caucasian, middle class females; however, the ethnicity of the patient was not a variable in the study. The epidural rate of the facility was 72%, so there were fewer non-epidural analgesia patients; this statistic influenced the generalization of the study.

The instrument used to record the data was a computer Excel spreadsheet that listed the assigned client number, gravida status, epidural analgesia use, use of instruments for the delivery, vaginal or cesarean birth, episiotomy, maternal fever, length of first and second stage of labor, and the use of pitocin for augmentation. Primiparous women and the total sample were categorized to determine the difference in relationship to epidural analgesia use.

Chi-square Test

The chi-square test of independence determined if the variables being examined were independent or related to each other. The conventional level for type one error was $\alpha = .05$. The results of the study will be disseminated to obstetrical nurses at this and other facilities. It will help to inform them about what is best statistically for their clients

in labor and to provide research knowledge that adds validity to educational programs regarding pain management and childbirth outcomes for their clients.

CHAPTER FOUR

RESULTS

Data for the study were analyzed using the SAS System. The general statistical capability of this program and its popularity as the leading statistical program today led to its selection for the research.

Demographic Information

A sample of 200 birth records (N=200) was obtained from a retrospective review of medical records for women who delivered in 2002 at a midwestern hospital. The hospital was located in a community with a population of over 100,000 people. The facility had the largest share of the market in delivery of babies for the area. It was a referral center for high-risk obstetrical patients because of a level three neonatal intensive care nursery and a maternal-child transport team at the facility.

Medical records of women who were admitted in labor to this facility from January 1, 2002, to December 31, 2002, were selected for the research. Repeat cesarean births (N=189) were excluded from the total births (N=2009) to make the selection of the number of possible charts for the study (N=1820). A systematic sample of every ninth birth was made from the qualifying births (N=1820) meeting the criteria for that year. Multiple births were included in the population sample. There were no fetal demise patients who fell into the sample.

Data were manually extracted from the medical records and the birth book, and entered into an Excel spreadsheet by the researcher. A number from 1 to 200 was assigned to the 200 patient records to protect patients' privacy. The conventional level for type I error ($\alpha = .05$) was accepted.

The ethnicity of the population was not factored into the research. The percentage of patients who were married was 78% of the total births, and single women were 22% of the total births. Teenage mothers accounted for .02% (N=57) of the total.

Statistical Methods

The statistical methods used for this study were the Chi-square test of independence and Fisher's Exact test. The conventional level for type I error ($\alpha = .05$) was accepted. All tests have 1 degree of freedom (DF), except for the length of the first stage of labor and the length of second stage of labor which are 2 DF.

Table 1 presents the data comparing epidural analgesia and patients without epidural analgesia to cesarean births. There was a negative relationship between cesarean births and epidural analgesia (p value = .0012) with the total sample. This study revealed that 9 of 123 patients, or 7.32%, with epidural analgesia had cesarean births. The percentage was 23.38% with the group without epidural analgesia. The rationale behind the assumption that epidural analgesia was a factor that increased the cesarean birth rate was that epidural analgesia diminished uterine performance and slowed down the progress of labor (Apgar, 1998). Since there was a negative relationship between epidural analgesia and the rate of cesarean births, further studies need to be done to validate the outcome of the study.

Table 1. Relationship between cesarean birth and epidural analgesia

Variable	With epidural analgesia n=123	Without epidural analgesia n=77	Chi-square	P value
Cesarean birth	7.32 % 9/123	23.38% 18/77	10.4588	.0012

There was a positive relationship between pitocin augmentation and epidural analgesia (p value =.0002). Of the patients with epidural analgesia, 52.85% had augmentation with pitocin compared to 25.97% of those patients who did not have epidural analgesia. Table 2 depicts the data comparing epidural analgesia and pitocin augmentation. As labor slows down, the labor is stimulated with pitocin by physician order to increase uterine contractile efficiency. Pitocin requires continuous fetal heart monitoring to insure that the uterus is not hyperstimulated, which could lead to other complications for the mother and baby.

Table 2. Relationship between pitocin and epidural analgesia

Variable	With epidural analgesia n=123	Without epidural analgesia n=77	Chi-square	P value
Pitocin	52.85% 65/123	25.97 % 20/77	13.9924	.0002

A positive relationship did exist between the length of first stage of labor and epidural analgesia (p value = .0004). Table 3 presents the data comparing epidural analgesia and the first stage of labor, divided into three groups according to the length of the labor. Group one labored 0-5 hours. Group two labored 5-10 hours. Group three labored over 10 hours. The finding revealed that laboring women who used epidural analgesia had longer labors than those who did not use epidural analgesia. Group one had 27 of 60 patients (45%) without an epidural who labored only 0-5 hours as opposed to 21 of 115 patients (18.26%) with epidural analgesia who labored 0-5 hours. Group two had 51 of 115 patients (44.35%) who used epidural analgesia who labored 5-10 hours compared to 22 of 60 patients (36.67%) without epidural analgesia who labored 5-10 hours. Group three had 43 of 115 patients (37.39%) with epidural analgesia who labored longer than 10 hours

compared to only 11 of 60 patients (18.33%) without epidural analgesia who labored longer than 10 hours.

Table 3. Relationship between the length of the first stage of labor and epidural analgesia

Variable	With epidural analgesia n=115*	Without epidural analgesia n=60*	Chi-square \neq	P value
Length of first stage of labor	Group one 18.26% 21/115	Group one 45% 27/60	13.9924	.0004
	Group two 44.35% 51/115	Group two 36.67% 22/60		
	Group three 37.39% 43/115	Group three 18.33% 11/60		

Group one labored 0-5 hours.

Group two labored 5-10 hours.

Group three labored 10+ hours.

\neq The tests have 2 DF.

* The frequency is missing 25 patients who delivered without labor.

There was also a positive relationship between the length of the second stage of labor and epidural analgesia (p value = .0007). Table 4 presents the data comparing the second stage of labor with epidural analgesia. In Group four, the patients without epidural analgesia, 39 of 60 patients (65%), pushed less than 30 minutes compared to 43 of 115 patients (39.39%) who had epidural analgesia and pushed for less than 30 minutes. Group five had 56 of 115 patients (48.70%) who had epidural analgesia push 30 minutes to 2 hours as compared to 20 of 60 patients (33.33%) who did not have epidural analgesia and pushed for 30 minutes to 2 hours. Only one woman from the total group of 60 patients (1.67%) without an epidural pushed for over 2 hours as compared to 16 of 115 patients

(13.91%) with epidural analgesia who pushed for over 2 hours. The discomfort and fatigue for the laboring woman who pushes over two hours are tremendous. The discomfort and fatigue impact the satisfaction of the labor experience for the woman, the fetus, and her family; and puts strain on the labor room nurse who is assisting the patient.

Table 4. Relationship between the length of the second stage of labor and epidural analgesia

Variable	With epidural analgesia n=115*	Without epidural analgesia n=60*	Chi-square \neq	P value
Length of second stage of labor	Group four 37.39% 43/115	Group four 65.00% 39/60	14.6438	.0007
	Group five 48.70% 56/115	Group five 33.33% 20/60		
	Group six 13.91% 16/115	Group six 1.67% 1/60		

Group four pushed 0-30 minutes.

Group five pushed 30 minutes-2 hours.

Group six pushed over 2 hours.

\neq The tests have 2 DF.

* The frequency is missing 25 patients who delivered without labor.

There was no relationship between maternal fever and epidural analgesia from this study. Table 5 reflects the data for those patients who had epidural analgesia and developed a fever. The results of the study did have 27 of 123 women who had epidural analgesia develop a fever of over 100 Fahrenheit during labor, postpartum day one, or postoperative day one. There were 9 of 77 patients without epidural analgesia who developed a fever. The 27 patients who had a fever were more likely to be treated with

antibiotics, leading to increased cost and stress with their childbirth experience. Treatment for neonatal sepsis may increase, leading to a lengthened hospital stay for the newborn.

Table 5. Relationship between maternal fever and epidural analgesia

Variable	With epidural analgesia n=123	Without epidural analgesia n=77	Chi-square	P value
Maternal fever	21.95% 27/123	11.69% 9/77	3.3793	.0660

There was no statistically significant relationship between instrumentation and epidural analgesia nor between episiotomy rate and epidural analgesia. Table 6 compiles the previous data discussed into one table.

The study separated the primipara women from the total sample to compare the results. Table 7 compares the relationship among epidural analgesia, the total sample, and the primipara sample that delivered by cesarean birth. A relationship did not exist between cesarean birth and epidural analgesia with primipara women with this sample. The total sample had 7.32% of women with epidural analgesia deliver by cesarean birth compared to 12.96% of the primipara sample with epidural analgesia. These data could have some implication for clinical practice.

There was a relationship between pitocin augmentation and epidural analgesia with primigravida women ($p=.0009$). Table 8 compares the relationship between epidural analgesia and pitocin. Pitocin is used to augment the labor, compelling the uterus to contract more efficiently and frequently, which requires closer monitoring of the mother and baby due to the potential of uterine hyperstimulation and fetal distress. Walker and O'Briens's (1999) study found pitocin to be significantly related to epidural analgesia.

Table 6. Comparison of the study variables between groups with/without epidural analgesia

Variable	With epidural analgesia n=123	Without epidural analgesia n=77	Chi-square \neq	P value
Cesarean birth	7.32% 9/123	23.38% 18/77	10.4588	.0012
Pitocin	52.85 % 65/123	25.97% 20/77	13.9924	.0002
Length of first stage of labor	Group one 18.26% 21/115 Group two 44.35 % 51/115 Group three 37.39% 43/115	Group one 45 % 27/60 Group two 36.67% 22/60 Group three 18.33% 11/60	13.9924	.0004
Length of second stage of labor	Group four 37.39% 43/115 Group five 48.70% 56/115 Group six 13.91% 16/115	Group four 65.00% 39/60 Group five 33.33% 20/60 Group six 1.67% 1/60	14.6438	.0007
Maternal fever	21.95% 27/123	11.69% 9/77	3.3793	.0660
Instrumentation	17.89% 22/123	9.09% 7/77	2.9548	.0856
Episiotomy	56.10% 69/123	49.35% 38/77	.8665	.3519

Table. 7 Comparison of cesarean birth and epidural analgesia with total sample and the primipara sample

Variable	With epidural analgesia n=123	Without epidural analgesia n=77	Chi-square	P value
Total sample Cesarean birth	7.32% 9/123	23.38% 18/77	10.4588	.0012
Primigravida sample Cesarean birth	12.96% 7/54	29.63% 8/27	3.3136	.0687

Table 8. Relationship between pitocin and epidural analgesia with the primigravida sample

Variable	With epidural analgesia n=54	Without epidural analgesia n=27	Chi-square	P value
Pitocin	57.41% 31/54	18.52% 5/27	11.0250	.0009

The primigravida group had a positive relationship between the first stage of labor and epidural analgesia (p value=.0219). Table 9 reveals the data comparing epidural analgesia and three groups of this stage of labor. The women in Group one who labored less than 5 hours and used epidural analgesia were only 4 patients out of 48 (8.33%) compared to 6 patients out of 19 (31.58%) who did not use epidural analgesia for comfort. Group two women who labored for 5-10 hours with or without epidural analgesia were similar. Group three women with epidural analgesia who labored for over 10 hours were 27 patients out of 48 (56.25%) compared to 5 patients out of 19 (26.32%) in the group that did not use epidural analgesia for comfort. As previous studies have shown, epidural analgesia does lengthen the first stage of labor with primigravida women.

Table 9. Relationship between the length of the first stage of labor and epidural analgesia with the primigravida sample

Variable	With epidural analgesia n=48	Without epidural analgesia n=19	Chi-square \neq	P value
Length of first stage of labor	Group one 8.33% 4/48	Group one 31.58% 6/19	7.6450	.0219
	Group two 35.42% 17/48	Group two 42.11% 8/19		
	Group three 56.25% 27/48	Group three 26.32% 5/19		

Group one labored 0-5 hours.

Group two labored 5-10 hours.

Group three labored 10+ hours.

\neq The tests have 2 DF.

A relationship was found between the length of the second stage of labor and epidural analgesia ($p=.0485$) in primigravida women. Table 10 compares epidural analgesia and the second stage of labor with primigravida women. Only 1 patient out of 19 (5.26%) from the primigravida group who did not have an epidural pushed for over 2 hours compared to 13 of 48 women (27.08%) who had epidural analgesia.

There was no relationship among maternal fever, instrumentation, episiotomy rate, and epidural analgesia with primipara women. Table 11 is a composition of data comparing primigravida women who used epidural analgesia and those who did not use epidural analgesia for comfort with their childbirth.

Table 10. Relationship between the length of the second stage of labor and epidural analgesia with the primigravida sample

Variable	With epidural analgesia n=48	Without epidural analgesia n=19	Chi-square \neq	P value
Length of second stage of labor	Group four 6.25 % 3/48	Group four 21.05% 4/19	6.0540	.0485
	Group five 66.67% 32/48	Group five 73.68% 14/19		
	Group six 27.08% 13/48	Group six 5.26% 1/19		

Group four pushed 0-30 minutes.

Group five pushed 30 minutes-2 hours.

Group six pushed over 2 hours.

\neq The tests have 2 DF.

The results of this study corroborated some of the findings of previous researchers.

Comparing cesarean births, pitocin augmentation, the first stage of labor, the second stage of labor, and epidural analgesia with the total sample, a relationship was revealed. When comparing the primipara women sample, there was a relationship among pitocin augmentation, first stage of labor, and second stage of labor with epidural analgesia. With $\alpha = .05$, there was no relationship between cesarean birth and epidural analgesia, which is not congruent with previous research. The total sample and the primipara samples did not reveal a relationship between maternal fever, instrumentation, or the use of episiotomies; and epidural analgesia, which is a contrast to previous studies.

Table 11. Comparison of rates of occurrence between primigravida groups with/without epidural analgesia and the seven variables

Variable	With epidural analgesia	Without epidural analgesia	Chi-square \neq	P value
Cesarean birth	12.96% 7/54	29.63% 8/27	3.3136	.0687
Pitocin	57.41% 31/54	18.52% 5/27	11.0250	.0009
Maternal fever	29.63% 16/54	11.11% 3/27	3.4380	.0637
Instrumentation	31.48% 17/54	14.81% 4/27	2.6036	.1066
Episiotomy	68.52% 37/54	55.56% 15/27	1.3160	.2513
Length of first stage of labor	Group one 8.33% 4/48 Group two 35.42% 17/48 Group three 56.25% 27/48	Group one 31.58% 6/19 Group two 42.11% 8/19 Group three 26.32% 5/19		.0219
Length of second stage of labor	Group four 6.25% 3/48 Group five 66.67% 32/48 Group six 27.08% 13/48	Group four 21.05% 4/19 Group five 73.68% 14/19 Group six 5.26% 1/19	14.6438	.0485

CHAPTER FIVE

DISCUSSION AND CONCLUSION

In this chapter, interpretation of the data analysis and discussion of findings and limitations is presented. Implications and recommendations for practice, education, further research, and conclusions are also discussed.

Interpretation of Results

The data analysis revealed a statistically significant relationship between epidural analgesia and an increase in the length of labor and use of pitocin augmentation. The increase means added stress and possibly added medical intervention to the patients, which leads to increased medical costs. Birthing over the last hundred years has moved from home to hospital, resulting in a dramatic shift in our view of birth. Traditional methods of comfort have been abandoned for medication (Lothian, 2001). In the past 10 years, the United States has experienced an increase in the use of epidural analgesia.

The finding that the frequency of cesarean births was less with epidural analgesia than without epidural analgesia was unexpected. Breech presentations may have been the reason some of the babies were delivered by cesarean birth. These data was not separated out in the records at this facility. There may be a clinical significance since the women with epidural analgesia who delivered their babies by cesarean birth were still a significant number at 7 of 54 primigravida women. Cesarean birth means a longer recovery period; the potential for an increased risk of infection, bleeding, or trauma; and added cost. The woman may deal with negative emotions if she views cesarean birth as a failure.

The positive relationship between pitocin and epidurals has important clinical impact. It implies that epidural analgesia diminishes uterine performance, leading to a slow down of labor progression, requiring further intervention with the use of pitocin to increase the labor contractions (Apgar, 1998).

A longer first stage of labor leads to other medical intervention, increasing the cost of the labor. The patient will need intravenous therapy, can no longer ambulate, needs continuous fetal heart monitoring, needs frequent vital signs, and possibly needs a foley catheter since she may be unable to void on her own. The second stage of labor was lengthened with the use of epidural analgesia for women in this study. The increased length of pushing the fetus down the birth canal leads to exhaustion and emotional stress. As birth technology has increased, interventions once reserved for complicated labors, such as intravenous lines and confinement to bed, have become routine to all (Lothian, 2001). The interventions have led to an increase in the length of labor. Use of pitocin augmentation becomes a routine intervention as the length of labor increases.

The shift toward more interventions has not been positive for laboring women. The use of epidural analgesia greatly increases the financial and emotional cost of childbirth. Satisfaction with the labor experience does not increase with the use of epidural analgesia for pain relief. Satisfaction with childbirth is more related to a woman's sense of mastery of her labor experience and is viewed as a developmental event in a woman's life (Lowe, 1997). Mastery can lead to an increased sense of self esteem and personal strength.

The absence of a significant relationship between epidural analgesia; and use of episiotomy, fever, and instrumentation was different than results of previous studies (Apgar, 1998; Lieberman & O'Donoghue, 2002; Walker & O'Brien, 1999). The finding may be clinically significant even though the statistics were not significant.

Maternal fever was present in 27 of 123 patients with epidural analgesia, and some type of treatment was given to the women and/or the babies. Maternal fever may lead to a higher rate of unnecessary neonatal sepsis treatment (Goetzl et al., 2001). The treatment may include extra vital signs, laboratory blood work including blood cultures, intravenous antibiotics to both mother and baby, and spinal fluid tap to name a few. The treatments add to the cost of the hospitalization and may result in the woman going home without her baby, which is emotionally stressful to the family.

Episiotomies may be less frequent in women with epidural analgesia due to better control by the women during the pushing phase. Avoidance of an episiotomy greatly increases the comfort for the woman in activities she would do after delivery, such as walking, sitting, or urinating.

Forceps or vacuum extractors are used to assist in the delivery of the baby and have the potential for harm to the woman and her baby. This study showed no relationship between instrumentation and epidural analgesia. The results did show a longer second stage of labor with the use of epidural analgesia. It is a current practice to allow women who are 10 centimeters to refrain from pushing until the baby has descended further into the birth canal, thus lengthening the labor but possibly avoiding instrumentation.

Limitations

The information for this study was obtained from only one institution that had an epidural analgesia rate for childbirth of 72% in 2002. A previous study had been done at an institution with lower epidural analgesia rates (Walker & O'Brien, 1999). The rate of epidural analgesia usage varies dependent on the available anesthesia personnel, the attitudes of the primary physician regarding labor pain, and the culture of the place of birth.

Ethnicity was not factored into the study due to the low minority population at this facility. The epidural rate may be higher since there were no midwives practicing at this facility. Midwives tend to recommend natural alternatives of pain relief. The institution in the study has more high-risk patients than others because of its level-three intensive care nursery and a maternal transport team, which may elevate the rate of cesarean births.

The timing of when the epidural analgesia was given was not factored into the study but could be considered for future research. There may be an increase in cesarean birth rate when the epidural analgesia is placed prior to cervical dilatation of 4 to 5 centimeters. It is theorized that epidural analgesia causes a relaxation of the pelvic floor musculature, leading to malpresentation of the fetus. One study revealed no difference in type of delivery, vaginal or cesarean birth, as to when epidural analgesia was placed (Walker & O'Brien, 1999). The type of medication used for the epidural analgesia was not considered as it does vary from physician to physician. Other types of injectable medication were not examined in relationship to the variables. The amount or timing of pitocin augmentation was not considered

as pitocin is titrated at the discretion of the individual labor nurse at this facility. The amount of childbirth education that the clients received was not a consideration.

Implications for Nursing

A number of implications for nursing practice and nursing education are indicated from the results of this study. Healthcare providers relay influential wellness information to childbearing women and their partners. A wellness approach, presented by a nurturing nurse, empowers women to take a greater responsibility for factors that affect their health (Walker & O'Brien, 1999). Laboring women expect the nursing staff to be informed on current knowledge regarding childbirth. They need emotional support during their childbirth and need encouragement to make their own decisions on what is best for them with this experience. The study reveals a longer labor with the use of epidural analgesia, and this information needs to be given to childbearing women. Methods of pain relief such as ambulating, hydrotherapy, relaxation, and massage are noninvasive ways to increase comfort while laboring. The Gate Control Theory proposes that pain is a sensory, multidimensional phenomenon of discomfort that is influenced by psychological and physiological variables (Sittner et al., 1998). The theory supports use of noninvasive methods to decrease pain.

Pitocin is used more frequently when epidural analgesia is given. The analgesia effect of the epidural is to slow down the labor by spacing the uterine contractions and decreasing their intensity. Pitocin is then required to counteract the effect of

the epidural on the contraction. Does the patient understand the added interventions that are associated with epidural analgesia?

The Neuman Systems Model focuses on wellness in relation to environmental stressors. The place of birth and attitude of the caregiver play a significant role in decreasing the stress of the clients. Many labor nurses receive minimal training on alternative comfort measures for labor. The labor nurses are most likely in continuous contact with the laboring women, so they need the best available evidence on the efficacy and safety of each pain relief strategy (Walker & O'Brien, 1999). The training on the alternative comfort measures for labor is often not provided. However, training to manage the complex care required for women who receive epidural analgesia is offered (Leeman, Fontaine, King, Klein, & Ratcliffe, 2003).

Current evidenced-based knowledge on safe options for comfort methods during labor is needed. It is time to shift the paradigm back to trusting nature's plan for birth (Lothian, 2001). A change in basic beliefs requires a change in the way nursing is practiced. The goal must be to ensure that the woman is confident in her ability to give birth and will be able to find comfort in response to her contractions. Women surveyed in childbirth classes expected that more than half of the nurse's time would be spent providing physical comfort, emotional support, and information. These findings are in stark contrast to what the nurse actually does (Lothian, 2001). Providing labor support takes more time for the already overworked obstetrical nurse.

Prenatal classes taught primarily by nurses provide the majority of education on pain management methods. Some childbirth educators have to avoid saying anything critical regarding epidural analgesia because of hospital policy. Childbirth education is marginalized as many clients are insisting on shorter and less frequent childbirth classes to meet the busy lifestyles of the childbearing woman and her partner. Many pregnant women do not attend childbirth classes because they already have decided to use an epidural analgesia and assume they do not need any other information. This fallacy needs to be dispelled. Women who attend formal childbirth education classes report less pain throughout labor than do unprepared women (Lowe, 1997). Clinic healthcare providers, who see women on prenatal visits, are a good resource to enlighten the patients on the benefit of childbirth classes even though an epidural analgesia is planned. The side effects of epidural analgesia should not be explained during intense labor pain nor should informed consent be obtained at this time. Informed consent should be obtained during the antenatal period rather than during labor when the woman may be deeply distressed by pain and unable to make a fully informed decision (Marshall, 2000). If the learner is not ready to learn, the information will not be absorbed (Bastable, 2003).

Women need to trust their body's ability to deal with the pain of labor, secure in the knowledge that birth is a natural process (Stafford, 2002). Endorphins are naturally released to decrease pain as the pitocin causing contraction is increased (Lothian, 2001). When the birth environment supports pharmacologic pain support, women are more likely to fear pain rather than work actively with their pain (Lowe, 1997).

The educator must determine the complexity of the material to be taught depending on the data obtained during the assessment of the learner, including the client's readiness to learn and learning style (Bastable, 2003). After receiving all necessary information on epidural analgesia, women who choose epidural analgesia must be fully supported in their choice by the healthcare provider.

Recommendations for Future Research

A study to determine why or why not clients choose epidural analgesia and if they were satisfied with their decision is recommended. Understanding the rationale behind a woman's decision would guide the educator to adjust her teaching methods. The method of instruction chosen should be appropriate for the information being taught (Bastable, 2003). These interventions are consistent with strengthening the primary line of defense as suggested by the Neuman model.

The perception of the intensity of labor pain and its impact on the birth experience could be another study. Without the proper information, a person's perception becomes reality. Pain is as bad as the woman thinks because her pain is exactly how she perceives it (Lowe, 1997). What actually are the beneficial outcomes of epidural analgesia?

Does it matter when the consent is signed as to the percentages of clients who chose epidural analgesia? The risks and benefits of a procedure need to be given to the patient before labor begins. The prime time for learning is when the patient asks a question (Bastable, 2003).

How does the use of epidural analgesia modify the caregiver's procedures? Giving emotional support to a woman during the difficult part of labor requires time

and energy for the labor nurse. Research is needed to determine whether time spent monitoring the technical aspects of labor analgesia detracts from supportive nursing activities (Leeman et al., 2003). The provider must realize that labor pain belongs to the woman experiencing it, and the management of the pain also belongs to her (Lowe, 1997). What are the staffing/cost issues?

A study measuring the benefits of prenatal education compared to a group that received no prenatal education would also provide valuable information on the use of epidural analgesia. Do women know the side effects of epidural analgesia? A study of labor nurses' perceptions of childbirth pain would be a research topic as well. The labor nurse may have personal experiences that cloud her perceptions when teaching about epidural analgesia, thus limiting the choices offered to the laboring woman.

Previous studies had implicated maternal fever, instrumentation, and a higher rate of episiotomies with epidural analgesia. Further studies need to be done on these variables. Does a relationship still exist with these variables? Have the improvement of epidural techniques and medications eliminated the relationship?

In summary, more research in the area of pain relief for childbirth is needed. Pain assessment is a collaborative effort between the woman and the provider. Providing the pregnant women and healthcare providers current knowledge is crucial to insuring a positive childbirth outcome and evidenced-based nursing practice.

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