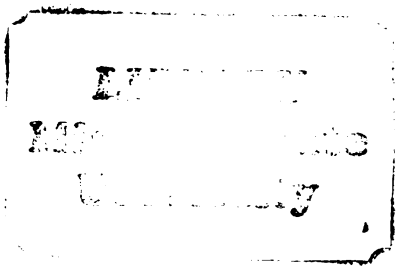

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AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE UPRIGHT POSITION AND THE SECOND STAGE OF LABOR

By

Barbara Taylor Sparks

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ABSTRACT

AN INVESTIGATION OF THE RELATIONSHIP BETWEEN THE UPRIGHT POSITION AND THE SECOND STAGE OF LABOR

By

Barbara Taylor Sparks

Since the 1960s increasing numbers of women have desired more flexibility in hospital birthing environments, including the choice of position for labor and birth. This study describes the length of the second stage of labor in primiparous women with uncomplicated pregnancies who used an upright position.

It was found through a retrospective chart review that twenty-five women (ages 17 to 32 years) took 61 ±35 (mean ± standard deviation) minutes for the second stage of labor. There was a moderate correlation between age and length ($r=.44$, $P \leq .05$).

In a parallel study, Hayes* found that women from the same population took 47 ±21 minutes when in a recumbent position. This is not a statistically significant difference from length in an upright position ($P \leq .05$). This result lends support to the concept that either recumbent or upright position is appropriate for the second stage of labor.

*Hayes, S. An Investigation of the Relationship Between the Recumbent Position and the Second Stage of Labor. Unpublished masters thesis, Michigan State University, 1983.

To all women who labor to deliver their babies; may your path be smooth, your babies healthy, and your environment flexible.

ACKNOWLEDGEMENTS

My thanks to:

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A special thanks to my colleague Sandra Hayes, whose perserverance, competence and friendship made research collaboration a satisfying and productive experience.

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CHAPTER I

INTRODUCTION

There exists a small but outspoken minority of women who over the last fifteen years have expressed dissatisfaction with standardized birthing procedures employed by health care personnel. They believe they are subject to inflexible, arbitrary medical and nursing protocols that often interfere with the natural progression of their labor and impair their ability to respond fully to their initial experience with their babies. These women also believe that often the practices they find most objectionable have not been medically justified and are merely tradition hardened into habit.

The modification of health care practices is a long and tedious process that can seem threatening to both the consumer and the health care community. There exists a strong reluctance among doctors and nurses to accept innovative health care practices over time honored albeit imperfect routines. Some consumers are making attempts to modify health care practices within the hospital setting. Others are choosing home birth. When considering this option

woman are often forced to select attendants who are not formally trained in assisting women with the birth process, and have inadequate backup should an obstetrical emergency occur. Under these circumstances this alternative to the hospital birthing site pose increased risks to both mother and infant.

The purpose of this study is to scientifically investigate a small but significant aspect of traditional hospital care that patients' often find objectionable, the routine use of the lithotomy position for the second stage of labor and birth. The possibility of an alternative upright position, which may decrease length of the second stage will be investigated. The results will contribute to a regrettably small data base on factors affecting the length of normal labor in hospitals.

This chapter is the introductory step in this research project. The purpose of the research will be presented, along with speculation on how the results will contribute to the quality of health care provided for women giving birth. Methods and collaboration plans will be presented. Important historical events in obstetrics will be traced, along with current implications of these events. Definitions of concepts and the scope, assumptions, and limitations of the study will be outlined. Finally, a plan for the rest

of the masters thesis will be presented.

Collaboration

This research project was done in collaboration with Sandra Hayes. The purpose of this collaboration is to make use of two sets of data addressing similar and interrelated questions. These data, analyzed separately, contribute to the scientific body of knowledge in the field of obstetrics. A comparison of the data from both projects provides additional information which is relevant to current obstetrical practices and has the potential to stimulate future research questions.

The question asked in this project is: What is the length of the second stage of labor in primiparous women with uncomplicated pregnancies who use the upright position? Hayes will ask: What is the length of the second stage of labor in primiparous women with uncomplicated pregnancies who use the recumbent position?

The two theses have been written separately with the exception of Chapter II (conceptual framework) and Chapter III (literature review). Although the research methods and tools used in the two studies were identical, Chapter IV (methodology) was written separately. The last two chapters, V and VI,

presenting the results and analysis of results, as well as nursing implications, were written separately also.

Purpose

The purpose of this study is to examine the length of the second stage of labor in women who use an upright position. This is an important question because of current obstetrical practices, and consumer reactions to them.

Obstetrical practices in hospitals have increasingly become entrenched in routine since the early 1900s. Many of these routine practices, however, have not been scientifically evaluated; they are simply rooted in hospital tradition (Haire, 1972; Banta & Thacker, 1979). Consumers are objecting to some of these traditions and are particularly verbal about lack of flexibility and choice in the process surrounding birth in hospitals. Women who deliver in hospitals often feel they have few birthing alternatives and little scientific information about safe and unsafe birthing practices (Jordon, 1980).

Births at home are often unsafe. Women who choose this alternative usually are attended by lay midwives, with varying types and amounts of training. Currently no formalized standards exist to monitor

their practice. No medical backup or specialized ambulance service is available for home birth emergencies. Thus, women who choose to deliver at home and then develop obstetrical complications may be exposed to increased danger and fragmentation of care.

As a result of this danger, home birth currently may not be a safe alternative for dissatisfied consumers. What then, can we, as health care professionals, offer them? Two solutions are possible. The first is to begin to change the obstetric system in the United States to accommodate a safe home birthing option.

One might approach this change by modeling from countries such as England or Holland, where home birth is an accepted and safe health care option (Jordon, 1980). This would involve standardized training and licensure of home birth attendants, establishment of medical backup in hospitals to cover home birth emergencies, and specially equipped ambulances for fast transport of mother or baby, when needed.

The majority of obstetricians in this country oppose home birth because they do not feel it can be safe. As many of these doctors are not familiar with birthing options in other countries, they are reluctant to consider change in the United States. Despite the fact that home birth is an attractive option for dissatisfied consumers and merits further consideration,

implementation of change in this direction will undoubtedly take many years. The option of change in hospital birth procedures may be more realistic in the short term. A variety of alternatives within hospital based birth settings would serve to provide the dissatisfied consumer with safe options that are flexible in accordance with her individual needs. This flexibility could eventually facilitate more radical departures from the birth routines with regard to location.

A first step to changing rigidity of hospital birthing protocols is scientific examination of current obstetrical practices, and examination of seemingly reasonable alternativs. This research project reflects this first step. It is examination of a proposed alternative to the current medically mandated birthing posture of lithotomy position on a delivery table. The alternative is upright using a delivery table, bed or birthing chair. There is much historical precedent for the use of an upright position for birth, as will be shown below. Upright position is also one of the issues consumers have expressed a need to change.

The length of the second stage of labor in an upright position is examined in this research. The results will be compared to existing documentation

of length of the second stage. The findings also will be compared to the results of Hayes' research, in which the length of the second stage in a recumbent position is measured. If the second stage in an upright position does not take significantly longer than in a recumbent position, and also is not longer than previously cited norms for the second stage of labor, it will be reasonable to conclude that relative to length, an upright position is a reasonable alternative to the lithotomy position. This knowledge can be used by nurses to help consumers bring about one change in hospital practice, flexibility in the position used for birth.

The results of this collaborative investigation will provide the medical and nursing community with scientific data they may use in considering the consumers' wish to choose an alternative birth position to lithotomy. Projecting into the future, if several other entrenched obstetrical traditions such as routine episiotomies or routine use of medication for analgesia are examined scientifically, it may be found that they are unnecessary for routine use in hospital birth. If they are found to be of variable usefulness, this information will be consistent with consumer demands to eliminate them from <u>automatic</u> hospital practice. Possibly hospital administrators, doctors, and nurses

will then become flexible in their obstetrical practices, determining need for intervention based on individual cases, not impersonal policies. The published results of this type of research would also allow consumers to make informed choices about alternative birthing processes in the hospital. Given increased flexibility in hospital obstetrical policies, it is likely that dissatisfied consumers may once again look toward the hospital as a satisfying environment in which to give birth.

Historical Developments

> The basic error has crept into the obstetrics field, that pregnancy and labor are pathologic entities, that childbearing is a disease, a surgical malady which must be terminated by some spectacular procedure.
>
> (Holmes, 1919)

This "basic error" in obstetrics can be examined by tracing three developmental stages of partuition in this country: birth at home, birth in the hospital, and a current increase in births at home. From the 1500s to the late 1800s, women delivered their babies at home. Midwives, who were private entrepreneurs, contracted with women to attend their deliveries

(Devitt, 1979; Dye, 1980). Childbirth was considered a natural event with some danger, as with other natural events, but an event that was managed adequately by the laboring women with a small amount of help from, and only a little intervention by, her attendant (Jordon, 1980). The position used to deliver babies during these early years was an upright posture, either sitting, squatting, or kneeling. These positions are comparable to those used by women in most cultures of the world, and to the positions used by women prior to the advent of medical intervention in births (Naroll, et al., 1961; Hugo, 1977; Caldeyro-Barcia, 1979).

This first stage of birthing practice began to change in the late 1800s. Physicians, supported by Public Health officials, began to advocate birth in hospitals, attended by doctors. The rationale for this change was based on the assumption that childbirth was a pathologic event. Encouragement for hospital birth was provided by the theory that the pain of childbirth was unncessary and could be eliminated. Painless childbirth was promised with the stipulation that it would be provided in hospitals (Devitt, 1979).

Upper class women were the first to accept this new philosophy of birth. Gradually, women of all classes followed them into the hospitals for their births. The doctors' promises of painless birth were kept

first with the use of general anestheisa, and later with local anesthesia. It soon became apparent, however, that anesthesized women had difficulty pushing out their babies, and in 1932 De Lee's forceps began to be used to assist in delivery (Devitt, 1979). The use of this technology soon became standard procedure for all child bearing. An offshoot of this intervention was change in position of birth, from upright to recumbent. This change occurred as a result of the illness orientation of hospital births, use of anesthesia, use of episiotomy and subsequent forceps, and most important, convenience of access to the perineum for the physician (Atwood, 1976; Hugo, 1977; McKay, 1980; Roberts, 1980).

This second stage of obstetrical practice, hospital birth, became firmly entrenched as the redefinition of childbirth as a medical event continued to evolve. By 1975, over 90% of all deliveries occurred in hospitals (Pearse, 1976). Routine use of technology has led to a modern practice of obstetrics that has little relation to the natural event that has been occurring for millions of years (Jordon, 1980). Symbolic of this technology is the position change. In assuming the sick role, lying down for birth, accepting anesthesia, forceps delivery and episiotomy, women have relinquished control and power of the birthing process

(McKay, 1980). By assuming the lithotomy position, out of sight of their own child's birth, women assign responsibility and achievement of their delivery to the physician (Sparks, 1981).

The third stage of obstetrical development in the United States began with the rise of the human rights and feminist movement in the 1960s. The demands for economic and social rights of women were accompanied by an increased interest in their health, and the demand to assume "control" of their bodies. Women postulated they could gain control by learning how their bodies function, how they could optimize their bodies function, and how they could participate equally with providers in decisions involving care of their bodies. Women are also looking critically at cross-cultural infant mortality rates (McKay, 1980), discovering that rates for infant mortality are far higher in the United States than in countries such as Holland and Japan, with a tradition of less medical intervention at birth. For example, infant mortality rates in the United States are 15.3/1000 live births, compard to 9.5/1000 in Holland, and 8.9/1000 in Japan (World Health Organization, 1978/79). Since a great deal of medical justification for intervention at birth is based on infant outcome, that is, "a perfect product," and infant outcome in this country is not

optimal compared to other countries, women are questioning the gamet of obstetrical intervention procedures (Haire, 1976).

Women are also beginning to demand participation in choices surrounding their childbirth experiences (L'Esperance, 1979). To some extent this need is a result of learning about historical birth practices, and finding that many of them are still safely used in other countries. These historical practices are still appealing because they are consistent with womens' wishes for self control, family involvement, and a healthy approach to birthing (Jordon, 1980).

Current Implications

The result of increased public awareness about birthing practices is more consumer assertiveness about the right to participate in choices surrounding the birthing process. The popularity of books such as Our Bodies Our Selves (Boston Women's Health Collective, 1979), and Immaculate Deception (Arms, 1975) attest to this awareness. Women's support groups are also focusing on the birthing issues. The goal of the Consumer Task Force On The Childbearing Years in Lansing, Michigan, for example, is to educate families about choices in childbirth practices. A small, but growing minority of consumers are moving the responsibility

of birth away from the physician and nurse hospital team, and demanding deliveries with less medical interference and more personalized support (Banta & Thacker, 1979).

Some consumers are turning to nurse midwives or a few sympathetic doctors for their birthing needs. The consumers are negotiating with health care providers about specific procedures for their hospital births. They are also expending much energy developing systems to rate hospitals' and doctors' flexibility on their approach to birth (Lansing Area Doctors Directory, 1979-80).

Other consumers are withdrawing from the formal obstetrical scene entirely, and choosing to deliver at home with the help of lay midwives (L'Esperance, 1979; Conklin & Simmons, 1979). It is difficult with no comprehensive data to establish the numbers of families who are adopting home birth. They are suspicious of accepted systems, and loyal to the lay midwives who practice within various and ambiguous boundaries of the law. In a recent article about home birth, L'Esperance (1979) refers to two studies; one in which 300 home birth families were studied, and another in which 69 home birth families were studied. This gives one an idea of the scope of the home birth movement.

There are several issues of concern with the home birth movement. Most physicians and nurse midwives will not attend a home delivery. Thus, the majority of home birth families are attended by lay midwives. There are various laws governing lay midwives in the United States; in many states their practice is illegal; in some states their practice is "somewhat legal." Ambiguities in the legal system sets up a system of secrecy and counterculture for the home birth system. The women practicing midwifery have variable training. Some are well trained and competent. Others are poorly trained and unable to deal adequately with an obstetrical emergency. As the legal status is variable and confusing, and no consistent standards of training or care for lay midwives are established, the only quality control of this underground system is provided by consumers, who have variable abilities to evaluate scientific principles and their application to practice.

An additional concern about the home birth movement relates to midwife liability for complications of home birth. As this issue falls into an ambiguous legal category, lay midwives cannot establish hospital based medical backup systems should complications occur. Physicians are unwilling to serve as backup for an obstetric system in which they have little or no control. In countries such as England and Holland where

home births are attended by trained, licensed midwives, and sanctioned by physicians, ambulances with well trained personnel are quickly available for obstetric emergencies (Jordon, 1980). Midwives who legally assist with home births in these countries work as colleagues with physicians who serve as backups at the hospitals. In the United States, lay midwives usually do not have such necessary support systems. As a result, families who choose home birth are vulnerable to delayed and fragmented emergency care should a birthing crisis arise.

It seems that a compromise between home birth and technical, inflexible, impersonal hospital birth is needed. Health care providers and consumers recognize the helpful advances that have been made by the use of technology. Effective tools and interventions exist that can be used to help identify and treat complicated deliveries. In high risk pregnancies, technology such as electronic fetal monitoring is effective in helping achieve a healthy birthing outcome (Banta & Thacker, 1979). What needs to be changed is the routine application of this high risk technology to normal women in labor and delivery.

Changes requested by consumers are beginning to be accepted by physicians and nurses. Choice of delivery setting in a birthing room or in a delivery

room is somewhat common now. Husbands may usually attend the birth and breathing exercises are taught to help women deal with the pain of labor and birth. Most recently, birthing chairs have been reintroduced in hospitals, enabling women to remain upright during the last stages of their labor (McKay, 1980). The presence of the birthing chair in labor and delivery sites seems to have increased consumer awareness of the concept of upright position for birth. While some women use the chair, others negotiate with their birth attendants for the flexibility to try several upright positions, such as kneeling, squatting, or sitting in bed.

Our task as nurses is to use the scientific method to determine the effectiveness of old and new practices. It can then be determined which practices are not safe, and which are both safe and satisfying. This research project measures one aspect of the issue of position, the length of the second stage of labor in women who use an upright position to deliver. The length of labor will also be compared to that of women who use the recumbent position. Length of the second stage of labor is considered to be an important safety factor in this part of birth, and it will be important to determine if there is a significant difference in the length between the two positions (Willson, 1975).

This project is an example of how we can be truly informed advocates for our clients' needs and wishes.

Conceptual Definitions

Lithotomy Position. The lithotomy position is a position commonly used during birthing in hospitals. While on a delivery table, a woman lies on her back, legs flexed on the thighs, thighs flexed on the belly, and abducted (Miller & Keene, 1972). The lithotomy position is also called the neutral position; the line connecting the center of the woman's 3rd and 5th lumbar vertebrae is more horizontal than vertical (McKay, 1980; Atwood, 1976; Naroll, Naroll & Howard, 1961).

Recumbent Position. A recumbent position is a position in which the line connecting the center of the woman's 3rd and 5th lumbar vertebrae is below 30°. The most commonly used recumbent position is the lithotomy position described above.

Upright Position. An upright position is a position commonly used during birthing in cultures other than the United States. Women are erect: standing, sitting, squatting or kneeling. The line connecting the center of a woman's 3rd and 5th lumbar vertebrae is more vertical than horizontal, i.e., greater than 30° (Liu, 1974).

*Conceptual definitions written in collaboration with Sandra Hayes.

Birthing Chair. A birthing chair is a chair used to support pregnant women in their labor and delivery, often with a cut-out seat. Its purpose is to allow women to push the fetus down the birth canal while in an upright position. Sometimes there are foot supports to aid the woman in her efforts to push. The birthing chair can be a straight backed, modern chair turned on its side, a stool, or a modern adaptation of a delivery table (Caldeyro-Barcia, 1979).

Primipara. A primipara is a woman who has delivered her first infant after the period of viability, regardless of whether the child is living at birth (Agnew, et al., 1965; Lerch, 1974; Fitzpatrick, 1971; Jensen, Benson & Bobak, 1980; Olds, et al., 1980). Lerch (1974) further defines the state of viability as 25 weeks gestation and beyond, thus indicating that first trimester abortions or miscarriages do not influence the parity of a woman.

Second Stage of Labor. The second stage of labor is the stage in the process of birth that begins with complete dilation of the cervix (10 cm. in diameter) and ends with the delivery of the infant (Pritchard & MacDonald, 1980; Olds, et al., 1980; Lederman, et al., 1979; Jensen, Benson & Bobak, 1980; Bergsjo & Halle, 1980; Bergsjo, Bakketeig & Eikom, 1979).

Uncomplicated Pregnancy. An uncomplicated pregnancy

has been defined in the literature only by stating what it is not. Therefore, for the purposes of this study, absence of all of the following will indicate an uncomplicated pregnancy (Leitch, & Tinker, 1980; Pritchard & MacDonald, 1980).

Pregnancy Induced Hypertension	Chronic Hypertension
Toxemia	Chronic Lung Disease
Pre-eclampsia	Multiple Births
Diabetes Mellitus	Breech Presentation
Heart Disease	Incompetent Cervical Os
Renal Disease	Bleeding--2nd or 3rd Trimester
Age--below 16 yr. or 35 yrs. and above	Abnormal Fetal Position

Scope

The main factor that was examined in this research project was the length of the second stage of labor, with subjects in an upright position. Ms. Hayes measured the same factor, length of the second stage, with her subjects in a recumbent position. Although there are undoubtedly many other variables that may influence length of labor (patient past experience in hospital, anesthesia, size of fetus, etc.), these studies focused primarily on duration of the second stage of labor.

When the results of the two studies were combined

and analyzed in Chapter V, the independent variable was position (recumbent or upright) and the dependent variable length of the second stage. It is acknowledged, however, that other independent variables also have an influence on duration of labor, and that these variables may obscure the primary relationship that is studied. These potentially confounding variables include: medication, fetal position, maternal pelvic anatomy, support persons in labor, and childbirth education. These variables were controlled. Patients who took medication, had abnormal fetal presentation or abnormal anatomy, no support person, or have had no childbirth classes were not included in the studies.

Assumptions*

In this study the researcher makes the following assumptions:

1. The literature review throughout these theses is representative of the work that has been done on the obstetrical issue of position for the second stage of labor.
2. The obstetrical care of patients using the recumbent position and patients using the upright position was similar in quality.

*Written in collaboration with Sandra Hayes.

3. Accurate data were retrieved from the charts regarding course of pregnancy, second stage of labor, and use of the upright and recumbent position.
4. Length of labor is important to maternal and fetal well-being (Bryant & Danforth, 1977).
5. Position of women in the second stage of labor significantly influences the length of second stage of labor (Liu, 1974, 1979; McKay, 1980; Caldeyro-Barcia, 1979).

Limitations*

The limitations of the study are:

1. One hospital site was used, thus limiting the generalizability of the results.
2. Charts of twenty-five women who used the upright position and twenty-one women who used the recumbent position were reviewed. The size of the sub-population in each birthing position may have been too small to reflect the true relationship between birth position and length of the second stage.
3. All patients in the sub-populations were similar; that is, they all chose to deliver

*Written in collaboration with Sandra Hayes.

their babies in a hospital with a physician provider. It is possible that they were different, psychologically or physiologically, from women who chose to deliver at home. Thus, it is not possible to generalize the results to a home birth population.

4. Equal numbers of clinic patients and private doctor patients were not required. It is possible that a different type of woman goes to a clinic rather than a doctor in private practice, and that this difference may affect the length of labor.
5. All information about pregnancy and delivery may not have been accurately or consistently documented in the prenatal records or labor and delivery forms.
6. The position described as recumbent may have been somewhat variable, that is some women may have been lying flat on their backs with their thighs elevated and abducted, and some women may have been somewhat propped up from the waist, with their thighs elevated.
7. Some women may have changed position during the second stage of labor, either from the recumbent to upright or the reverse. If this change was documented in the chart,

these patients were eliminated from the studies. In the rush of delivery, however, this change of position may not have been documented.

8. All the desired data was not consistently available on the charts, and thus some aspects of data anaysis were limited, i.e., specific type of occupation.
9. As a result of additional documentation required on hospital records for the studies, nurses may not have consistently or accurately documented this information.
10. Patients may have been in the second stage of labor prior to the actual determination, by vaginal exam, of the onset of this stage.

Overview of the Chapters

The thesis is presented in six chapters. In the first chapter the problem was defined and background material provided. The second chapter, co-authored with Sandra Hayes, builds on the first with a more detailed discussion of concepts and variables employed in the research projects. A Nursing Theory adapted from Florence Nightingale's Theory of Nursing is also presented, as well as a discussion of the relationship of this Theory to the variables of the studies.

The third chapter, also co-authored with Sandra Hayes, contains a review of the literature. In it, both classic research in the area of position for birth and the most current publications and research are presented. Limitations of currently available literature will also be delineated in this chapter.

In Chapter IV the research design was presented. This chapter, written separately, contains a discussion of instrumentation, field procedures, data collection, and statistical analyses used. Following is Chapter V in which the data results are presented. First, the data specific to this independent project is presented, that is, What is the length of the second stage of labor in primiparous women with uncomplicated pregnancies who use an upright position for birth? Then the data resulting from Hayes' work on recumbent position is summarized, and the comparative results presented to answer the question: Is there a statistically significant difference in the length of the second stage of labor in primiparous women with uncomplicated pregnancies who use an upright or recumbent position?

A discussion follows on the relationship of the results to the concepts and theory presented in Chapter II. Then, the separate and combined research results are interpreted and their relevance to Nursing Theory discussed.

The primary focus of Chapter VI is the nursing implications of the results. Conclusions are presented. If labor is shorter in an upright position, what responsibility do nurses have to disseminate this information to physicians, to other nurses, and to consumers? How can nurses most effectively act as change agents and patients advocates, given the research findings? What obligation do the researchers have to communicate this information to student nurses? How can the results be applied in various clinic settings and childbirth education classes? What does "no difference" in the length of labor according to upright or recumbent position mean? How can the information gleaned from these combined studies best be disseminated and integrated into health care practice?

Research recommendations will also be presented, including suggestions for improvements on the current work, and additional variables to consider in future studies. Finally the inevitable problem will be addressed. What further research is needed to add additional pieces to the puzzle of nature versus intervention in the modern human birth process?

CHAPTER II*

CONCEPTUAL FRAMEWORK

In this chapter, the concepts of lithotomy position and upright position will be discussed and related to the second stage of labor. Other variables that may affect delivery will then be described. Following this description, an explanation of Florence Nightingale's Theory of Nursing will be presented. Finally, it will be shown how this research derives from Nightingale's concepts.

Lithotomy Position

The lithotomy position is defined as lying with the back flat and with the knees drawn up and spread wide apart by "stirrups" or leg supports (Haire, 1972; Atwood, 1976). This recumbent position was first introduced to obstetrics by Francois Mauriceau in the 17th century because it made the use of forceps easier (Liu, 1979). The lithotomy position was introduced in America in the 1800s by Dewees, again to facilitate the use of forceps. Since the introduction of the position by Dewees, the lithotomy position has grown

*This chapter written in collaboration with Sandra Hayes

in use and popularity until it is now the accepted position for the majority of all hospital vaginal deliveries (Pritchard & MacDonald, 1980). The lithotomy position for delivery has become a custom and thus, has decreased the opportunity for women to choose their position for delivery (Liu, 1979). Liu (1979) indicated that when current Western obstetrical practices are used, labor and delivery are viewed as strict surgical procedures that dictate the lithotomy position in which fetal monitors, forceps deliveries and episiotomies can be easily used. Bryant and Danforth (1977) identified two purposes that the lithotomy position serves: 1) ease of control of asepsis and 2) convenience of the birthing attendent. In addition, the position provides other advantages to the attendent: fetal heart tones can be auscultated without a position change, external efforts can be brought into play (application of fundal pressure), anesthesia can be introduced, controlled and managed easily, and episiotomies can be easily made and repaired (Moir, 1964; Atlee, 1956; Roberts, 1980). The birthing attendent assumes control and the patient is perceived as passive. In short, the advantages of the lithotomy position are related to provider ease and convenience, not to patient comfort, patient desire, or physiologic principles.

By contrast, the disadvantages of the lithotomy

position are experienced by the mother and the fetus. Supine hypotensive syndrome and postural shock can occur rapidly when the heavy gravid uterus compresses the vena cava (Atwood, 1976; McKay, 1980), a problem that does not occur in the upright position (Liu, 1979). In the lithotomy position the inferior vena cava is compressed by the gravid uterus causing venous pooling in the lower extremeties, a decreased blood return to the heart, decreased cardiac output leading to decreased uterine blood flow, fetal acidosis and fetal hypoxia (Atwood, 1976; Liu, 1979). Liu (1979) also indicated that in the recumbent position, the weight of the brain substance falls toward the frontal lobes. The frontal lobes of the fetal brain are less well developed than are the older occipital lobes and are therefore more apt to sustain injury during the labor and delivery process (Liu, 1979). Use of the lithotomy position, then, produced conditions that are potentially threatening to the well being of the fetus.

In 1909 King noted that a woman in the recumbent position was deprived of both thigh pressure on the walls of the abdomen and uterus and the effects of gravity which act together to decrease the time of labor (Liu, 1979). Further, there is an increased need for episiotomies with the lithotomy position due

to the increased tension on the pelvic floor and the stretching of the perineal tissue (Cogan & Edmunds, 1978; Haire, 1972). Liu (1979), applying Newton's law of gravity to the birthing process, indicated that it seems to be more mechanically advantageous to expel a fetus toward earth than along a horizontal plane.

Caldeyro-Barica (1979), on research of 370 women, reported that the intensity of uterine contractions and the efficiency of cervical dilatation decrease when women deliver in the lithotomy position rather than in the upright position. Liu (1974), in her research, found that the duration, intensity, and frequency of uterine contractions decreased in the recumbent position and that the second stage of labor was longer for women who delivered in the lithotomy position than for women who delivered in the upright position. Hugo (1977) stated that due to the abnormal stretch created by the use of stirrups, the lumbar curve of the back is not supported and a high incidence of back strain occurs when the lithotomy position is utilized for labor and delivery. Further, prolonged pressure from stirrups and straps may cause thrombosis in leg veins, damage the perineal nerves, and cause temporary, but painful leg cramps (Bryant & Danforth, 1977; McKay, 1980).

Yet another disadvantage of the lithotomy position

is the inability of the patient to respond appropriately to sensory input. During the second stage of labor the activity of birth attendents surrounding the laboring mother greatly increases. The woman is basically unable to change her position due to the use of stirrups or leg supports and thus cannot visualize most of the activity that is occurring around her. The woman can hear sounds related to the activity but without the visual input, she is unable to appropriately interpret the meaning of the sounds. Activity at the delivery end often proceeds as if the patient were not conscious. According to McKay (1980) this inability to move creates a psychological deficit. Assuming that many women desire active involvement in the complete birth experience, the limitations imposed by the lithotomy position may result in feelings of frustration and/or disappointment with the birth process (Jordan, 1980; McKay, 1982). The patient's control of the birth is decreased and ultimately the mother's responsibility for the birth is relinquished to the physician. The mother does not give birth: the physician delivers the infant (Sparks, 1981; Jordan, 1980). A summary of the advantages and disadvantages of the lithotomy position in relation to physiology, provider and patient are presented in Table #1.

Table 1

Advantages and Disadvantages of the Lithotomy Position

	Advantages	Disadvantages
Provider	1. Easy administration of medications 2. Easy forceps application 3. Easy episiotomy creation and repair 4. Asepsis easy to maintain 5. Patient perceived as passive	NONE
Patient	1. Able to be passive and uninvolved if desires	1. Decreases control over birthing process 2. Shifts responsibility for the birth to the physician 3. Decreases use of senses
Physiologic	NONE	1. Postural shock 2. Backache and back strain 3. Unnatural pushing position 4. Decreases uterine activity 5. Potential for thrombosis, nerve damage and leg cramps (use of stirrups) 6. Potential aspiration of vomitus 7. Abnormal perineal stretching 8. Frontal lobes of fetal head receive most pressure from uterine contractions 9. Potential acid-base disturbances that lower fetal ph and stress fetus

Upright Position

The term physiologic position has been used by many authors to indicate positions that vary from semi-upright (head elevated 30 degrees) to squatting, kneeling, sitting, or standing erect (McKay, 1980; Howard, 1958; Hugo, 1977). Although the term physiologic position has many variations, it is clear from the literature that some type of upright, non-recumbent, position is assumed.

As early as 2500 B.C. the physiologic position was used for childbirth (Atwood, 1976). This fact is known because of the existence of primitive birthing stools (Atwood, 1976). Naroll, Naroll and Howard (1961) indicate that even today in non-European societies, uninfluenced by modern Western medical practices, women normally assume some kind of upright position for childbirth. Over the centuries the "posture aids," as Atwood (1976) describes the birthing stool or chair, have been modified, adapted and modernized until the models used today include electronic height and position control. The principles behind the use of the upright position for delivery, however, remain unchanged.

The upright position has many advantages. Research done by Caldeyro-Barcia (1979) identifies that in the upright position, the synergistic effects of gravity in combination with uterine contractions and efficient

use of the abdominal muscles produce more effective bearing-down efforts. Caldeyro-Barcia (1979) further states that contractions in the upright position are more efficient than in the recumbent position by 1.7 to 1.9 times. Liu's (1974) research indicates that in the upright position, contractions lasted a mean of 6.52 seconds longer, were 10.01 mmHg. more intense, and occurred at a frequency of 0.40 more contractions per 20 minute period as compared to contractions in the recumbent position.

McKay et al. (1978) quote Ehrstrom's research that identifies enlargement ranging from 0.5 to 1.5 cms of the pelvic measures in the maternal sitting position. Use of the upright position, then, actually facilitates slight enlargement of the birth canal. The increased effectiveness of the contractions, the increased efficiency of bearing-down efforts, and the increased pelvic measures in the upright position act together to shorten the second stage of labor and, thus, decrease fatigue, increase feelings of accomplishment, and increase active participation and involvement by the woman in the birthing process (McKay, 1980; Hugo, 1977; Caldeyro-Barcia, 1979).

McKay et al. (1978) and Hugo (1977) further report increased patient comfort in the upright position and a decreasd need for pain relief via medication. Further,

in the upright position the need for episiotomies decreases, probably because the perineum is able to stretch more naturally in response to the descent of the fetal head (McKay, 1980; Hugo, 1977). Liu (1979) indicates that in the upright position, the major force from the uterine contractions is placed on the occipital lobes of the fetal head. These lobes are laid down early in fetal development and, thus, are older and stronger than the frontal lobes that receive the greatest amount of pressure from uterine contractions in the recumbent position. Finally, the upright position allows the woman full use of her senses. She is able to see, hear, and integrate what is happening around her. The patient is able to retain some measure of control and assume the major portion of responsibility for the birth (McKay, 1980).

The disadvantages of the upright position are primarily experienced by the provider. Notelovitz (1978) states that in the upright position, it is difficult to "control" the birth process, administer analgesics or anesthetics, apply forceps, and create and repair episiotomies. The literature to date has not identified any physiologic disadvantages to the patient. It is possible, however, that some may exist. Local clinical specialists report increased fetal bruising and perineal edema following delivery in an

upright position (Bays & Curtain, 1982). These observations, however, have not been substantiated by formal studies or research, nor mentioned in the literature. In sum, by contrast with the lithotomy position, the advantages of the upright position are related to the patient and the disadvantages primarily related to the provider (see Table #2).

Variables Affecting the Second Stage of Labor

A pregnant woman comes to labor and delivery with an individualized background made up of social, psychological, spiritual and physiological factors (Jensen, Benson & Bobak, 1981). The sum of these factors plus the birthing environment determine the process and outcome of the birth experience. Realizing that the woman functions based on an interaction of all of the above spheres, it is inappropriate to assume that any one aspect of her environment or make-up independently influences the length of the second stage of labor. With this understanding, identification and discussion of some of the variables that may affect the length of the second stage of labor will follow.

Controlled Variables (See Table 3). Medication for analgesia and anesthesia has an effect on uterine activity. Lowensohn et al. (1974) states that there is a definite depression of uterine activity after

Table 2

Advantages and Disadvantages of the Upright Position

	Advantages	Disadvantages
Provider	1. Electronic controls to adjust height and position as needed 2. Actively involved patient	1. Difficult to administer analgesics or anesthetics 2. Difficult to "control" birth process 3. Difficult to apply forceps 4. Difficult to create and repair episiotomies
Patient	1. Increased ability to actively participate in the birth 2. Retains responsibility for the birth 3. Less medical intervention necessary--less medication, decreased use of forceps and episiotomies 4. Sensory input appropriately integrated	1. Necessitates active involvement on the part of the patient 2. Decreases use of medications for pain relief
Physiologic	1. Enlargement of pelvic measures 2. Forces of gravity and expulsion are synergized 3. Shortened delivery time 4. Decreased need for episiotomies 5. Natural pushing position 6. Longer, more intense, more efficient contractions 7. Pressure from contractions on older, better developed lobes of fetal head 8. Fewer threatening alterations in fetal ph due to decreased uterine blood flow	1. Possible increase in perineal edema 2. Possible increase in the amount of fetal bruising

Table 3

Controlled Variables

Medications

Use of Forceps

Age

Childbirth Education

Support Person present during Labor and Delivery

Fetal Presentation and Position

Pelvic Measurements

administration of epidural anesthesia for pain associated with labor. Haire (1972) and Pritchard and MacDonald (1980) indicate that all regional anesthesia, including pudendal block, inhibit the mother's ability to push the baby down the birth canal and, thus, prolong labor.

Position of the fetus in the birth canal also can affect the length of the second stage of labor. Jensen, Benson and Bobak (1981) and Pritchard and MacDonald (1980) indicate that persistent occiput posterior or occiput transverse positions may prolong the second stage of labor and may ultimately result in manual or forceps rotation and/or forceps delivery.

Pelvic anatomical problems or abnormal pelvic measurements also can adversely affect the progress of labor (Caldwell & Moloy, 1933; Jensen, Benson & Bobak, 1981; Pritchard & MacDonald, 1980; Willson, Beechan & Carrington, 1975). The adequacy, however, of the maternal pelvis is a more pragmatic descriptor of the possibility of vaginal birth. Adequate pelvic measurements are determined by the size and position of the infant. Normal pelvic measurements are determined by statistical norms. Thus, an adequate pelvis for a particular size infant may not be a "normal" pelvis.

The presence of support person(s) for the woman

in labor has been identified by Haire (1972) and Sosa et al. (1980) as positively affecting progress in labor. A support person is defined as a person whose function is to remain with the mother as a lay helper throughout the labor and delivery (Jensen, Benson & Bobak, 1981). The support person is traditionally a family member or close personal friend. When the woman in labor is separated from her family and/or friends, maternal fear and anxiety are elevated (Haire, 1972). One of the striking results Lederman et al. (1978) report in their research is that in the presence of maternal anxiety, there is an increased flow of epinepherine which lowers uterine contractility and potentially prolongs labor.

An additional variable affecting the length of labor is childbirth education. Women who have participated in childbirth classes tend to have better control of their fears and anxiety level. Haire (1972) cites a Canadian study that demonstrated that women who were prepared for participation in the birth process tended to experience shorter labors.

Due to the physiological changes that occur as the body ages, it might be expected that the age of the woman could affect the length of labor. The literature to date, however, has not dealt with age as a factor affecting the length of labor except in

high risk groups, i.e., women under 16 years of age and 35 years of age and older. Women in these age groups will not be included in this study.

A variable that clearly needs to be controlled is the mechanical extraction of the infant from the vagina via obstetrical forceps. Pritchard and Mac Donald (1980) validate that this obstetrical intervention, i.e., the use of forceps, changes the normal length of the second stage of labor.

Intervening Variables (see Table 4). Research has been done on how the length of labor is influenced by the stage of labor (1st or 2nd) in which rupture of membranes occur. Lynaugh (1980) analyzed several studies in which this problem was addressed. Conflicting and inconclusive results are reported in the review, leading to the conclusion that at this time it cannot be definitively said that when the membranes rupture affects the length of labor.

Race is another variable that has been studied in relation to the length of labor. Duignan (1975) demonstrated that the progress of the first stage of labor was identical regardless of race. Research results have subsequently been published that support these findings (Thom, Chan & Studd, 1979).

The use of fetal monitoring must also be considered as a variable possibly affecting the length

Table 4

Intervening Variables

Rupture of Membranes

Race

Marital Status

Episiotomy

Use of Fetal Monitors

Lacerations

Type of Physician

Own or On-call Physician

Type of Childbirth Education

Weight Gain

of labor. Buchan (1980) and Roux (1976) demonstrated that anticipation of internal fetal monitoring can be a significant source of emotional stress and anxiety to the laboring woman. As early as 1955 Garcia and Garcia (1955) identified that fearful patients had longer labors and more epinepherine-like substances in their blood. Patients with the highest serum epinipherine levels also experienced labor inertia.

More recently, Lederman et al. (1978) looked at this same issue. Working with women in labor identified as having "higher anxiety levels" they found that women with high anxiety levels had increased levels of ephinepherine and subsequent poor progress in labor. Thus, it would be logical to conclude that anticipation of internal fetal monitoring can cause anxiety, resulting in a longer labor.

Obesity has long been thought to affect labor adversely and to be associated with a variety of serious complications during pregnancy, labor, and delivery (Pritchard & MacDonald, 1980). Gross, Sokol and King (1980), however, found no significant differences in the length of labor in obese, (90+Kg.), and normal weight patients.

Cogan and Edmunds (1978) indicate that a high percentage of women who deliver in hospitals have episiotomies performed. Since this procedure enlarges

the outlet of the birth canal, it shortens the second stage of labor (Cogan & Edmunds, 1978).

There are many other factors of interest to these researchers that have not been addressed in the literature. Although no direct relationship to the length of the second stage of labor has been previously identified, the following variables were included in these studies to provide further research issues and questions. They are: the amount of weight gained during pregnancy, the marital status of the patient, lacerations, the type of physician from whom the patient received care, whether the patient was delivered by her own physician or a physician "on-call" and the type of childbirth education classes taken.

In sum, several variables, other than birthing position, have been identified as affecting the length of the second stage of labor. The variables identified as controlled variables have been shown by research to affect the length of the second stage of labor. The present studies will focus primarily on birthing position, although data will be collected on the intervening variables identified. In addition, data will then be collected on several demographic descriptors that will be used to further describe the characteristics of the samples (see Table 5).

Table 5

Demographic Descriptors

Age

Occupation

Type of Insurance

Comparison betwen Lithotomy and Upright Position

When we look at the relationship between the lithotomy position and the second stage of labor, several conclusions can be drawn. First, the lithotomy position is an unnatural position for the pushing process that is necessary for expulsion. The woman, flat on her back, is pushing without the added assistance of gravity. The inability to push effectively often creates the "need" for the use of forceps. The application of forceps necessitates some type of regional anesthesia, thereby further decreasing the woman's ability to push effectively (Haire, 1972). Given the lithotomy position, the inability to push effectively, use of forceps and subsequent need for regional anesthesia, the "natural" length of the second stage of labor may be altered. Because the length of the second stage may be altered, forceps assisted deliveries will not be included in the present studies.

A second conclusion concerns a decrease in the intensity and efficiency of uterine contractions which occurs in the lithotomy position as compared to an upright position. The change in uterine function adds to the length of labor (Caldeyro-Barcia, 1979; Liu, 1974).

Third, the active involvement in the birthing

process and ultimately the responsibility for the birth itself, are given up by the woman due to the psychological and sensory deprivation that occurs in the lithotomy position.

In summary, the lithotomy position tends to hamper the normal physiological processes necessary for birth; it decreases the woman's active involvement and increases the opportunity and need for medical intervention in the second stage of labor.

In contrast, use of an upright position creates a more natural position for pushing. The impact of gravity coupled with uterine contractions and the use of abdominal muscles, synergize to create effective bearing-down efforts. The ability of the woman to push effectively can greatly alter the length of the second stage of labor (Caldeyro-Barcia, 1979). Uterine contractions are longer, more intense, and more efficient in the upright position as compared to the lithotomy position (Liu, 1974, 1979). These increased uterine effects, added to the synergistic effects of the bearing down efforts, act together to decrease the length of the second stage of labor. The productive bearing-down efforts also tend to decrease the need for pain relief and decrease the use of forceps (Hugo, 1977).

Last, but equally important, is the ability of

the woman in the upright position to be actively involved and maintain some control and responsibility for the birth. Sensory input is appropriately integrated, fear and anxiety of the unknown is decreased due to the ability to see what is going on, and thus, cooperation is enhanced leading to a shorter second stage of labor.

The upright position then aids the normal physiologic processes of expulsion, increases the woman's active involvement and responsibility for the birth, and decreases the need for medical intervention in the second stage of labor.

Florence Nightingale's Theory of Nursing

An explanation of Florence Nightingale's Theory of Nursing will now be presented and a discussion of how this research is derived from her concepts will be explored.

The "core concept" of Nightingale's theory is the environment (Torres, 1980). Nightingale's emphasis on the physical environment is not surprising given the war situation that existed at the time of her writing. Nightingale's activities occurred during a crisis situation for her countrymen. She needed to respond in a way that would give rapid and widespread results. It then follows that her emphasis would be

on the physical environment, where the conditions were blatently destructive to health. The environment of the patient was broadly encompassing and although Nightingale did not specifically identify the psychological and social environments as being distinguishable from the physical environment, she addressed all three in her practice of nursing (Torres, 1980). Murray and Zentner (1975) stated that the environment, as defined by Nightingale, is "all external conditions and influences affecting the life and development of an organism and capable of preventing, suppressing or contributing to disease or death" (p. 149). Only when the physical environment is cared for can the psychological (emotional) and social environments be directly addressed (Torres, 1980). The three components, however, must be seen as interrelating rather than as separate, distinct parts (Torres, 1980). This interrelatedness is echoed more currently in Maslow's Hierarchy of Needs, in which he posits that physical needs must be fulfilled before psychological and social needs can be addressed (Maslow, 1954). Maslow and Nightingale would both support the idea that one must first meet the physical needs and the needs of the physical environment before the psychological and social needs can be addressed directly.

The goal of nursing for Nightingale is to create an environment in which patients heal themselves, that is, to assist patients to maintain their vital powers so that they are able to meet their own needs (Torres, 1980). Nursing is distinct from medicine and is a non-curative, interventionist practice (Torres, 1980). Nursing assists the patient to maintain a proper environment in which nature can act and the body can heal itself (Nightingale, 1859). To implement Nightingale's theory, then, one must focus on adjustments or alterations in the environment (Torres, 1980).

Nightingale was a strong proponent of human rights and strongly objected to man being used as a "passive pawn" controlled by another individual (Palmer, 1977). She stressed reliance on observation, fact, and experience in order to validate needs and inveighed against reliance on conventional practices (Palmer, 1977). Nightingale has been described as "a 'herald of revolt' against the barriers of convention, both in thought and conduct" (Palmer, 1977, p. 85).

The key point in Nightingale's theory is the relationship between the patient's condition and the patient's nature (Torres, 1980). By altering the ten physical environmental variables Nightingale

identifies, (see Table 6) the nurse creates the proper situation in which nature can act to preserve health and prevent disease and injury (Given, 1981). If the physical environment is cared for, emphasis on the psychological and social environment will necessarily follow. For example, if a pregnant woman is allowed to assume an upright position instead of a recumbent position for the second stage of labor, it will be necessary for the provider/s to relate to the woman as a whole entity rather than a "reproductive process." By altering the physical environment (changing the birthing position from recumbent to upright), a change has also occurred in the patient's psychological and social milieu.

Although Nightingale never directly identified a spiritual environment in her theory, Palmer (1977) speaks of her as a proponent of the modern concept of "wholistic man." In this sense, then, for Nightingale the spiritual dimension can be said to be the patient's condition and nature which reflect his or her value system.

These research projects are a logical extension of Nightingale's Theory of Nursing. The authors are surveying the physical environment, more specifically, the position used for giving birth, and how the position used affects the length of the second

Table 6

Nightingale's Environmental Variables

Cleanliness

Ventilation

Air

Light

Noise

Water

Bedding

Drainage

Warmth

Diet

stage of labor. The research question in Nightingale's terms is: If the birthing position is altered from the traditional lithotomy position to an upright position, will a better environment be created in which nature can act to preserve the health of the mother and infant?

Since use of the lithotomy position is rooted in tradition and not based on research or scientific principles, Nightingale's theory supports the authors' systematic investigation of this position. The lithotomy position has also altered the view of childbirth from one of a natural process to one which becomes more pathologically oriented. The lithotomy position creates a situation in which medical intervention is easily instituted and often needed in order to complete the birth process. In the lithotomy position, the environment is such that nature cannot fully act to preserve health. Intervention decreases the woman's responsibility for and control of the birth and makes her a "passive pawn" controlled by the physician. Nightingale's views on human rights would conflict with this dehumanization of the woman.

The upright position combines the scientific principle of gravity and the physiologic forces of the uterine contractions and the abdominal wall muscles. This synergistic effect creates effective bearing-down

efforts which in turn propels the fetus down and out the birth canal, a natural process (McKay, 1980). Use of the upright position does not create a situation that is conducive to easy medical intervention with forceps and/or anesthetics. In contrast, the need for such medical intervention is decreased because of the productive pushing efforts.

By freeing the woman from the delivery table (the lithotomy position) and using the upright position, the physical environment is altered. Following the principles laid down by Nightingale, it is the researchers' proposition that this environmental change creates a better condition in which nature can act. With an alteration in the birthing position, the psychological and social environments may also be altered. The woman experiences less fear and anxiety, is more actively involved as a participant in the birthing process, and is better able to interpret sensory input.

These research projects follow Nightingale's Theory of Nursing by examining two alternative positions as part of the physical environment, and asks, Does one position allow nature to act better than the other? Either environment examined may have a direct effect on the pyschological, social and spiritual environments of the woman. The way in which Nightingale's

theory was adapted and utilized as a basis for these research projects is depicted in Figures 1 and 2.

Figure 1. The Role of Nursing

ADAPTED FROM NIGHTINGALE'S CONCEPT OF NURSING

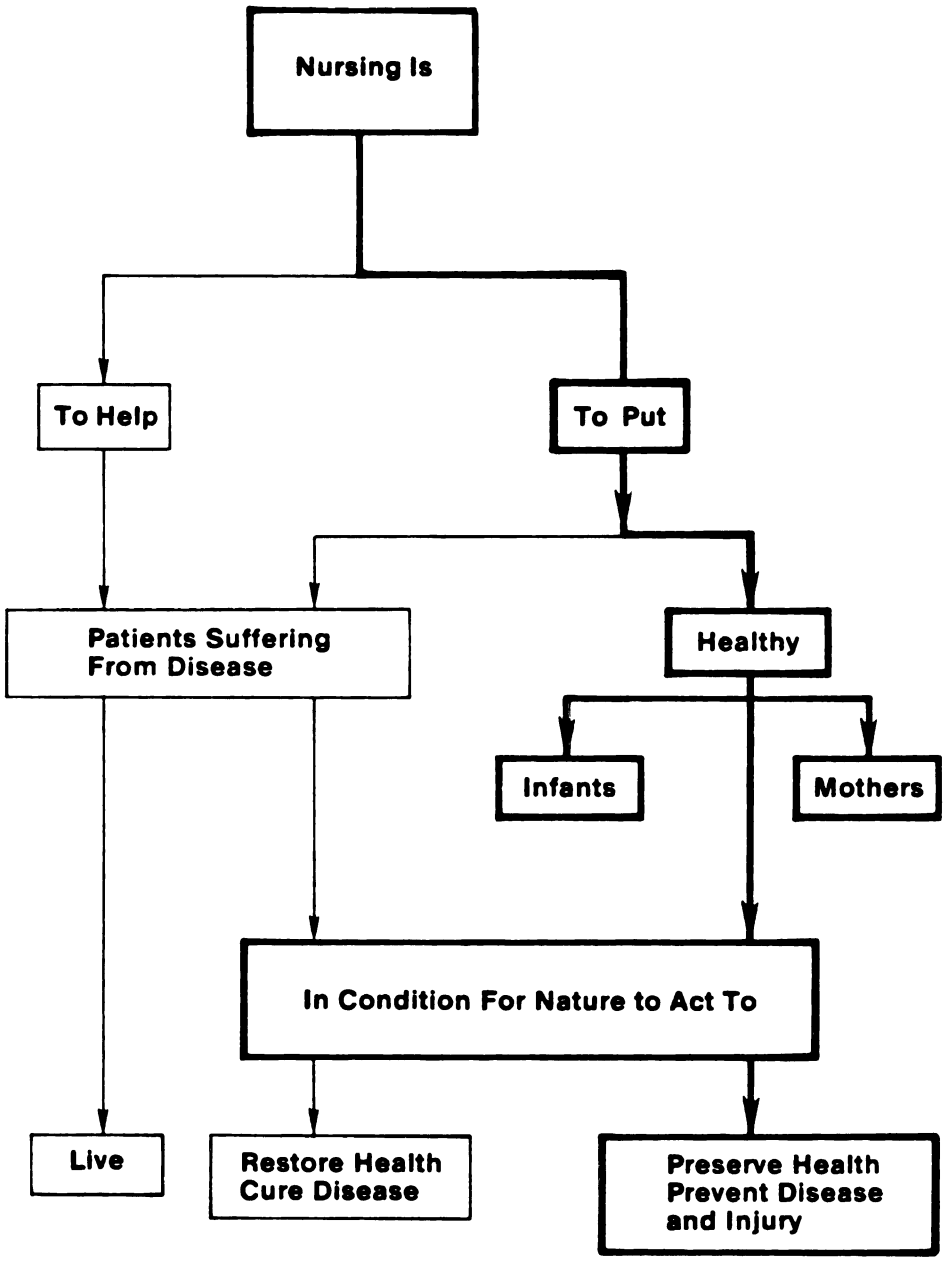
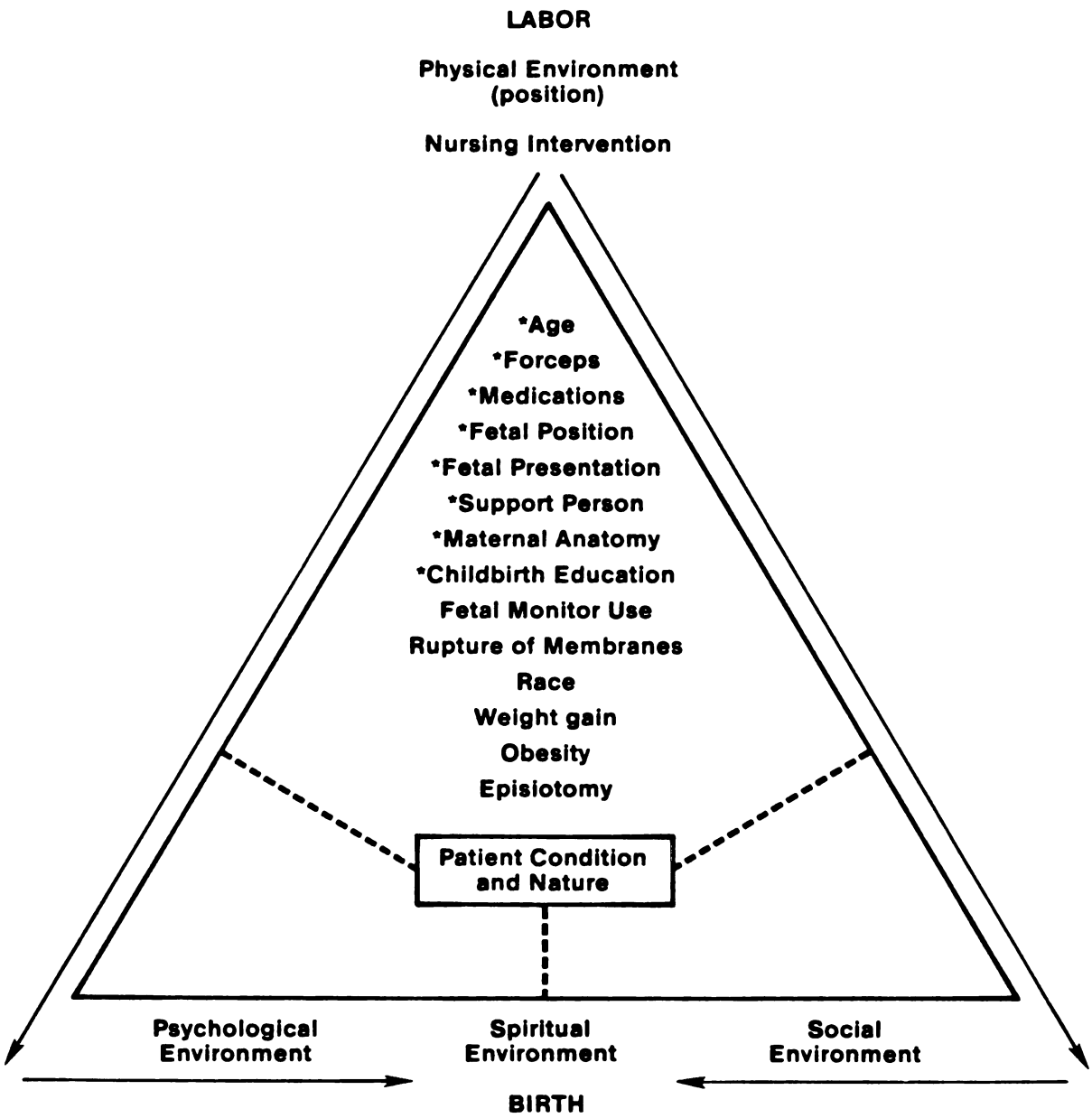


Figure 2. Variables Affecting Birth and the Environment



ADAPTED FROM NIGHTINGALE'S CONCEPT OF NURSING

*These Variables were Controlled

CHAPTER III

LITERATURE REVIEW*

Introduction

The literature discussed in this chapter is organized into six topic areas. First, the literature related to the trends in childbirth practices in the United States is reviewed followed by cross-cultural birthing practices. Next the literature from professional and lay sources related to current consumer trends is critiqued. The general references that are used to define the concepts of second stage of labor, uncomplicated pregnancy and primiparous women are then discussed and evaluated. Presented next is a review of the literature related to the key concept of these theses, birthing position. Finally, the literature that addresses several controlled variables and intervening variables and their relationship to the length of the second stage of labor is presented. This literature review directed the development of the instruments used to screen charts and collect data in these studies.

*This chapter is written in collaboration with Sandra Hayes

Trends in Childbirth Practices in the United States

In the early 1900s most births occurred in the home. Today, by contrast, almost all births occur in hospitals amid a plethora of technology. To understand this transition, it is important to trace its historical roots. The purpose of this section is to present a brief discussion of the trends in childbirth practices in the United States.

In the mid 1970s numerous articles began to appear in scientific journals, identifying historical practices and current trends in obstetrical care. Two classics of that period are Atwood (1976) and Haire (1978). Atwood's approach is an extensive review of previous anthropological and physiological discussions and research pertaining to birthing position. He relates this previously published literature to past culturally patterned behavior and draws conclusions about the meaning of the birth event. Atwood concludes that birthing posture is determined by cultural norms and that there is no one "correct" birth position. He further states that the female body has been shown to be adaptable to many positions and cultural practices. Atwood's meticulous review, published in 1976, appears to be the foundation for numerous subsequent articles and research on this subject. One such article by Hugo (1977) reviews three currently used birthing

positions and the rationale for their use. Hugo identifies the lack of current research justifying the use of any of the positions. Use of the lithotomy position evolved for attendent convenience at the beginning of the 19th century and since that time has become a cultural norm within this country. The routine use of lithotomy position in the United States differs from birth positions used in most other cultures. Hugo feels that women's comfort and ability to participate have not been considered by practitioners whose patients use the lithotomy position and suggests that this issue bears further examination. Hugo's conclusions concerning culturally determined birthing positions support Atwood's, and thus lend credibility to both authors work.

The other classic work of the 1970s is Haire's The Cultural Warping of Childbirth. In contrast to Atwood's somewhat physiologic approach to birth practices, Haire approaches the history and development from a sociological perspective. She identifies trends in childbirth practices from the early 1900s, as does Atwood. She then focuses on emerging technological advances, their meaning to the populous and medical community, and their integration into obstetrical practice. Haire carefully reviews changing norms and approaches to patient care in the field of obstetrics. Among those changes identified are the transition from

an upright to a recumbent position for birth, use of routine episiotomies, and an increased use of medications in labor. She concludes, in agreement with Hugo, that many practices have been integrated into routine hospital procedures, despite the fact that they have not been supported by scientific research. In reviewing Haire's thorough and important contribution to the clarification of childbirth practices, one must recognize that Haire was affiliated with the International Childbirth Education Association (ICEA) at the time of her publication. This organization is committed to "educated parental participation and decreased obstetric intervention in uncomplicated labors" (ICEA Review, 1978). Given the commitment of the organization that commissioned Haire to write this review, the work could be viewed by some as biased. Despite this potential bias, few articles were published in the next few years on the subject of birth practices in the United States that did not refer to the issues presented in Haire's work.

A purely historical perspective on birthing practices in the United States is supplied by Devitt (1977). In his discussion he provides statistics related to maternal and perinatal mortality and morbidity. He also presents past legislation enacted that directly or indirectly affected obstetrical care. Although

the focus of this article differs from others previously discussed, the trends of increased technological and medical intervention in birth are consistent with those presented by Atwood and Haire.

Several years after the Haire and Atwood articles were published, many other articles on the same subject began to appear. In all of them, a brief historical perspective was provided (Caldyro-Barcia, 1979; Dye, 1980; Roberts, 1980; McKay, 1980; Naroll, Naroll & Howard, 1980). They all consistently identify the trend from home to hospital birth in the early 1900s that occurred when female midwives were replaced by male physicians as birth attendents. The advent of physicians delivering in hospitals marked the change in the perception of birth from a normal process in which limited intervention was necessary to an event that necessitated both physician attendence and technological intervention.

Interestingly, although the professional backgrounds of the authors reviewed are widely divergent, i.e. Atwood--anthropologist, Hugo--nurse midwfie, Devitt--B.A. biology, Haire--consumer, and although their approaches to the topic of birthing practices are varied, they all arrive at similar conclusions. These authors present various examples of the trend from home to hospital birth, and the increased use of

technology that seems both a cause and a result of hospital birth. The trends cited are all consistent and also confirm previous information presented by Atwood and Haire.

A factor identified by all authors mentioned above is that many current obstetrical practices are routed in tradition, and have not been based on the results of scientific inquiry. One such practice is the use of the lithotomy position for the second stage of labor. This use of the lithotomy position, and current consumer dissatisfaction with it, provided the impetus for the current studies.

Cross Cultural Birthing Practices

Both the health status of a population and a society's response to problems of health are shaped by the socioeconomic and political organization, as well as the culture of the society. To understand what is unique to one health care system vis-a-vis another, as well as to suggest possible future directions for change in our system, it is important to compare the birthing practices in other cultures to our own. The purpose of this section is to describe birthing positions used in countries other than the United States.

In 1961 Naroll, Naroll, and Howard examined 104 reports of anthropologists, government officials,

missionaries and other ethnographers "from a sample of 75 non-European societies" chosen from the Human Relations Area Files (HRAF) (p. 953). The HRAFs are made up of multiple diverse studies from different countries. They are a compilation of ethnographies ranging over time, and gathered by researchers from different backgrounds with various degrees of knowledge concerning the research process. Thus, different and non-standardized methods have been used in collecting and analyzing data.

The authors found in their search that in most non-European societies examined, women normally used an upright position for childbirth. Although Naroll, Naroll, and Howard (1961) did not control definitions and methods, they did attempt to evaluate the data collection process and content for random error or bias and found none that were statistically significant. While this work is not offered as a scientific study, it would seem that the consensus of the report is worth noting; some form of upright position is used for birth in many countries.

Notelovitz (1978) and McKay (1978) report the same findings as Naroll, Naroll, and Howard (1961). They found that in countries that have not been influenced by Western medical practices and technology, women assume some kind of upright posture for birth.

Stanton (1979) provides a sampling of observations made by social scientists and physicians who have witnessed birthing practices of people in "traditional" societies. She also found a wide variety of positions used for birth, and suggested that knowledge and understanding of this variety "might add perspective and create flexibility within our own cultural practices" (p. 925).

Consistent with authors previously discussed, Jordan (1980) in Birth In Four Cultures identifies frequent use of some form of the upright position for birth in the Yucatan and Holland. Jordan discusses in depth the concept that individual cultures justify their birthing practices as superior to others without necessarily objectively evaluating them. Thus, cultural justification limits the exploration of old or new potentially useful birthing practices. Through extensive use of participant observation, Jordan provides data related to birthing practices in four countries. She then presents the significance of these practices within the context of their cultural milieu.

Jordan's work is provocative and valuable as it provides a unique perspective from which one can view birthing practices. She posits that because of the cultural acceptance of currently used practices, a system evolves in which tradition dictates, and

alternative practices are few. The use of the lithotomy position for the second stage of labor is one such culturally dictated practice in the United States.

In sum, all of the literature previously discussed identifies the routine use of some form of the upright position for the second stage of labor in many societies. Nevertheless, no literature was found that correlates any birthing position with maternal or fetal outcome. So, while it is known that the upright position is commonly used in many societies, it is not known how the use of this position effects the birthing process.

Consumer Issues

To understand consumers' dissatisfaction with current birthing practices in the United States, a selected review of the literature was conducted. It is apparent that within the last 15 years, consumers in the United States have become increasingly critical of "routine" birthing practices. In addition to criticizing the established practices, consumers also are exploring possible alternatives. In this section of the chapter, articles written by consumers and articles written about consumers by health care providers are examined.

One of the earliest products of the feminist

movement in the 1960s is a book published by the Boston Health Collective (1979). The focus of this book is self help. Assuming that women desire more control over their bodies and their health care, the book was written to provide women with facts, information, and methods for enlightened self care. The significance of this work is that it was one of the earlier consumer activist publications that encouraged and assisted women to assume more control over their own health care.

Two other well known books, Immaculate Deception by Arms (1975) and The Hidden Malpractice by Corea (1977) are openly critical of current obstetrical norms and practices. Both Arms and Corea discuss how active involvement and responsibility for the birth process are inappropriately transferred from the woman to the physician. Further, Arms states that physician interference in normal childbirth degrades women and endangers their babies. Arms and Corea present scenarios of hospital experiences involving medical intervention. Arms, more than Corea, draws conclusions about current birth practices, based on actual, but atypical, birth experiences. The importance of these two books is that they are widely read by consumers and when these same consumers negotiate for obstetrical care, they do so with a higher awareness of controversial issues,

i.e., routine episiotomies.

Numerous articles have appeared in newspapers, lay magazines and lay journals that advocate and report variations in routine childbirth practices (Clark & Gosnell, Newsweek, 1981; Kaplan, "Family Weekly", Lansing State Journal, 1982; Nolan, Health Care News, 1982; Otten, Saturday Evening Post, 1982; Gilette, Ethicon, 1982; Norwood, New York, 1982; Greene, Country Journal, 1983). Topics addressed range from birth position and use of the birthing chair to nurse or lay midwives as birth attendents. If one looks at the difference in reader appeal between New York Magazine and the Family Weekly supplement of the Lansing State Journal, it is clear that the subject of birthing alternatives appeals to multiple segments of the population.

Michelle Harrison, a physician in advanced training, has written a book, A Woman In Residence (1982) aimed at consumer readership. In her book, Harrison has shared with the reader her increasing frustration with the humiliating way that traditional medical practitioners treat women. Harrison reiterates Corea's statement that many physicians demean and often act disrespectfully toward female patients. Support for Harrison's opinions are illustrated in her book by specific examples, many of which relate to birthing practices. The book

is clearly aimed at consumer readership by virtue of both the language used and the publishing house from which it was printed.

Discussions of consumer dissatisfaction with birthing practices are also increasingly evident in scientific journals. One such article by L'Esperance (1979), published in a major nursing journal, contains a discussion of the increased movement toward home birth as a manifestation of the consumer's "healthy aggression." L'Esperance contends that this behavior develops out of a perceived threat to a woman's autonomy and self control that is imposed by present maternity care and suggests that one method of decreasing this threat is to allow the patient to select childbirth options. The nurse, according to L'Esperance, can therapeutically intervene by facilitating communication between the consumer and physician. The importance of this article is that it raises provider awareness of the reasons for consumer behavior and identifies nursing interventions to help consumers more effectively communicate with providers.

In addition to provider discussions of consumer wishes surrounding the birth process, research has been done to measure scientifically expressed consumer satisfaction with current birthing practices. One such study by Pridham and Schutz (1983) is a major

and unique contribution to clarifying parental goals relative to the birthing experience. The study was done to "assess to what degree the providers involved were giving obstetric care that was oriented to family goals" (p. 15). A research group composed of nurse clinicians, family practice residents, faculty physicians and staff nurses from a midwestern university conducted a survey using a retrospective self-reporting approach. The survey was designed to evaluate parental goals, plans, and evaluation related to their birthing experience. Two specific areas were addressed: plans made, accomplished or not accomplished, and parental wishes for the next birth experience. The participants in the survey were obstetric families receiving care from the department of family medicine at a university hospital.

A 158 item questionnaire was developed by the research group based on their literature review and their own experiences. The content validity of the questionnaire was established by consensus of the research group, and the tool was pilot tested on 10 families. The questions asked addressed five areas of previously expressed concern surrounding the birth experience. One such area was desire for alternative labor and delivery positions. The questionnaire consisted of 80% check-list or Likert scale items and

20% open-ended questions. The open-ended questions were coded by two people with an interrater reliability of 89.6%. Of the 149 questionnaires that were sent to families having delivered within the last 13 months, 91 (61%) were returned. Background variables such as parity, age, marital status and attendance at childbirth classes were reported. Frequency tables were used to display the results as absolute frequencies and as percentages of the sample.

Pridham and Schutz concluded from their results that most parents had the experiences that they wanted in the birth process and primarily desired more infant-family interaction following birth. Of particular interest to these studies is the data that indicated 3% of the sample planned to use alternative birthing positions but could not, and 11% would like to try an alternative position with subsequent deliveries. The data also indicated that 23% of the sample would like to deliver in a labor/birthing room next time.

While the overall percentages are small, of significance is the disparity between the percentage of families who desire an alternative position (11%) and the percentage of families who would like to deliver in the labor/birthing room (23%). It is unclear what this inconsistency means for the following reasons. First, what questions were asked and how were they

phrased? If the question asked was: Would you rather sit up or lie down to have your baby?, the response elicited might be different from that obtained if the question had been phrased: Would you like to use an alternative birthing position? Second, what type of question was used to gain this information, open-ended or forced choice? Third, did a few people express the desire for several changes or did several people express the desire for a few changes? In the study by Pridham and Schutz it is unclear whether the 11% that desire an alternative birthing position are part of the 23% that desire use of the labor/birthing room.

It is difficult to interpret the results of any individual category within the data. This difficulty results from the fact that while demographic variables were carefully presented relative to the total group of respondents, there is no information that describes the characteristics of various subgroups that expressed dissatisfaction. For instance, it is unclear whether the people who desired an alternative birthing position were different in any way from those who did not. Given the eight women who had cesarean section births and the two women who delivered at home, the potential for demographic variability is great. The lack of consistency related to method and location of birth in the research sample can be considered a limitation

of the study.

The study has other limitations as well. The sample included only patients who went to family practice clinics. These patients may be different from those who seek care from an OB/GYN specialist. Thus, the generalizability of the results is limited. The questionnaires were sent to families that had delivered over a 13 month period. No specific information, however, was provided related to differences in length of time since delivery and reported dissatisfaction. This is important when one considers that women 13 months post partum may have worked through conflicts pertaining to delivery much more thoroughly than women who delivered three weeks prior to receiving the survey.

The study indicated that a birthing room became available during the last two months that the survey was conducted. It is unclear how many respondents actually used the birthing room and if this affected their wishes for the next birth experience. Did any of the 23% who wished delivery in a labor/birthing room for the next delivery use it previously, or had they all delivered in the delivery room? This information is particularly important to the issues concerning birthing process but is not available in the article reviewed.

Pridham and Schutz also do not state when the data

were collected. This information is important because of the increased consumer awareness related to birthing position over the last two years. It is reasonable to speculate that these data could have been collected as long as three years ago, thus indicating a lower level of consumer awareness than currently exists. The speculation that the data were collected several years ago is reinforced by the fact that the most current bibliographic reference was from 1978. In sum, did the families in the study know enough about alternative birthing positions to make their responses relevant to clinical practice in 1983?

There are many limitations to the study that have been discussed. Nevertheless, it is significant that researchers are beginning to determine scientifically what consumer needs are, with the long term goal of adjusting health care practices to meet these needs if possible.

While there is an abundance of lay literature that addresses consumer concerns about the birth experience, there is little research other than the work of Pridham and Shutz that scientifically evaluates consumer interest in alternatives. Providers disregard the consumer demands in the interest of "safe" health care, but are unable to provide the consumer with scientific evidence to support their position.

Thus, a schism between consumer wishes and the credibility of some routine obstetric practices is established.

In summarizing the literature related to consumer issues, there is consistency between what consumers are writing for consumers, what providers are writing for consumers, and what nurse providers are writing for nurses about consumers. It is important to note, however, that a very small number of nurses are writing for nurses or consumers and furthermore that articles written by obstetricians addressing consumer needs were not found by these authors. The consensus of the articles reviewed in this section was that consumer requests for individualized care and less medical intervention may indeed be reasonable and merit scientific inquiry.

These findings are of the utmost significance to these researchers as they provide justification for the research questions. That is, is the consumer request for alternative birthing positions a reasonable request relative to the length of the second stage of labor?

Having discussed the literature related to trends in childbirth practices in the United States, the literature dealing with cross cultural birthing practices, and the literature that addresses consumer concerns

related to birthing practices, literature related to the major concept of these theses is next reviewed.

Primipara

The definition of the concept primipara used in these studies evolved from a review of medical and nursing text books widely used in this country. In all texts reviewed, the definition of primipara is consistent; a woman who has given birth to her first infant after the period of viability, regardless of whether the child is living at birth (Agnew et al., 1965; Pritchard & MacDonald, 1980; Lerch, 1974; Fitzpatrick, 1971; Jensen, Benson & Bobak, 1980; Olds et al., 1980). Lerch (1974) further defined viability as that of an infant of 25 weeks gestation and beyond.

Second Stage of Labor

Medical and nursing textbooks were again used to define the concept of the second stage of labor. This stage begins with complete dilatation of the cervix and ends with delivery of the infant. The texts were consistent in their definition (Pritchard & Mac Donald, 1980; Wilkerson, 1973; Olds et al., 1980; Jensen, Benson & Bobak, 1980; Fitzpatrick, 1971). Current researchers in the field of childbirth identify the same definition of the second stage of labor as do the authors cited above (Lederman et al., 1979; Bergsjo

& Halle, 1980; Bergsjo, Bakketeig & Eikom, 1979).

Uncomplicated Pregnancy

While reviewing the literature to formulate a definition of uncomplicated pregnancy, it became clear that the concept is indirectly defined by stating what it is not. In other words, the absence of the following abnormalities of pregnancy indicate an uncomplicated pregnancy: toxemia, pre-eclampsia, eclampsia, diabetes mellitus, heart disease, renal disease, age less than 16 or greater than 35, chronic hypertension, chronic lung disease, multiple births, breech presentation, incompetent cervical os, bleeding in the 2nd or 3rd trimester, and abnormal fetal position. The literature reviewed on this subject were well known and accepted medical and nursing text books (Pritchard & MacDonald, 1980; Isselbocker et al., 1980; Juhasz, 1973; Lerch, 1974; Leitch & Tinker, 1978; Olds et al., 1980; Jensen, Benson & Bobak, 1980).

Birthing Position

The literature reviewed relative to birthing position can be divided into three categories: those articles that define specific birthing positions, reviews and discussions of various birthing positions, and research based articles on birthing position.

Naroll, Naroll and Howard (1961) identify definitions

of the lithotomy and upright position that have been used consistently over the last 22 years. These definitions are used in the current classic discussion on birthing positions by Atwood (1976) and more recently by McKay (1980), a nurse researcher involved internationally in issues related to childbirth. Liu (1974) refined Naroll, Naroll & Howard's definition of the upright position, for the purpose of her own research on the effects of an upright position during labor. Liu's refined definition is as follows: A woman is in an upright position when the line connecting the 3rd and 5th lumbar vertebrae is greater than 30° from the horizontal plane. This definition has practical application in a research context, as position can be more consistently labeled either upright or recumbent. Although Liu created a definiton of upright that is easily measured, no mention was made in her article about how the definition was established. Indeed, nothing was found in the literature that validated a definition of any specific position. It has merely been assumed that the definition is adequate.

A definition of the lithotomy position, in the cultural context of the United States, is addressed by Miller and Keene (1972) and Atwood (1976). That is, the lithotomy position is described as the woman lying on her back, legs flexed on thighs, thighs flexed

on abdomen and abducted. The same definiton of lithotomy position is consistently found in the most recent medical and nursing text books (Pritchard & MacDonald, 1980; Jensen, Benson & Bobak, 1981). The definition of lithotomy position was further refined by Liu (1974). Liu stated that a woman is in a lithotomy position when the line connecting the 3rd and 5th lumbar vertebrae is less than 30° and the patients thighs are flexed on the abdomen with the legs abducted.

In addition to articles that primarily define birthing positions, many articles discuss use of position and the effect on various aspects of labor. Hugo (1977) and Atwood (1976) provide a literature review and discussion of several birthing positions. In these articles the authors provide information related to the physiologic effects of the upright and recumbent position on labor. Hugo presents a concise summary of these issues while Atwood presents a comprehensive and detailed examination of past and present literature on the subject. Despite the differences in approach, these two authors agree on the relative advantages and disadvantages of both the upright and recumbent position and conclude that the upright position is more advantageous to the mother and fetus, but less convenient for the attendant. This issue

of attendent convenience is supported in the discussions presented by Gilder (1977) and Andrews (1980).

While Hugo and Atwood discussed the lithotomy and upright position, McKay (1978) and Liu (1979) focused exclusively on the advantages of the upright position. In addition to supporting each other's conclusions, McKay's and Liu's conclusions are consistent with the earlier work done by Hugo (1977) and Atwood (1976), thus lending credibility to all the authors' works.

Russell (1982), as early as 1969, identified specific numerical increases in the anterior-posterior and transverse pelvic diameters in the upright position. These values were determined through the use of x-rays during labor. Ehrstrom's work, as reported by McKay (1978), again using x-ray, also found increased pelvic diameters in the upright position. Since Russell and Ehrstrom established the presence of increased pelvic diameters in the upright position, it would seem to follow that progression through labor is faster in the upright position. Indeed, Liu (1979) and Roberts and Mendez-Bauer (1980) report that women who used an upright position had a shorter labor. They did not attribute this shorter length of labor to increased pelvic measurements however, but rather to a different set of variables, i.e., force of gravity and the more effective use of abdominal and thigh muscles.

Despite the fact that for several decades evidence has been available that indicates the physiologic advantages of the upright position, custom more than scientific knowledge has continued to dictate the recumbent birthing position (Roberts & Mendez-Bauer, 1980; Nobel, 1981; McKay, 1978). In sum, many authors have identified advantages of the upright position and several have concluded that one advantage is a shorter length of labor. This advantage, however, is attributed to compatible but different factors involved in the birth process and the upright position.

Length of the Second Stage of Labor

In the literature search relative to the length of the second stage of labor, few research articles were located that measured this important parameter. One frequently cited article by Hellman and Prystowsky (1963) utilized data from 1937-1945. These data were collected in a retrospective chart review from a major university hospital in Maryland. A sample of 13,377, including multiparas and primiparous women, was used to establish a norm for the length of the second stage of labor. High risk pregnancies, according to present standards, were eliminated from the sample. No mention of birthing position or use of medications during labor was discussed. The results were presented as median

rather than mean durations for multiparas and primiparas due to a "skew distribution." Hellman and colleague found that in primiparas the median duration was slightly under 50 minutes and in multiparas the median duration was slightly under 20 minutes.

Although the scope of this study was ambitious, it is difficult to assess the meaning of the results because of the way the data were presented. The only graph that plots numbers of deliveries against minutes of the second stage of labor combines primiparas and multiparas. Given this obtuse graphic and the impracticability of presenting raw data due to the size of the study, further analysis of the data becomes limited. Distribution around the median is unknown. Interestingly, the medians established in this dated study continue to be the norms for the duration of the second stage of labor cited in major medical and nursing test books today (Willson, Beecham & Carrington, 1975; Pritchard & MacDonald, 1980; Jensen, Benson, & Bobak, 1981). Since this study is still widely accepted as valid, it is with frustration that these authors note our inability to use this research as a norm with which to compare our results. There are three reasons for this: 1) the distribution curve around the median cannot be compared since it is not available in Hellman and Prystowsky's study, 2) no information on use of

medication was presented and drugs were frequently used during that period of time for labor and delivery (see Chapter I and III), 3) position for the second stage of labor is not stated.

In looking at current studies that measure the duration of labor, one finds a different approach from that of Hellman and Prystowsky (1963). Rather than just identifying the normal length of labor, current researchers have studied variables that affect the length of the second stage of labor. Of particular interest to these authors are the articles that relate birthing position to the length of labor.

Liu (1974) studied the effects of the upright and recumbent positions on labor in sixty primiparous women who received care from OB/GYN departments in two separate cities. Strict psychologic and physiologic criteria were used to determine eligibility for the study. Liu reviewed antenatal records to select subjects. Thirty women were assigned to the experimental group and thirty to the control group. Subjects in the study were paired in terms of their sequential admission to the hospitals. The only difference in the groups was the use of the upright position for labor in the experimental group. The investigator collected all the data related to the length of the second stage of labor herself. She found "the first

and second stages of labor were shorter among women in the upright position" (p. 2205). The mean value for primiparous women in the upright position was found to be 34.0 minutes, and the mean value for primiparous women in the recumbent position was 74.67 minutes. From this finding she concludes that the upright position is advantageous for women because reducing the length of labor reduces the danger to the mother and infant.

This well organized and conducted study has two limitations. First, the data analysis is problematic. The only data presented related to the length of the second stage of labor are the mean durations in the upright and recumbent positions. No raw scores were presented and no statistical analysis other than the means were reported. A glance at the minimal data shown indicates an impressive difference between the means, i.e., 40.67 minutes. Neither the significance level nor the standard deviation are given. Thus, one is unable to understand the results comprehensively. A second and less important limitation of this study is the level of generalizability possible due to the strict criteria used for inclusion in the study. Therefore, the results cannot be applied to women who do not fit within the study criteria.

Given the similarity between the criteria used

in Liu's research and that of the present studies, a basis for comparing mean values for the length of the second stage of labor exists. A more thorough comparison of results would have been possible if Liu had published more statistical information about her study. Nevertheless, the lack of other well controlled studies on the length of the second stage of labor makes Liu's the only benchmark available to use for purposes of comparison.

In contrast to the well controlled and well conducted study of Liu, a study conducted by McManus and Calder (1978) lacks credibility both in design and execution. In their study 40 subjects were divided into four equal subgroups; multigravida women in an upright position, multigravida women in a recumbent position, primigravida women in an upright position and primigravida women in a recumbent position. All subjects were induced. The reasons for induction were not given but were said to be "similar." The lateral recumbent and upright positions were used, but the absence of definitions of the positions makes is unclear how the researchers determined position for the purposes of their study.

A few parameters of pregnancy were controlled, i.e., no multiple pregnancies or breech presentations. McManus and Calder concluded that there was no

difference in the length of labor between the upright and recumbent groups for either multigravidas or primigravidas.

These reported results must be examined in light of several significant limitations of the study. First, the small sample size is compromised by its subdivision into four groups. Second, the reasons for induction are stated as being similar, but they are never clearly identified. Three, amniotomy was the initial means of induction followed by oral prostaglandins for all subjects. In addition, some subjects also received IV oxytocin for induction. Thus, not all subjects received the same intervention. Consistency of intervention was also not maintained in relation to "mode of delivery": some patients delivered spontaneously, some had forceps assisted deliveries, and two patients actually had caesarean sections. It is unclear at what point during labor interventions took place and therefore how intervention affected the length of the labor. In the data presented, the length of labor for those who delivered spontaneously vs forceps assisted vs caesarean section are not reported separately. Rather, the raw data are reported as one meaningless mean. Further, the level of significance is not reported. The inconsistency between the findings of Liu (1974) and those

of McManus and Calder (1978) are of minimal concern to these researchers because of the significant limitations of the McManus and Calder study.

A study often cited by researchers in the field of childbirth is that of Calderyo-Barcia (1979). This study was conducted in 11 hospitals in seven South American countries and was directed by a group of four, including Caldeyro-Barcia. The following conditions were fulfilled by all subjects included in the study: low risk labors, uncomplicated pregnancies, spontaneous onset of labor, normal cervical dilation from 3-5 cms, single fetus in vertex presentation, anterior position, no rupture of membranes prior to onset of labor, no cephalopelvic disporportion, normal pelvis, no medications or oxytoxics. The subjects were randomly selected and matched for gravidity, parity, maternal height and weight, age, and weight gain. Caldeyro-Barcia completed the study with 225 women who used the "horizontal" position and 145 women who used the "vertical" position. The results showed that labor from 4-5 cm. dilatation to 10 cm. dilatation was shorter in the vertical position than in the horizontal position by 78 minutes, at the $p = 0.006$ level of significance. Further increase in the intensity and duration of uterine contractions and a more rapid rate of dilatation occurred in the vertical position. The frequency

of contractions, however, was unchanged. Unfortunately, evaluation of this study is limited since no raw data are presented and, more importantly, statistical methods were not discussed.

Another problem with the study report is that the "horizontal" and "vertical" positions are not defined. Given that this study was conducted in 11 hospitals, located in 7 countries, and directed by 4 people, the potential for differing and inconsistent interpretations of the positions is great. Considering the large scope and detailed plan of the study, one might assume that the positions were specifically defined and consistently reported. The article describing the research, however, does not address this issue.

A limitation of Caldeyro-Barcia's work that directly relates to these research studies is that he did not evaluate the effects of the two positions on the length of the second stage of labor. Thus, an opportunity to measure the duration of the important second stage of labor, given the tightly controlled sample already selected, was lost.

Controlled Variables

It has been thought, and in fact substantiated by research, that many variables affect the physiologic process of birth. The literature has shown that the

following variables may affect the length of labor and therefore they were controlled in the present studies: use of medications, use of forceps, fetal presentation and position, pelvic measurements, maternal age, childbirth education, maternal complications and the presence of support persons in labor.

Medications. A type of medication commonly used to enhance and accelerate labor during the intrapartum period is oxytocin (Haire, 1978; Dutton, 1978). Haire indicated that "oxytocic agents...are administered to intensify artifically the frequency and/or the strength of the mother's contractions as a means of shortening the mother's labor" (p. 19). This statement is consistently supported by other commonly acknowledged experts in the field of obstetrics (Pritchard & Mac Donald, 1980; Jensen, Benson & Bobak, 1981). Pritchard and MacDonald (1980) discuss the effects of meperidine, an analgesic commonly used during labor, and conclude that its use may increase uterine activity and thus shorten the natural length of labor.

The literature reviewed consistently states that the use of regional anesthesia can result in depression of uterine contractions and thus prolong labor (Jensen, Benson, & Bobak, 1981; Haire, 1978; Pritchard & Mac Donald, 1980). Regional anesthesia is defined as paracervical blocks, caudals and epidurals. Haire (1978)

in her extensive review further states more specifically that regional anesthesia inhibits the mother's ability to push the baby out and thereby prolongs the second stage of labor.

Lowenshon et al. (1974), using a sample of 65, did a highly technical study that measured the change in intrauterine pressure following the injection of epidural anesthesia. The level of uterine activity was evaluated for one ten-minute period prior to introduction of the epidural, to establish a baseline. Following introduction of the epidural, uterine activity was measured for three ten minute periods and these results were compared with the pre-anesthetic findings and also with a group of 20 women in the control group who had no anesthesia.

The results were as follows: after administration of epidural anesthesia there was marked decrease in uterine activity, which remained below the baseline determinations for thirty minutes. A difference in uterine activity between the experimental and control also existed, and was reported significant at the $P \leq 0.05$ level. Lowensohn et al. suggest that the common practice with epidural anesthesia is to give hourly injections to maintain pain control. If medication is added hourly, and uterine activity drops significantly after each administration of medication,

one could conclude that labor would be prolonged when epidural anesthesia was used.

The one limitation of this study relates to the method used for determining baseline levels of uterine activity. It is unclear just how these baseline levels were established, even though it is stated that they were done over a ten minute period. Were there contractions occuring during baseline measurement time? If there were uterine contractions, were the heights of the contractions averaged to determine each woman's baseline value? Since not all women were at the same point in labor when the baseline was determined, does this make any difference in baseline determinations?

Returning to the original premise that regional anesthesia prolongs labor, the research findings of Lowensohn et al. seem to support this statement. Therefore, it is important to control medications when studying the effects of birthing position on length of the second stage of labor.

Forceps. A review of the literature regarding obstetrical forceps indicates that their use shortens the length of the second stage of labor (Pritchard & MacDonald, 1980; Haire, 1978; Jensen, Benson & Bobak, 1981; Clark & Affanso, 1979).

Fetal Presentation and Position

In the review of major medical and nursing obstetrical text books, one finds the commonly held opinion that any fetal presentation, other than vertex, is considered abnormal (Pritchard & MacDonald, 1980; Jensen, Benson & Bobak, 1981; Clark & Affanso, 1979). The literature demonstrates that the result of fetal malpresentation is dystocia, thereby leading to prolonged labor (Pritchard & MacDonald, 1980; Jensen, Benson & Bobak, 1981). These same authors also report a prolonged labor when the fetus is in an occiput posterior or occiput transverse position.

Maternal Pelvic Measurements. As with abnormal fetal presentations and positions, the literature also includes discussion of the relationship between contracted maternal pelvises and dystocia. In an abstract, Caldwell and Moloy (1933) described their study of anatomical variations in the pelvis, the obstetrical significance of these variations and the prognostic importance to the process of birth. As a result of their study, Caldwell and Moloy concluded that a prolonged labor may result when pelvic resistance due to abnormal maternal measurements is encountered. This conclusion, based on Caldwell and Moloy's original work, has been widely cited in obstetrical texts over the last fifty years (Oxorn, 1968; Willson, Beecham

& Carrington, 1975; Jensen, Benson & Bobak, 1981; Pritchard & MacDonald, 1980).

Age. A search of the Index Medicus, Cumulative Index of Nursing Literature and the International Index for Nursing Literature produced no citations that deal with maternal age and the length of labor. The only exception to this is relative to the use of age as a high risk determinent (Jensen, Benson & Bobak, 1981; Pritchard & MacDonald, 1980).

Childbirth Education

Beck and Siegel (1980) provide an extensive review of the literature on prepared childbirth and its effect on labor and delivery. They conclude that although research has been done to measure the effect of psychoprophylaxis on labor, "lethal research errors" (p. 441) inherent in the studies make their conclusions questionable. Nevertheless, Beck and Siegel conclude that it is reasonable to consider childbirth education as an effective means of reducing stress during labor and delivery and that an interface between psychosomatic research and childbirth is warranted.

Haire (1978) has also addressed the subject of childbirth education in her review. She indicates that several studies report a decrease in the length of labor in women who are prepared to participate in

the birth process.

Beck and Siegel (1980) in their reviews come to a different conclusion than Haire (1978) with regard to the effects of childbirth education on labor. In view of these differences, it would seem that in studies related to birthing practices, the variable of childbirth education should be held constant. In so doing, one would consistently control for the effects of childbirth education whatever the effects are ultimately found to be.

Maternal Complications. The medical and nursing text books reviewed are consistent in the information they contain regarding maternal complications and their possible effect on the length of labor. Due to an increased level of personnel and technological interventions required when maternal complications are present, the normal length of labor may be either lengthened or shortened depending upon the particular intervention (Pritchard & MacDonald, 1980; Jensen, Benson & Bobak, 1981; Clark & Affanso, 1979; Willson, Beecham & Carrington, 1975).

Support Persons. Sosa et al. (1980) provide excellent support for the contention that the presence of a lay support person during labor can influence the length of labor. Their research was conducted in a Guatemalan City Hospital where primiparous women

with uncomplicated pregnancies were studied. Upon admission to the hospital the women were randomly assigned to either a control or experimental group. As a result of the control criteria it was necessary to admit a total of 136 women initially to the study to obtain a final sample of 40, 20 in each group. Women in the experimental group were allowed to have a lay support person (doula) during labor and delivery. Those in the control group, in accordance with the normal hospital policy, had no support person present. Other factors related to care and intervention during labor and delivery were consistent between the two groups. Patients were excluded from the study if any of the following complications occurred: fetal distress, prolonged labor, need for augmentation, caesarian section, forceps, apgar scores less than 8, meconium stained amniotic fluid, or fetal respiratory distress. The physicians who eliminated the patients with complications from the study were unaware of the nature of the study.

The results of the study indicated that there was no statistical significance between groups related to marital status, age, infant birth weight or infant sex. The mean length of labor in the control group was 19.3 hours, and in the experimental group was 8.7, showing a significant difference at the $P \leq 0.001$ level.

These figures indicate total labor time; the second stage was not reported separately.

The findings of this well designed and carefully implemented study appear clear. A support person attending the women in labor appears to be a factor that shortens the length of labor. This is an important finding, despite the fact that it was reported on women in South America and therefore has somewhat limited generalizability. In subsequent research designs measuring factors which involve the length of labor, the presence of a support person must be held constant to avoid confounding effects.

Haire (1978), citing several earlier studies, also confirms the importance of a support person's presence during labor. She indicated that this support reduces fear, which has been shown to adversely affect uterine motility and blood flow.

Intervening Variables

Several variables were measured in these studies although they were not controlled. The variables are: rupture of membranes, race, marital status, obesity, episiotomy, use of fetal monitoring, lacerations, type of physician, birth attendent--own or "on call", and type of childbirth education. These variables were included to better describe the characteristics of

the samples and to provide further potential research questions relative to the length of the second stage of labor. The following discussion includes a critique of the literature related to these variables.

Rupture of Membranes. Lynaugh (1980) conducted a systematic review of the literature related to elective amniotomy to determine if routine rupture of membranes is warranted. Lynaugh reviewed each study relative to design, method, results and conclusions. The author concluded that there is little agreement in the literature as to the effect of amniotomy on the length of labor. Although the clinical impression of many practitioners is that amniotomy shortens labor, some research supports this contention and other studies do not. As a result of this dicotomy, several research articles will be individually reviewed.

The first article is the result of research done in England by Bainbridge, Nixon and Smyth (1958) between 1953 and 1956. In this retrospective study, 3750 consecutive hospital deliveries were reviewed. Included in this number were 2324 primiparas and 1426 multiparas. Patients with twins or whose labors ended in cesearean sections were excluded.

Patients were divided into groups according to parity, and when their membranes ruptured relative to stage of labor. Information was abstracted from patient

charts recorded previously by "students and midwives." The data were collected and analyzed by one investigator. The researchers conclude that there is no significant effect on the length of the second stage of labor, although total labors longer than average were associated with intact membranes, and total labors shorter than average were associated with ruptured membranes.

There are many blatent limitations to this large, although dated study. There was no control group in this project. "Averages" of length of total labor and the first stage were given. How these averages were derived mathematically, or the source of the figures used to compute the averages is unknown. We only know the age and delivery data of the patients; nothing about medications, position, pregnancy complications or chronic illnesses, marriage, race, etc. is provided. Thus, many intervening variables may have had an effect on the results. Two final limitations need to be discussed. First, although some terms were specifically defined, the definitions presented were not always consistent with those used by the majority of practitioners in the 50's as well as today. Second, the definition of the term pre-eclamptic/toxemic was changed during the study to include a wider group of patients. Thus, any results related to this group are suspect. Despite the limitations of this study, it is included

because it continues to provide a "scientific" rational for physicians to rupture membranes routinely to facilitate faster labor.

In contrast to Bainbridge, Nixon and Smyth (1958), Laros, Work and Witting (1972) conducted a well designed and controlled experiment in which they examined the relationship between amniotomy and the length of several stages of labor. A prospective study with 125 patients was done at a Southeastern Michigan hospital. Random assignment to experimental and control groups was done when cervical dilatation was 5-8 cms. All patients had a vertex presentation and were at 36-44 weeks gestation. In the experimental group, amniotomy was performed at this time. Labor management for both groups was the same, with the exception of the amniotomy. Patients were compared on the basis of intervening variables (medications, method of delivery), using chi-square analysis, and no significant differences were found between groups on the non-labor parameters. Data for multips and primiparas were analyzed separately. The results indicated a significantly shorter second stage of labor ($P \leq 0.01$) in primiparous women in the experimental group. Although the researchers stated they used a "normal group of patients", they failed to discuss what constitues a normal patient. They also were not specific as to where the patient samples

were obtained. Were they all from one hospital, or several? Were demographic variables other than age and gestation consistent between groups? Despite these few unanswered questions, the design and methods for this study were excellent and lend credibility to the results.

The importance of this study is the differing results from those of Bainbridge, Nixon, and Smyth (1958) relative to amniotomy and labor length in the second stage. Bainbridge, Nixon and Smyth (1958) concluded that amniotomy shortens the total length of labor. Laros, Work, and Whitting (1972) concluded that amniotomy shortens the second stage of labor, and thus decreases the total length of labor. Although these studies differ in method as well as some aspects of the results, they both conclude that amniotomy shortens some aspect of labor and together provide increased justification for this intervention in labor.

Friedman and Sachtleben (1963) conducted a study that found no difference in the length of any phase of labor related to amniotomy. Using a sample of 1729 patients, they divided this number into three sequential groups; group I (experimental N=709), group II (control N=280) and group III (experimental N=740). The experimental groups had amniotomy soon after labor was established. This time of amniotomy varied relative to

cervical dilatation, depending on dilatation at the time of hospital admittance. Group III duplicated experimental group I to act as a double check on results.

The data from primiparas and multiparas were analyzed separately. Intervening variables, uterine stimulation, malposition, and multiple pregnancies were analyzed in all three groups and no significant differences were found. It was found that "amniotomy, as a therapeutic procedure, is ineffectual in producing abbreviations in any of the phases of the first stage of labor consistently" (Friedman & Sachtleben, 1963, p. 767). Friedman and Sachtleben (1963) go on to conclude that there is "remarkable consistency...of the second stage...regardless of the time of rupture of the membranes" (p. 767).

Although the sample size is large, several limitations are evident. The results and discussion portion of this lengthy article are difficult to understand. These portions are verbose, and the statistics appear only in the tables. The narrative presents comparisons that are difficult to find in the tables. For example, when the results are discussed, they are discussed in terms of "remarkable consistency" instead of statistical significance. What does this mean? The authors do publish some of their data but it is not compiled and presented in useful ways. This limits both the

understanding and applicability of the results.

This article was reviewed because it was a study of significant size that disputed previously found research on the effect of amniotomy on the length of labor. Therefore, it raises a question as to whether artificial rupture of membranes does indeed alter the natural length of the second stage of labor as was indicated by Laros, Work and Whitting (1972).

In summary, both the review done by Lynaugh (1980) and the research efforts individually presented and critiqued above, lead one to conclude that at this time there is uncertainity as to just what effect rupture of the membranes has on the length of labor. Since this uncertainty exists, in any research studying the length of labor, it would seem important to at least record in what stage the membranes were ruptured and whether they were ruptured artificially or spontaneously. In so doing, one would be able to better describe the characteristics of the sample.

Race. Duignan, Studd and Hughes (1975) conducted a large prospective study in England to evaluate the effects of different racial groups on the length of labor. Of the 3217 consecutive labors that were evaluated, a sample of 1306 was obtained that met the extensive established criteria. Races included in this study were white (N=866), Asian (N=341), and Black (N=99).

Racial groups included: White (Western European women), Asian (immigrants from India, Pakistan and Bangladesh) and Blacks (immigrants from the West Indies and Africa). Both multiparous and primiparous women were studied.

The mean duration of the second stage of labor was found to be 41.5 minutes in primiparous women, including all races studied. The duration of the second stages ranged from 3 minutes to 115 minutes, although 83% of the subjects had a second stage of greater than 60 minutes. Separating the length of the second stage by race, Duignan, Studd and Hughes (1975) found that: white primiparous women had a longer second stage than Asian primiparous women at the significance level of $P \leq 0.01$, Asian primiparous women had a longer second stage than Black primiparous women ($P \leq 0.05$), and White primiparous women had a longer second stage than Black primiparous women ($P \leq 0.001$).

Although this study identified significant differences in the duration of second stage labor between races, the authors did not provide mean values according to race, only for the larger groupings of multiparous and primiparous women. Specific mean values for each race would have made the data more useful as a comparison for further research. Data collection techniques were not discussed in the article, however, all of the labor data was coded by the authors in preparation

for computerized analysis.

It was noted earlier in this discussion that the Asian and Black racial groups had immigrated to England from other countries. Factors of national difference prior to immigration, such as nutrition or pre-natal self-care customs, as well as racial differences could possibly account for the findings. Thus, the study has limited generalizability to a poulation that may be racially different but includes people who are not recent immigrants. Since it was not possible to find research done in the United States comparing race and the duration of labor, this study is helpful despite the limited generalizability. Considering the results of Duignan, Studd and Hughes (1975), further studies comparing length of second stage labor must take race into consideration, relative to research design. If this is neglected, one would be unable to distinguish if differences in the labor were due to the variables being tested, or whether race had a confounding effect.

A more recent study, again done in England, was conducted by Tom, Chan and Studd (1979). Using the same racial groups from the same geographical regions as those identified by Duignan, Studd and Hughes (1975), a study to identify normal and dysfunctional labor in any of the above groups was done. Racial composition in primigravidas was as follows: White (N=588), Black

(N=120), Asian (N=26). With a total N=1643, primigravidas and multigravidas, each racial group was also divided according to first or subsequent pregnancies. All patients had a spontaneous onset of labor and a single fetus in the cephalic presentation. Some members of the sample received medical labor augmentation and/or others epidural "analgesia" on request. The time of admission to the hospital was considered the beginning of the first stage. The mean length of labor for the first stage was not different between racial groups. No mention was made of the length of the second stage in any group.

In critiquing this article several limitations are evident. First, there is a much higher percentage of white patients (79%) than either Black (17%) or Asians (3.5%) patients. Is it possible that there was no difference between races because of the small numbers of Blacks and Asians in the sample? Second, since the first stage of labor began on admission to the hospital, the length of this stage depended on when the woman chose to come into the hospital. No specific criteria related to cervical dilation was used to standardize when the first stage began. Thus, some women may have been admitted at 2 cm while others were admitted at 8 cms, making the measurement of the length of the first stage inconsistent.

The article indicates that some patients received intravenous augmentation, and some elected to receive regional anesthesia. Both of these factors are known to affect the length of labor, and yet, in the results, the data from these patients were not analyzed separately. Lastly, in this study, Thom, Chan and Studd did not evaluate the length of the second stage of labor and yet they measure fetal outcome after birth, thus negating possible negative effects of the entire second stage of labor on the fetus.

This article was reviewed in hopes that it would contribute information relative to racial differences and length of labor. However, due to its poor design and inadequate analysis and reporting, it provides little light on the issues it purports to address.

Marital Status. A search of the Index Medicus, Cumulative Index to Nursing and Allied Health Literature and the International Nursing Index produced no references that address the issue of marital status and the length of labor.

Obesity. Gross, Sokol and King (1980) designed and conducted a prospective study comparing pregnancy risk factors in an obese and nonobese population. Obese patients were defined as being 90+Kg before pregnancy and equaled 10.1% (279) of the total sample of 2746. The data were collected over a 13 month period at a

large metropolitan Midwest hospital. All patients had received prenatal care. Extensive comparisons of pregnancy risk factors were carried out using contingency tables and chi-square analysis.

Using a significance level of $P \leq .001$, no significant differences between the obese and non-obese groups were found during the first or second stages of labor. This includes no differences in the length of the second stage of labor. This study is comprehensive, both in sample size and in number of risk factors studied. It carefully identifies risk factors in a sample of obese pregnant women and then compares the frequency of their occurrance to the frequency in a non-obese group of pregnant women. The definition of obesity is specific and easily measurable. The definition yields a group of obese patients that include a range of obesity levels. There are two limitations identified in this study. Data were collected by use of a computerized form twice during each subject's pregnancy. The literature does not report who collected the data, how it was collected, and, if more than one person collected it, were their methods consistent? Was there interrater reliability? The second limitation, particularly relevant to these studies, is the reporting of the data on duration of the second stage of labor. Mean durations (or raw scores) were not given, only

frequencies in percent of those women whose second stage of labor exceeded 2.5 hours were presented. It is also not clear how Gross, Sokol and King arrived at the figure of 2.5 hours as an indicator of labor abnormality and the need for intervention. Why did they determine that beyond 2.5 hours was too long for the second stage of labor? They cite no references.

This study is relevant because it indicates there is no significant difference in the length of the second stage of labor in obese and non-obese pregnant women. Therefore, it is not important to control for obesity when studying factors that affect the length of the second stage of labor.

Episiotomy. Cogan and Edmunds (1978) provide a review of the literature surrounding the use of episiotomy over the past two hundred years. They conclude from their review that one result of episiotomy creation is a shortened second stage of labor. Cogan and Edmunds (1978) also identify a frequency of episiotomy use in vaginal deliveries that exceeds 70% in the United States. Since the vast majority of women delivering in metropolitan hospitals have routine episiotomies with each birth, it is the opinion of these authors that one must identify whether a woman has had an episiotomy or not. This knowledge will help accurately interpret any data results related to the length of

the second stage of labor.

Use of Fetal Monitors. Various research articles identify prolonged labor in patients that experience increased levels of anxiety. Research has further correlated an increased level of anxiety with the use of electronic fetal monitoring. In the following discussion, research that addresses these two issues will be reviewed.

Garcia and Garcia (1955) studied the effects of plasma epinepherine on the uterine contractions of 33 laboring women. In the study, the patients were divided into three groups: patients who had normal labors (N=10), patients who were fearful of labor (N=18) and patients who experienced labor inertia (N=5). Venous blood was drawn immediately following a uterine contraction when the patients had reached 5-6 cm dilation. The blood samples were also drawn prior to use of any medications for pain, sedation or labor stimulation. The blood samples were then processed using a very technical procedure to preserve the epinepherine present in the plasma.

Contractions in rat uteri were chemically stimulated every two minutes and the uterine activity was recorded using a kymograph. Known quantities of l-epinepherine were then introduced into the rat uteri and the contractions were again measured using the kymograph. Following

these determinations, samples of the plasma drawn from the laboring women were introduced into the rat uteri and the contractions were measured as before. By comparing the differences in heights of the uterine contractions with and without the l-epinepherine and with the plasma samples, the concentration of epinepherine in the plasma samples was extrapolated.

In this study, Garcia and Garcia (1955) found: that the group with "normal labors" had levels of plasma epinepherine so low that it was not possible to measure with the procedure used and the labors were all "relatively short," the group that feared labor had a greater amount of plasma epinepherine detectable and a longer labor, and the group that experienced uterine inertia had levels of plasma epinepherine that were even higher and experienced prolonged labors requiring stimulation. In evaluating this research one must consider the small sample size that was used. Garcia and Garcia (1958), however, identify theirs as a preliminary report and acknowledge the small sample. Another limitation of the study is that although the mean lengths of labor are given for each group, and the mean levels for the plasma epinepherine for each group, there is no discussion related to significance level. It is unclear whether the differences found are statistically significant. In the group with normal labors, the only

treatment was nursing care, while in the fearful group, sedation was used in all but two patients and in the inertia group sedation plus labor augmentation was used with all patients. A question arises as to how much the medications used effected the length of labor and how much the increased levels of epinepherine affected the length of labor, or was it actually a combined affect of the two? One must also wonder whether the rat uteri used for this experiment respond in the same manner as the human uterus. Another question is, How were patients placed into the three groups? since no criteria or discussion related to this area was presented.

It is important to note, however, that this study does provide some early scientific validity to the assertion that increased levels of epinepherine effect uterine function and prolong labor. The study also discusses the relationship between increased fear and increased levels of anxiety which other authors have researched more currently. This study provides data that must be considered when evaluating factors that effect the length of labor.

An article by Roux (1976) discusses the use of electronic labor monitoring and subsequent patient responses to this technological advancement. Roux identifies a study that was done in 1970 in which 24% of the sample disliked and were frightened by the

instruments and procedures used with electronic monitoring. "From the patient's point of view, monitoring can cause anxiety" (Roux, 1976, p. 150). If this is the case, that electronic monitoring can cause fear, and if we utilize the results of Garcia and Garcia's (1955) work, one could conclude that in some patients the use of electronic monitoring could lead to a longer labor. Thus, anyone doing research on the length of labor must know whether electronic monitoring was used and if it was used, one must be aware that its use might prolong labor in patients where fear associated with its use was present.

Questioning whether psychological factors in pregnancy have an effect on the progress of labor, Lederman et al. (1979) conducted a study of 32 married, primigravidas with no medical or obstetrical complications. In the third trimester of pregnancy, interviews were conducted to obtain data related to anxiety levels and certain psychological factors, and base-line levels of plasma epinepherine, non-epinepherine and cortisol were obtained. Information related to knowledge about labor was collected using a 23 item instrument specially constructed for this study. The State-Trate Anxiety Inventory was used to measure anxiety in pregnancy and labor. Catecholamine levels were determined by assay and cortisol levels by radioimmunoassay. Uterine

activity information was obtained from a uterine monitor. Three phases of labor were defined: phase one--onset of labor to 3 cms dilation, phase two--3-10 cms dilation, and phase three--complete dilation to delivery (second stage of labor). At the beginning of each phase of labor, data was collected on anxiety level, plasma levels of catecholamines and cortisol, and uterine activity. The data related to psychological and demographic variables was then analyzed to identify relationships to anxiety, biochemical levels and uterine activity at the onset of each phase. All but eight of the 32 patients received some type of analgesia and/or anesthesia during labor. Twelve patients had oxytocin stimulated labors and sixteen patients had some type of regional anesthesia. While 16 patients had normal spontaneous vaginal deliveries (NSVD) 16 also had forceps assisted deliveries. Those with an NSVD had significantly shorter labors than those that were forceps assisted, $P \leq 0.05$. The anxiety measured at the onset of phase II also correlated with the length of labor, i.e., those with higher scores on the anxiety scale had longer labors, ($r = .43$; $P \leq 0.05$). Lederman et al. (1979) concluded then that anxiety at the onset of phase II labor may influence the progress of phase III (second stage of labor). Psychological conflicts centering around specific pregnancy factors, i.e., identification

of a mothering role and pregnancy acceptance were related to changes in the length of labor. This relationship was significant at the $P \leq 0.05$ level.

One limitation of this study is related to the definition used for phase I labor. This phase was defined as being the onset of labor to 3 cm dilation, however, no criteria was identified for the determination of the "onset of labor." One other question arises in relation to the 16 patients that received regional anesthesia. Were these 16 patients also the same 16 patients that had forceps assisted deliveries and higher anxiety levels? If so, was it the higher anxiety levels that caused the longer labors or was it the use of regional anesthesia that caused longer labors? Was it the increased anxiety levels that created the need for regional anesthesia or was there some other combined effect? The importance of this study is that it again demonstrates that a relationship exists between increased levels of epinepherine caused by elevated anxiety and the length of labor.

In 1977 Beck (1980) studied, via post partum interviews, patient responses to fetal monitors. This was a replication of a 1972 study done by the same researcher. In the 1972 study, Beck found that 62% of the sample had an initial negative response, 38% had a neutral response and there were no positive

responses to fetal monitoring. In 1977, 8% of the initial responses were negative, 18% were neutral and 74% were positive. There was a significant positive relationship between age and positive initial response and marital status and positive initial response in the 1977 study. Beck (1980) concluded that patients were more familiar with the concept of fetal monitors in 1977 than they were in 1972 and extrapolates from this that prior knowledge makes the fetal monitor less threatening. After the interviews were conducted, two researchers independently categorized the responses as negative, neutral or positive with an interrater reliability of 95%, although no information was presented relative to the use of a tool or format for the interviews. Based on this article it appears that patients on the East Coast of the United States had fewer negative initial responses to the use of fetal monitors in 1977 than they did in 1972. Why this change occurred is based on the assumption, by Beck, that increased knowledge increases acceptance. She arrives at this conclusion based on anecdotal conversations she describes in the article and fails to show scientific justification for this assumption. Even though the assumptions Beck makes are questionable, the data from the interviews do indicate that some patients still have negative responses to fetal monitors. Therefore, data should

be collected regarding use of fetal monitors when studying factors that may effect labor.

In summary, Roux (1976) and Beck (1980) conclude that for some patients the use of fetal monitors elicits negative responses and produces increased anxiety. Garcia and Garcia (1955) and Lederman et al. (1979) demonstrate that increased anxiety causes increased levels of epinepherine which in turn causes decreased uterine activity and thus prolongs labor. Given this information, one doing research on the length of labor must collect data relative to the use of fetal monitors, as their use may contribute to changes in the length of the second stage of labor.

The intervening variables listed below were included in the present studies because of research interest, however, no literature was found that discussed or measured their relationship to the length of the second stage of labor: type of physician, birth attendent--own or "on call" physician, and type of childbirth education classes.

Summary of the Literature Review

A review of the existing literature has been presented on the following areas: trends in childbirth practices in the United States, cross cultural birthing practices, consumer issues, general references used to

define concepts, literature related to birthing position and literature related to controlled and intervening variables. A great deal of information was found that addressed the areas of past and present birthing practices, cross-culturally. The issue of consumer needs and requests was addressed both in the lay literature and in scientific journals. The area inadequately addressed in the scientific literature was that of birthing position and how it effects the length of the second stage of labor. What research was done had questionable results and/or was conducted in other countries. The present studies will attempt to contribute to the small body of scientific knowledge that exists in the United States relative to birthing position and the length of the second stage of labor.

In the next chapter, the methods used in these studies will be presented.

CHAPTER IV

METHODOLOGY

Overview

This section contains the research design used in this study, and the study by Hayes (1983). The screening tools and data collection will be discussed. Presented also will be the pre-testing methods, sample size and selection, field procedures for collecting and recording data, and types of statistical analyses used to interpret the data.

Two individual theses were done. In this study the length of the second stage of labor in women who used the upright position was measured, while in the work by Hayes (1983) the length of the second stage of labor in women who used the recumbent position was measured. The methodology used for both studies was identical, but data were analyzed separately for each birthing position. Further data analysis was done comparing the results of both surveys, thus providing an answer to the broader question: Is the length of the second stage of labor significantly shorter in an upright or recumbent position?

Research Design

To determine the length of the second stage of labor under different physical conditions (birthing position), the survey approach was used. This approach was chosen for two reasons. First, the researchers were asking "What is?". The researchers wished to know if birthing positions currently being used affect the length of the second stage of labor. The second reason the survey approach was used was because the data were taken from existing hospital charts. Use of this readily available information facilitated data collection as soon as approval was granted from the research review board at St. Lawrence Hospital and from the University Committee on Research Involving Human Subjects (UCRIHS).

Selection of Study Subjects

The research populations were defined as primiparous women, 16 to 34 years of age, who had a vaginal delivery at St. Lawrence Hospital. For the purpose of the study primiparous was defined as: A woman who has delivered her first infant after the period of viability, 25 week gestation and beyond, regardless of whether the child is living at birth (Agnew et al., 1965; Lerch, 1974; Fitzpatrick, 1971; Jensen, Benson and Bobak, 1980). Thus, women who have had abortions or miscarriages

prior to 25 weeks gestation were still considered primiparous.

The criteria for inclusion in the study consisted of two steps. Step I determined if the women met criteria for an uncomplicated pregnancy. That is, their pregnancy had to progress in the absence of the following conditions (Leitch & Tinker, 1980; Pritchard & MacDonald, 1980).

1. Pregnancy Induced Hypertension (PIH)
2. Toxemia
3. Pre-eclampsia
4. Eclampsia
5. Diabetes--gestational, adult onset, juvenile onset
6. Heart disease--cardiac anomalies, valve damage from rheumatic fever
7. Renal disease--history of renal failure past or present
8. Chronic hypertension
9. Chronic lung disease--emphysema, COPD, adult asthma
10. Multiple births--this pregnancy
11. Incompetent cervical os - diagnosis and/or treatment during this pregnancy
12. Vaginal bleeding--second or third trimester.

Criteria 1-4 are similar and are often used interchangeably by physicians. Inclusion of all four similar terms insured comprehensive collection of this complication of pregnancy in the charts. Medical identification of any one of the four diagnoses (PIH, toxemia, pre-eclampsia, eclampsia) indicated a high risk situation and excluded women from the populations.

The process of identifying diabetes was a similar one to that of PIH. Any one of the three variants must have been apparent within the chart to exclude a woman from the population. Exclusion from the study was also done if any woman had cardiac anomalies or cardiac valve damage from rheumatic fever. Renal failure or chronic hypertension were identified as high risk complications of pregnancy, and women who had a medical diagnosis of either of these conditions were excluded from the study. Blood pressure before the 20th week of gestation that is higher than 140/90 is an indication of chronic hypertension (Willis, 1982).

A medical diagnosis of lung disease was also cause for exclusion from the study, as this condition affects use of medications and position for birth. Twins or triplets were also considered a high risk condition, and patients with this condition were excluded. Treatment of incompetent cervical os by either Shirodkar or cerclage procedure was cause for exclusion, as was

vaginal bleeding during either the second or third trimester.

In summary, Step I consisted of a retrospective chart review to identify women in the population who had any one of the twelve complications listed above. This procedure was done with the use of Screening Tool #1 (see Figure 3). If the chart review with Screening Tool #1 did not indicate any high risk factors, Step 2 was begun with each chart, utilizing Screening Tool #2 (see Figure 4) to further define an appropriate sub-population.

Screening Tool #2 listed 7 items, each of which have been shown by previous research to affect the length of the second stage of labor. All patient charts that had passed the first screening step were then subject to this second step. If the patients did not meet all 7 criteria in this step, they were excluded from the study. The patients who met this second set of criteria constituted the sub-population who were eligible for inclusion in the study. By the use of this process the researchers hoped to obtain a homogeneous population. Items on Screening Tool #2 are presented below.

It was required that all study subjects attend childbirth classes. This was indicated on the hospital charts by "yes", "no", or "not indicated". This tool

Figure #3

Prior to Nursing Intervention _____

After Nursing Intervention _____ CODE # _____

SCREENING TOOL #1*

1. PIH (as defined by medical diagnosis) YES____NO____
2. Toxemia (as defined by medical diagnosis) YES____NO____
3. Pre-eclampsia (as defined by medical diagnosis)
   YES____NO____
4. Eclampsia (as defined by medical diagnosis)
   YES____NO____
5. Diabetes (as defined by medical diagnosis)
   Adult Onset: YES____NO____
   Gestational: YES____NO____
   Juvenile Onset: YES____NO____
6. Heart Disease (as defined by medical diagnosis)
   Cardiac Anomalies: YES____NO____
   Mitral Stenosis: YES____NO____
   Valve Damage as a result of Rheumatic Fever:
   YES____NO____
   Pulmonary Hypertension: YES____NO____
7. Renal Disease (as defined by medical diagnosis)
   History of Renal Failure Past or Present:
   YES____NO____

*Developed in collaboration with Sandra Hayes

Figure 3 (cont)

8. Chronic Hypertension (as defined by medical diagnosis) YES____NO____

9. Chronic Lung Disease (as defined by medical diagnosis)

   Emphysema: YES____NO____

   Adult Asthma: YES____NO____

   C.O.P.D.: YES____NO____

10. Multiple Birth this Pregnancy: YES____NO____

11. Incompetent Cervical OS (diagnosed and/or treated during this pregnancy) YES____NO____

12. Vaginal Bleeding--2nd or 3rd Trimester: YES____NO____

13. Age: Under 16 yrs of age YES____NO____

    35 years of age or older YES____NO____

14. Evidence of Mid or High Forceps: YES____NO____

15. Evidence of Substance Abuse (as defined by medical diagnosis) YES____NO____

Figure #4

Prior to Nursing Intervention ____

After Nursing Intervention ____ CODE #_____

SCREENING TOOL #2*

1. Childbirth Education: YES____NO____NOT INDICATED____
2. Support Person Present:

   Labor--YES____NO____NOT INDICATED____

   Delivery--YES____NO____NOT INDICATED____
3. Maternal Pelvic Measurements:

   Adequate____Marginal____

   Not Adequate_____Not Indicated____
4. Fetal Presentation: Breech--YES____NO____
5. Fetal Position:

   Persistent Occiput Posterios--YES____NO____
6. Medications given during 1st or 2nd stage of Labor:

   YES____NO____

   If Yes: Name Route Amount Time Stage of Labor

   _____

   _____

   _____

*Developed in collaboration with Sandra Hayes

Figure 4 (cont)

7. Stage of Labor:

1st stage--Time of Onset____Time of Completion____

2nd stage--Time of Onset____Time of Completion ___

3rd stage--Time of Onset____Time of Completion____

8. Forceps Used: YES____NO____

ACCEPTABLE: YES____NO____

(if No, Why? _____)

did not differentiate type of childbirth classes. Evidence of a support person present during labor and delivery was also indicated by a positive, negative or "not indicated" answer on the chart. Each woman in the study had a support person with her during her hospital experience. This could be either a family member or a friend. A staff nurse was not considered a support person, in the context of this study.

It was deemed important that maternal pelvic measurements be adequate in all study subjects. This was recorded on the charts as "adequate", "not adequate", "marginal", or "not indicated". Ideally, pelvic adequacy or inadequacy would be consistently indicated on the record. However, pre-testing with the Screening Tool #2 indicated that this information was often lacking. A consultation followed with T. Kirschbaum, M.D., Professor and Chairman, Department of Obstetrics and Gynecology, College of Human Medicine, Michigan State University, and with J. Walczak, D.O., Professor of Obstetrics and Gynecology, College of Osteopathic Medicine, Michigan State University. Both physicians agreed that for the purpose of these studies, it was reasonable to assume adequate pelvic measurements if: 1) total labor time was 22 hours or less, 2) vaginal delivery occurred without forceps, 3) no oxytoxics were used to augment labor, and 4)

APGAR scores were 8 or greater. The result of this consultation was that criteria for adequate pelvic measurements could be met in one of two ways. Either the adequacy was indicated on the chart, or the patient delivery met the four standards listed above.

Fetal presentation was evaluated to rule out breech infants. Responses on the screening tool were listed as "yes" or "no". Patients who delivered their infants in a breech presentation were excluded from the study. Fetal position was also evaluated, to rule out persistent occiput posterior, and this too was indicated as "yes" or "no".

Patients who used medications during their labor and delivery were eliminated from the study. This was done to rule out any effect that medications might have on the length of labor. This was easily determined from the chart and recorded on the screening tool as "yes" or "no".

It was also determined that use of forceps alter the natural length of the second stage of labor. Therefore, patients who had forceps assisted deliveries were excluded from the study.

In summary, if the charts met the criteria established in Screening Tool #2, they were used for data collection in either this study or that of Hayes (1983), depending upon the position each woman used for the

second stage of labor. The criteria were: evidence of attendance at childbirth education classes, evidence of a support person present during labor and delivery, adequate maternal pelvic measurements, no breech presentations or persistent occiput posterior positions, no medications during the first or second stage of labor, and no use of forceps.

To insure anonymity of the sub-population, a code number was given to each chart at the onset of the first screening and the same code number was used for the second screening and for data collection (the code number given could in no way identify a particular chart once data collection was completed). Thus, confidentiality was ensured and patients whose charts were audited for these studies were not at risk for invasion of privacy.

Instrumentation and Data Collection

Data collection was done simultaneously by both researchers. From the labor and delivery department, case numbers of primiparous patients with vaginal deliveries were obtained. These records were audited weekly in the medical records section of the hospital. The researchers used records documented six months prior to data collection, and data collection continued for five months until the desired sample size was

obtained. A data collection tool was developed for use in this study (see Figure 5).

General descriptors of the sub-population studied were gathered and recorded on the data collection tool. The sociodemographic data collected include: age, marital status, race, type of insurance, and occupation. The data on occupation was not categorized but written directly as recorded on the chart. Gravidity was also included in the data recording, as it was possible to have had several early pregnancies that were lost, and still qualify as a primiparous woman.

Although there was no scientific literature on this subject, it was of interest to the researchers to determine if a relationship existed between type of physician and position used. Therefore, the name of the physician was checked against the phone directory for determination of specialty, such as OB/GYN, General Practice, or Family Practice. The prenatal records also indicated whether the patient was a private or clinic patient.

Both Lamaze and Expectant Parent Classes are offered in the Lansing area. To determine if a relationship existed between type of childbirth education and position used, the type of class each woman attended was recorded. This information was available in several places on the patient record.

Figure #5

Prior to Nursing Intervention ____

After Nursing Intervention ____ CODE # ____

DATA COLLECTION TOOL*

squat _____

kneel _____

chair ____

1. AGE: ____

2. MARITAL STATUS: Married____Single (never married)____
   Separated____Divorced____Widowed_____

3. RACE: Oriental____Black____White____Other____
   Not Indicated____

4. INSURANCE: Private Company____Medicaide____
   Private Pay--no insurance____

5. OCCUPATION: Patient_____
   Spouse_____

6. GRAVIDITY: ____

7. PHYSICIAN: Private Physician____OB Clinic____
   OB/GYN____Family Practice____General Practice____
   HMO____

8. CHILDBIRTH EDUCATION: Lamaze____
   Expectant Parents Classes ____

9. TYPE OF ANESTHESIA USED FOR DELIVERY: Local____
   Pudendal____Paracervical____None____

*Developed in collaboration with Sandra Hayes

Figure 5 (cont)

10. FETAL POSITION AT DELIVERY:

    LOA____LOP____ROA____ROP____OA____

11. POSITION FOR 2ND STAGE OF LABOR:

    Upright____Recumbent____

12. LENGTH OF LABOR:

    1st stage--Time of Onset____Time of Completion____

    2nd stage--Time of Onset____Time of Completion____

    3rd stage--Time of Onset____Time of Completion____

13. EPISIOTOMY: YES____NO____

    If Yes--What Kind: LML____RML____ML____

    Extensions: YES____NO____

      If Yes--What Kind: 1°____2°____3°____4°____

    Lacerations: YES____NO____

      If Yes--What Kind: Perineal____1°____2°____

                         3°____4°____

14. FETAL MONITOR: YES____NO____

    If Yes--What Kind: Internal____External____

    Internal--Time put on____Time removed____

    External--Time put on____Time removed____

15. PERINEAL EDEMA: YES____NO____

16. DELIVERY BY: Own Physician____On-Call Physician____

17. IV RUNNING FOR HYDRATION: YES____NO____

      If Yes--What Kind: _____

18. INFANT APGAR: 1Min____5Min____

19. DATE AND TIME OF LAST MEAL: _____

Figure 5 (cont)

20. RUPTURE OF MEMBRANES: Spontaneous____

    Artificial____Time____

21. WEIGHT AT TERM: ____

22. WEIGHT GAIN DURING PREGNANCY: ____

ACCEPTABLE: YES____NO____

Is any data missing? YES____NO____

If Yes--What? _____

Is the data that is missing:

Absolutely Necessary ____

Desireable ____

Knowledge of fetal position at delivery was necessary since it has been shown that babies in the posterior, left occiput posterior, and right occiput posterior positions take longer to deliver than do those in the anterior position (Pritchard & MacDonald, 1980). If the infants of women who delivered in the upright position were found to be more frequently in the posterior position than the infants of women who delivered in a recumbent position, the length of the second stage of labor could have been skewed by fetal position. Thus it was important to record this information so that statistical analyses could determine if fetal position was the same in each group. Position at birth was found on the delivery room record.

In order to compare characteristics of patients in each birthing position, presence of an episiotomy, extensions and lacerations were all variables that needed to be measured. This information was obtained from the delivery room record.

In order to satisfy the interests of the administrators at St. Lawrence Hospital, information related to perineal edema was gathered. Some post partum nurses had indicated to their Head Nurse that there was an increase in the incidence of perineal edema in patients who used the upright position, as compared to patients who used the recumbent position.

Data was collected on whether the patient was delivered by her own physician, or an on-call physician. This was done because it was thought by the researchers that delivery by an on-call physician may change the dynamics of delivery and, therefore, the length of the second stage of labor.

Infant APGAR scores and the use of intravenous fluids were also variables thought to possibly relate to the length of the second stage of labor; therefore data was collected on both of these variables for future statistical analyses.

Previous to these studies, birthing position was not consistently recorded on the patient records. At the researchers' request, either "recumbent" or "upright" were circled on each delivery room sheet. This was the only piece of information added to the ongoing record keeping to accommodate these studies.

With the exception of birthing position, all of the information discussed above was routinely recorded on several portions of the patient's chart: hospital admission form, pre-natal record, labor and delivery records, recovery room record or post partum record.

As these studies used only objective data, determination of the reliability and validity of the screening tools and data collection tool were not necessary or appropriate. It was possible to establish interrater

reliability for record audit. This was done by both researchers independently auditing the same eight charts. The interrater reliability was determined by dividing the number of items both researchers identified similarily by the total number of items. The result of this equation indicated that the interrater reliability was 90%.

Field Procedures

Research Permission. The researchers met with nursing administrators at St. Lawrence Hospital and presented the research proposal both verbally and in writing. The Chairman of the Research Committee, St. Lawrence Hospital, granted permission to begin the data collection (see Appendix A, Figures A1-A4). Approval for the research studies was also granted by the Michigan State University Committee on Research Involving Human Subjects (UCRIHS) (see Appendix A, Figures A5 and A6).

Following approval by UCRIHS, both researchers met with the entire nursing staff of the Labor and Delivery Suite at St. Lawrence Hospital. The studies were explained, and their relevance to clinical practice discussed (see Appendix B, Figures B1 and B2). At this time the researchers also asked the nurses to add one additional piece of data to their normal recording procedure,

and this was birthing position.

An objective measure of the upright and recumbent positions was needed by the nursing staff. For this reason, diagrams were posted in all birthing and delivery rooms. These graphically indicated the angle of 30° between the patient's lumbar spine and the horizontal plane. In addition to the diagrams, a 30° angle was measured on all birthing beds and delivery tables by use of a protractor. The angle was marked by a piece of red tape. When the red tape was visible, the patient was upright. If the tape was not visible because of the degree to which the head of the bed was rolled down, the patient was recumbent.

Pre-Test. Eight charts were used for pre-testing both Screening Tools #1 and #2. In addition, the same eight charts were used to pre-test the data collection tool. This was done to determine if the data needed for the studies were available in the charts, or if additions to the current record keeping system in the Labor and Delivery Suite were needed.

Three items needed for these studies were not routinely documented on the patient charts--type of physician, birthing position, and length of the second stage of labor. Since the name of the physician could always be found on the chart, it was possible to determine specialty from community resources, so this item

was no barrier to complete data collection. Length of the second stage of labor was not specifically noted. However, the time that the second stage began and the time that infant delivery occurred was routinely charted. Therefore, the length of the second stage could be calculated for each patient.

The remaining piece of information, birthing position, needed to be documented for each patient who delivered vaginally at St. Lawrence Hospital. This was done, with the approval of the nursing staff, by placing an additional category on the delivery room record. The category was birthing position, followed by the words "recumbent" and "upright". A check mark or circled word indicated which position each patient used for second stage and birth.

The only other adjustment to the record keeping system related to an obscure placement on the admission form. Because "childbirth education" was placed obscurely on the charts, this category was not consistently recorded. The researchers highlighted this area on the record with red pen, and the subsequent increased visibility corrected this problem.

It was at this point, in the pre-testing procedure, that the researchers became aware of inconsistent documentation of pelvic measurement adequacy on prenatal records. Drs. Kirschbaum and Walzak were then consulted,

and it was determined that alternative criteria for establishing pelvic measurement adequacy were appropriate.

The total number of records that were reviewed was 247. Through the use of Screening Tools 1 & 2, a sub-population of 25 subjects who used the upright position and 21 subjects who used the recumbent position was obtained. The combined sample size of 46 was 14% of the total number of charts audited. Although specific figures are not available, the greatest percentage of records were rejected due to the use of medication during labor or birth.

Data Analysis

Descriptive and inferential statistical analyses were done on the individual results of this research project and the project done by Hayes (1983). Then, analyses were done on the combined results to generate more information and to enhance the clinical applicability.

Descriptive Statistics. Descriptive statistics include measures of central tendency, such as means, measures of variability such as the standard deviation, and frequencies. This type of analysis does not measure causal relationships, but rather "what is" (Borg & Gall, 1979). For example, the average length of the

second stage of labor in the upright position would be determined by calculating the mean. The standard deviation provides information about the degree of variability from the mean that was found in the study sample scores. Frequencies done on intervening and incidental variables and demographic descriptors indicate the frequency with which a variable such as laceration occurs in women who use the upright position for the second stage of labor.

Inferential Statistics. Inferential statistics are used to draw conclusions and make inferences from sample statistics to the population. Inferential statistics used in this study and the study by Hayes (1983) include a t test and several correlational tests.

The Student's 2-Tailed T Test was used to measure the difference between the mean lengths of the second stage of labor in the upright and recumbent groups. A 2-Tailed T Test was used to determine the significance level of difference between the two means in either direction. The statistical significance level for both studies was set at $P \leq .05$. Any P level greater than .05 was not considered statistically significant.

Correlations are used to determine if a relationship exists between factors, and if so, correlations give a measure of the strength of the relationship. Correlation coefficients are represented by the letter

(r). This (r) symbol ranges numerically from -1.00 (a negative relationship) to 1.00 (a positive relationship). The strength of the relationship is scored by use of the following categories (Borg & Gall, 1979, pp. 513-514):

Value of r	Strength of relationship
0.00 to 0.20	no significant relationship
0.20 to 0.35	very slight
0.35 to 0.65	fair to moderate
0.65 to 0.85	marked to fairly high
0.85 to 1.00	high to very high

Two correlational techniques were used in this studies. The first, a Pearson Point-biserial Correlation was used to determine if a relationship existed between dichotomous and continuous variables. An example of appropriate use of this test would be measurement of the relationship between lacerations (yes or no) and length of the second stage of labor (numerical value).

The second correlational technique used was the Pearson Product Moment Test. This calculation was used to measure the direction and magnitude of two continuous variables such as age and length of the second stage of labor. The statistical significance level for both correlational tests was set at $P \leq .05$.

Summary

In this section the methodology for the research study and the study by Hayes (1983) was presented. Both the research design and the sample selection criteria were presented. Field procedures were outlined and the instruments and data collection techniques were discussed. Completing Chapter IV was a description of statistical methods and the rationale for their use. In the next section, which is Chapter V, the data results and analysis are presented.

CHAPTER V

DATA PRESENTATION

Introduction

This chapter is divided into two parts. In Part I, the data are presented. First, the results of the analysis of the length of the second stage of labor in an upright position, and variables influencing this length are described. Then, an overview of the analysis concerning the length of the second stage of labor in a recumbent position and relevant variables (Hayes, 1983)* is presented. Last, the results of the two analyses are compared, and the combined results presented.

Part II of this chapter includes an interpretation of the results. In this discussion, interpretations about the upright position for birth first will be offered. Then, the meaning of the results as they relate to the work of Hayes will be explored. Following this exploration, previous research done on the relationship between length of the second stage of labor and birth position and the results of this study will be

*For the remainder of this chapter, when Hayes is cited, the date (1983) will be assumed.

discussed. Next, the relationship of the results to Nightingale's Nursing Theory described in Chapter II is put forth. Finally the advantages and disadvantages of the retrospective survey approach are discussed and recommendations for future changes for methodological improvements are briefly considered.

Study Population

The study population consisted of primiparous women who had vaginal deliveries in a large midwest metropolitan Catholic hospital. This population was identified using Screening Tool #1 (see Chapter IV, Figure 3). The use of this tool facilitated exclusion of any primiparous women from the study who had complicated or high risk pregnancies.

A sub-population then was identified using Screening Tool #2 (see Chapter IV, Figure 4). Women in this sub-population were primiparous females who had vaginal deliveries with uncomplicated pregnancies and who met the following additional criteria:

- No forceps
- Age 16-34 years
- No medication in labor
- Normal maternal pelvic measurements
- No abnormal fetal presentation or position
- Evidence of childbirth education
- Evidence of support person in labor and delivery

Data Presentation

Sub-Population Demographic Characteristics. The 25 study subjects were a homogeneous group of predominately white, middle class, married women. Twenty-three (92%) had private insurance, while one (4%) had Medicaid and one (4%) paid for her care out-of-pocket (see Table 7). The women's mean age was 23.8 years with a range of 17 to 32 years of age. The ages were equally distributed around the mean, as evidenced by a median age of 24 years and a standard deviation of 3.6 (see Table 8). The occupations of the study subjects were not available in their medical records.

Intervening Variables. Consultation with nursing staff at St. Lawrence Hospital Labor and Delivery unit and experience as a maternity nurse confirms that study subjects were typical of the larger maternity population served by the hospital, both in terms of demographic and intervening variables.

Twenty-three women (92%) were Caucasian; the race of 2 (8%) women was not recorded on the charts. Four-fifths (80%) were patients of private physicians, and 5 (20%) received care at a HMO. A large proportion of the study subjects used OB/GYN specialists, 19 women (76%). Only 4 (16%) used Family Practice physicians, and 2 (8%) were attended by on-call physicians. Fifteen (60%) women attended Lamaze Childbirth education,

Table 7

Type of Health Insurance Coverage

of Women in the Upright Position (n=25)

Type of Insurance	Number of Subjects	Percentage
Private Pay	1	4.0
Medicaid	1	4.0
Private	23	92.0
TOTAL	25	100.0

Table 8

Age Distribution of Women in the Upright Position (n=25)

Age, Years	Number of Subjects	Percentage
17	1	4.0
18	1	4.0
20	4	16.0
21	2	8.0
22	2	8.0
23	2	8.0
25	4	16.0
26	4	16.0
27	2	8.0
28	1	4.0
29	1	4.0
32	1	4.0
TOTAL	25	100.0

Mean = 23.8 years

Median = 24.6 years

Mode = 20.0 years

Standard Deviation - 3.6 years

while 9 (36%) women attended Expectant Parent Organization classes. One (4%) study subject had childbirth education classes, but the type was not recorded.

Weight gain in pregnancy among the women ranged from 19 to 54 pounds; the mean weight gain of the study subjects was 32.7 pounds (see Table 9). There was not much tendency for cluster around the mean and the standard deviation was 8.6. According to recent standards, the recommended weight gain for pregnancy is 24 pounds (Jensen, Benson, & Bobak, 1981). Obesity could not be ascertained because of inconsistencies of data on the charts.

All but two (8%) women had episiotomies. Among the 4 (16%) women who had lacerations, two had lacerations that were secondary to episiotomies. Most women (96%) also had electronic fetal monitoring. Among the 24 women who had fetal monitors, 4 (16.6%) had both external and internal electrode monitors, and 20 (83.3%) had only external fetal monitors. Of the four subjects who had internal monitors, three had second stages longer than the mean for the entire group of subjects. Eleven subjects (44%) had their membranes ruptured artificially, while more than half (66%) had spontaneous rupture. Specific frequencies of all intervening variables can be seen in Table 10.

Table 9

Weight Gain in Pregnancy of

Women in the Upright Position (n=25)

Pounds Gained	Number of Subjects	Percentage
19	1	4.0
21	1	4.0
24	1	4.0
25	2	8.0
27	3	12.0
28	1	4.0
29	2	8.0
30	1	4.0
31	1	4.0
32	1	4.0
33	1	4.0
34	2	8.0
36	1	4.0
39	2	8.0
40	1	4.0
41	1	4.0
43	1	4.0
51	1	4.0
54	1	4.0
TOTAL	25	100.0

Mean = 32.7 lbs.

Median = 31 lbs.

Mode = 27 lbs.

Standard Deviation = 8.6 lbs.

Table 10

Frequency Distribution of the Intervening Variables in the Upright Position (n=25)

Variable	Number of Subjects	Percentage
Marital Status		
Married	23	92.0
Single	2	8.0
TOTAL	25	100.0
Race		
White	23	92.0
Unknown	2	8.0
TOTAL	25	100.0
Type of Physician		
OB/GYN	19	76.0
Family Practice	4	16.0
General Practice	2	8.0
TOTAL	25	100.0
Type of Classes		
Lamaze	9	36.0
Expectant Parent	15	60.0
Unknown	1	4.0
TOTAL	25	100.0
Episiotomy		
Yes	23	92.0
No	2	8.0
TOTAL	25	100.0
Laceration		
Yes	4	16.0
No	21	84.0
TOTAL	25	100.0
Fetal Monitor		
Yes	24	96.0
No	1	4.0
TOTAL	25	100.0
Rupture of Membranes		
Artificial	11	44.0
Spontaneous	14	66.0
TOTAL	25	100.0
Physician		
Own	23	92.0
On Call	2	8.0
TOTAL	25	100.0

Incidental Variables. To generate further research questions, information was collected on several variables of interest to the researchers. Information about these variables is presented below. As with the intervening variables, the distribution of women along these parameters is typical of that of the larger maternity population at the hospital in which these studies were done.

Twenty-one (84%) subjects had never previously been pregnant. Four women (16%) were gravid 2, indicating that they had terminated one other pregnancy before 25 weeks gestation.

Fetal position was variable in this group of subjects. The babies of 12 (48%) women presented in the Left Occiput Anterior (LOA) position, while 14% were in Left Occiput Posterior (LOP). Four women had babies in the Right Occiput Anterior (ROA) position, while 8 (32%) had Occiput Anterior (OA) fetal position.

Rupture of membranes occurred in 4 (16%) subjects before the onset of labor, while the membranes of 18 (72%) subjects ruptured in the first stage of labor and those of 3 (12%) in the second stage. Approximately three-quarters (76%) of the women did not have intravenous fluids during their labor, while 6 (24%) had additional hydration during their labor and birth. Infant APGAR scores at one minute ranged from 6 to 9,

with a mean of 8.2. The APGAR's at five minutes had a smaller range, from 9 to 10, with a mean of 9.1 (see Table 11 for scores and frequencies). The mean scores at both one and five minutes were well within the average mean scores for the general population (Clark & Affonso, 1979).

Statistical Analysis for Research Questions.

1. What is the mean length of the second stage of labor in primiparous women with uncomplicated pregnancies who used the upright position?

The mean length of the second stage of labor was 60.9 minutes, with a standard deviation of 35.4 (see Table 12 for raw scores and frequencies). Length of the second stage ranged from 18 to 130 minutes, with a median of 46.0 and a mode of 27.0. Differences between the mean, median, and mode indicate a large degree of variability in length of labor in the upright group and are reflected in the bimodal distribution depicted in Figure 6. Examination of the Figure suggests that two means exist, one in each mode. Because of the small sample size, however, this cannot be determined, and the possible reasons for the bimodal distribution remain unexplained.

2. Do any of the intervening variables correlate with the length of the second stage of labor in women who

Table 11

Frequency Distribution of Incidental Variables

in the Upright Position (n=25)

Variable		Number of Subjects	Percentage
Gravidity			
Gravida 1		21	84.0
Gravida 2		4	16.0
	TOTAL	25	100.0
Type of Patient			
Private Patient		20	80.0
Clinic Patient		0	0.0
HMO Patient		5	20.0
	TOTAL	25	100.0
Fetal Position			
LOA		12	48.0
LOP		1	4.0
ROA		4	16.0
OA		8	32.0
Unknown		0	0.0
	TOTAL	25	100.0
Monitor Type			
External only		20	80.0
Internal only		0	0
Both		4	16.0
Neither		1	4.0
	TOTAL	25	100.0
APGAR @ 1 minute			
5		0	0.0
6		1	4.0
7		1	4.0
8		15	60.0
9		8	32.0
Mean 8.2	TOTAL	25	100.0
APGAR @ 5 minute			
8		0	0.0
9		23	92.0
10		2	8.0
Mean 9.1	TOTAL	25	100.0
Stage of Rupture of Membranes			
First		18	72.0
Second		3	12.0
Before First		4	16.0
	TOTAL	25	100.0
Intravenous Fluids			
Yes		6	24.0
No		19	76.0
	TOTAL	25	100.0

Table 12

Length of the Second Stage of Labor of Women in the Upright Position (n=25)

Length in Minutes	Number of Subjects	Percentage
18	1	4.0
19	1	4.0
27	2	8.0
28	1	4.0
30	1	4.0
35	1	4.0
37	1	4.0
38	1	4.0
41	1	4.0
43	2	8.0
46	1	4.0
47	1	4.0
52	1	4.0
67	1	4.0
70	1	4.0
74	1	4.0
89	1	4.0
105	1	4.0
107	1	4.0
110	1	4.0
112	1	4.0
118	1	4.0
130	1	4.0
TOTAL	25	100.0

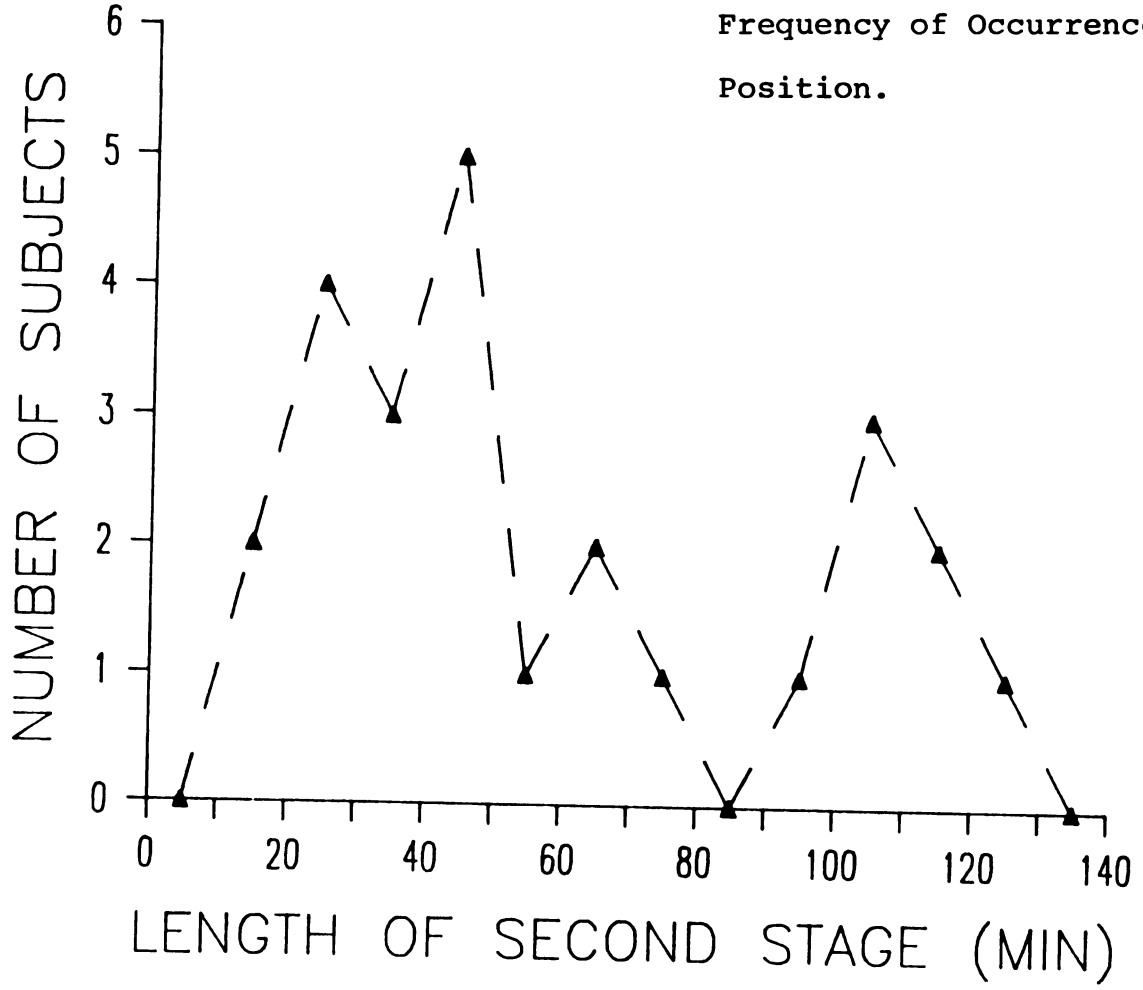
mean = 60.9 minutes

median = 46.0 minutes

Mode = 27.0 minutes

Standard deviation = 35.4 minutes

Figure 6. Length of the Second Stage of Labor, With Frequency of Occurrence in an Upright Position.



Mean	60.9 minutes
Median	46 minutes
Mode	27 minutes
S.D.	35.4

used the upright position?*

The intervening variables measured in this study were marital status, race, type of physician, type of childbirth class, presence of episiotomy, presence of laceration, use of fetal monitors, rupture of membranes, and delivery by own or on-call physician.

A statistically significant relationship--albeit slight--was found between length of the second stage of labor and lacerations (r-.35, $P \leq .05$). Restated, women who had shorter labors were likely to have lacerations. None of the other intervening variables were found to correlate at statistical significance with length of the second stage of labor. All correlation values can be found in Table 13.

3. Do any of the demographic variables correlate with the length of labor in women who used the upright position?

The demographic variables measured in this study consisted of age and type of insurance. No statistically significant relationship was found between length of labor and type of insurance. However, there was a positive correlation between age and length of labor ($r=.44$, $P \leq .05$). This means that there was a tendency for older subjects to have a longer labor. The strength

*For the remainder of this chapter, length of labor will imply length of the second stage of labor.

Table 13

Correlation Values for Variables and the Length of the Second Stage of Labor Upright Position

Variable	r Value	P value
Age	.43	.01*
Marital	.32	.06
On call MD	.12	.28
Childbirth education EPO or Lamaze	.32	.06
Laceration	.34	.045*
Fetal monitor	.28	.08
Weight at term	.10	.32

* $P \leq .05$

of this relationship is fair to moderate, and indicates that factors other than age are also important in determining length of labor. Of the women whose labor length fit into the "second mode", five (75%) were older than the mean age of the entire group, which was 24 years (see Figure 7).

4. Do any of the incidental variables correlate with length of labor in women who used the upright position?

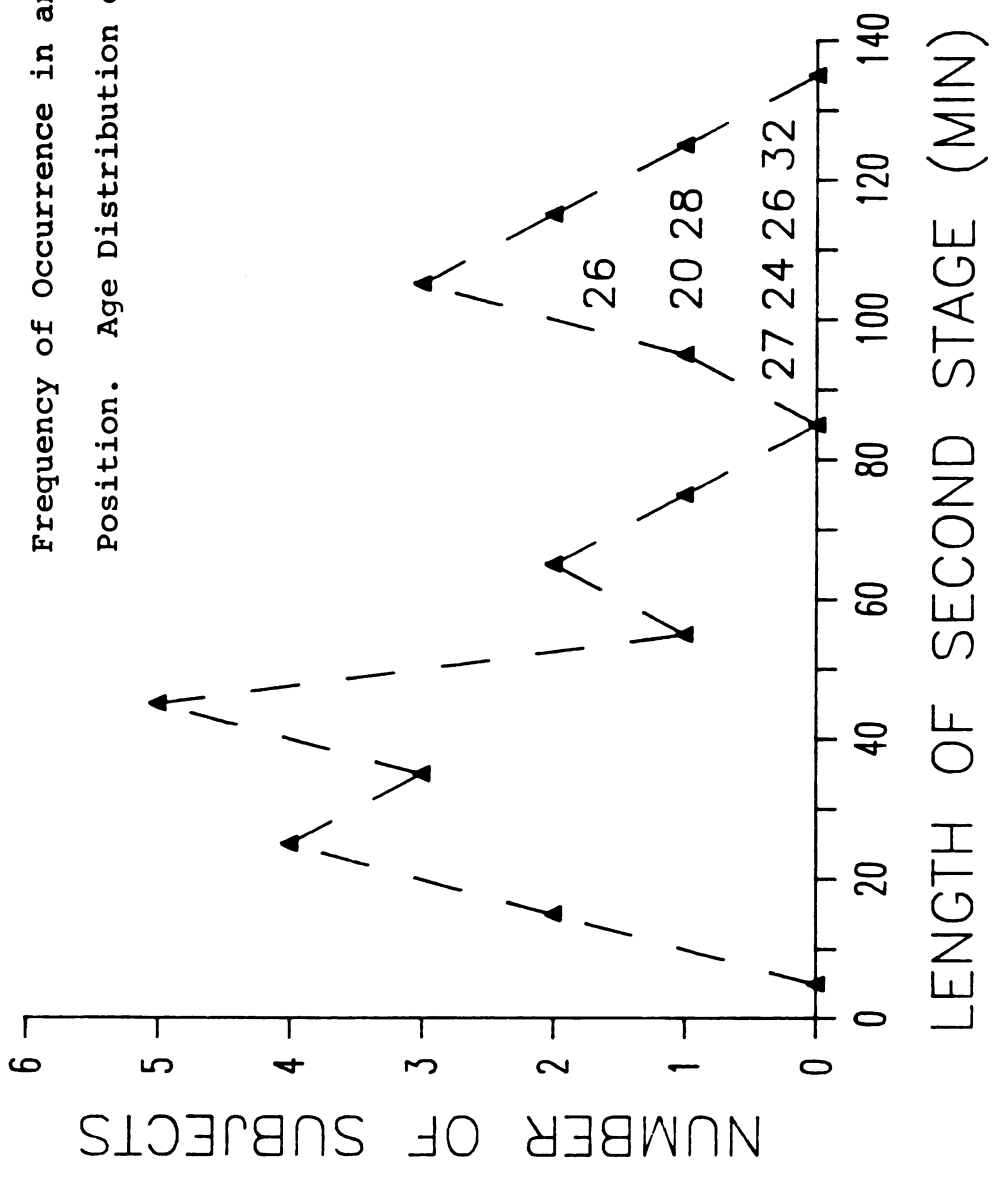
The incidental variables collected in this study were gravidity, type of health care setting, fetal position at birth, internal, external or both types of fetal monitor, APGAR scores at one and five minutes, and use of intravenous fluids.

No statistically significant relationships were found between any of these variables and the length of labor (see Table 11).

Hayes (1983). The following is a brief description of the results found by Hayes. Hayes' study population had identical criteria for inclusion as did the subjects in this study. Also, Hayes' sub-population was similar to that of this study on the frequencies of demographic, intervening and incidental variables (see Appendix C, Tables C-1, C-2, and C-3).

5. What is the mean length of labor in primiparous women with uncomplicated pregnancies who used the recumbent position?

Figure 7. Length of the Second Stage of Labor With Frequency of Occurrence in an Upright Position. Age Distribution of Second Mode.



The mean length of the second stage of labor in the recumbent position was 46.6 minutes, with a standard deviation of 21.1. The length of the second stage in this group ranged from 14 to 98 minutes, with a median of 42 and a mode of 30. Although the standard deviation is considerable, there is less variability around the mean in this group of subjects than in the upright group (see Figure 8).

Questions 6, 7, and 8. Do any of the intervening, demographic or incidental variables correlate with the length of labor in women who used the recumbent position?

No statistically significant relationships were found between length of labor when the recumbent position was used, and any of the intervening, demographic or incidental variables. All frequencies, percentages and correlations related to the study by Hayes may be found in Appendix C.

Summary. Among women who used the upright position during labor, age and lacerations were positively related to length of labor. No correlations of statistical significance were found between any variables and length of labor in women who used the recumbent position. The mean length of labor for the upright group was 60.9 minutes and for the recument group was 46.6 minutes.

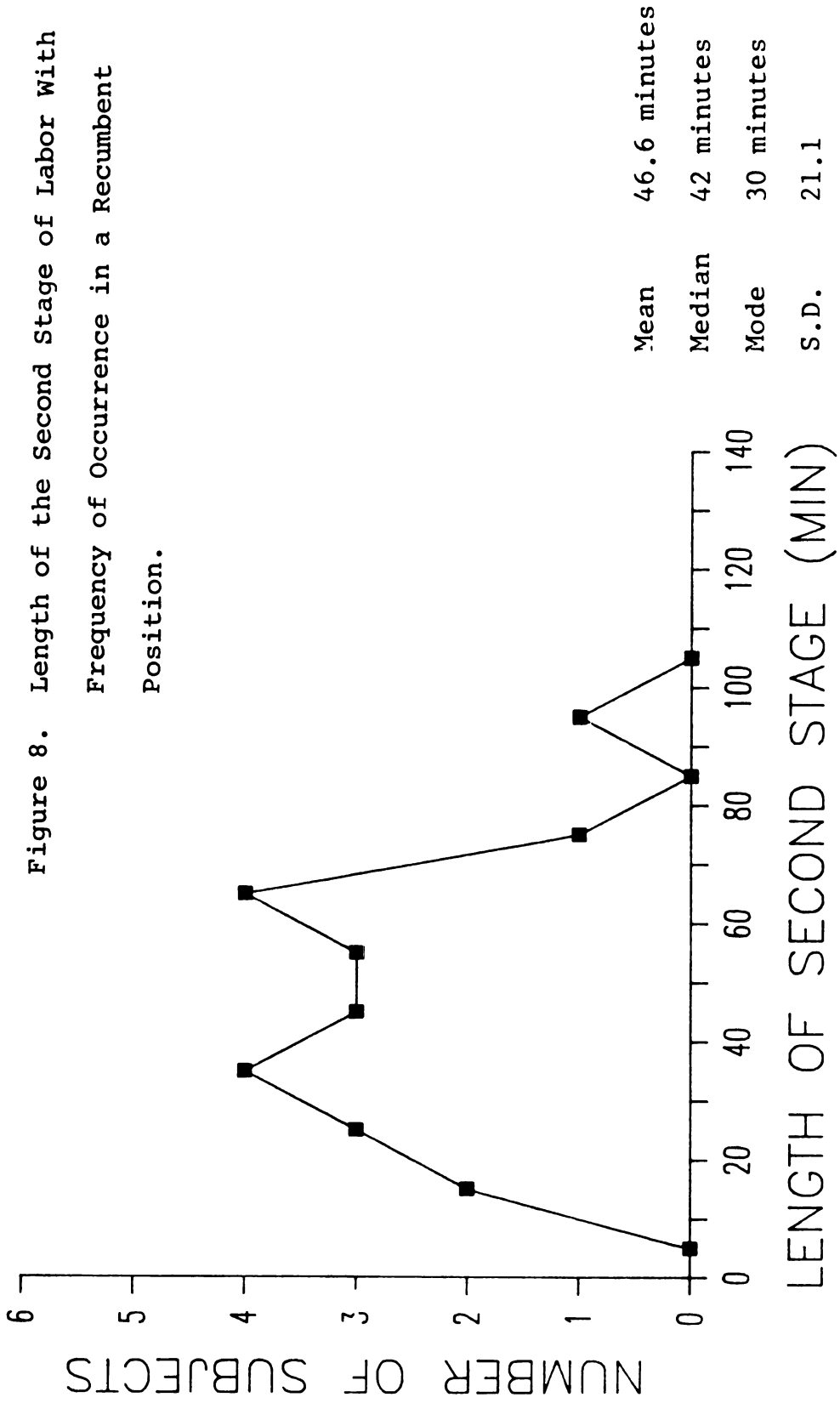


Figure 8. Length of the Second Stage of Labor With Frequency of Occurrence in a Recumbent Position.

Statistical Analysis for Research Questions, Sparks and Hayes.

9. Is there a statistically significant difference in the mean length of labor in primiparous women with uncomplicated pregnancies who used the upright or recumbent position?

There was no statistically significant difference in the mean lengths of labor between the two groups. The mean for the upright group was 60.9 minutes, with a standard deviation of 35.4. The mean for the recumbent group was 46.6 minutes, with a standard deviation of 21.1 (see Table 14). The actual difference in the mean length of labor between groups was 14.3 minutes. The large scatter in the data is reflected in large standard deviations, particularly in the upright group. When one examines the frequency and distribution plotted for the upright group, it is apparent that a bimodal distribution exists. In the recumbent group a normal distribution around the mean is seen. These differences are reflected in Figure 9.

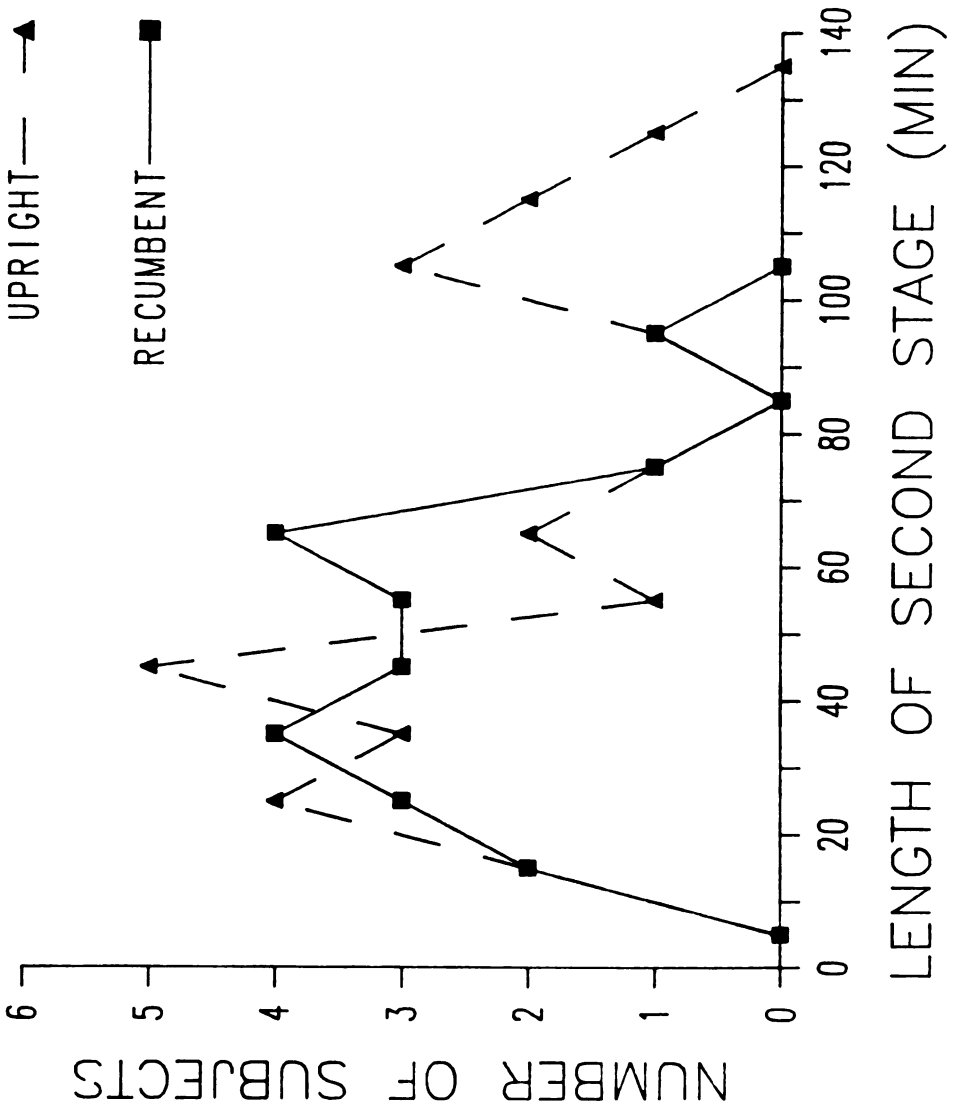
It was determined statistically that the variances were unequal between groups. This was corrected by use of pooled variance, and it was subsequently shown that there was no statistically significant difference between the means in the two groups ($P \leq .05$). The actual t-test value was $P \leq .111$.

TABLE 14

A Comparison of Mean and Standard Deviation Values Second Stage of Labor, Current Studies and that of Liu

Category	Hayes	Sparks	Liu (1974)
Upright position Mean (in minutes)		60.0	34.0
Recumbent position Mean (in minutes)	46.6		74.6
Standard deviation (in minutes)	21.1	35.4	Unknown

Figure 9. Comparison of Length of the Second Stage of Labor with Frequency of Occurrence in an Upright and Recumbent Position.



Of secondary interest is the comparison of the means of the first stage of labor. In the upright group the mean was 678 minutes, and in the recumbent group 673 minutes, indicating only 6 minutes difference in the means between the two groups. These means are consistent with the normal length of the first stage of labor, which is reported to be between 12-14 hours (Clark and Affonso, 1979).

10. Is there a significant correlation between age and position used for the second stage of labor?

Although a weak relationship was found between age and length of labor in the upright position, a similar result was not found among women in the recumbent group. When the data of the two groups were combined and the relationship between age and length of labor analyzed, no statistically significant relationship was found.

Examination of the data reveals a mean age of 24.1 years in the recumbent group, with a standard deviation of 3.9, and a mean age of 23.8 years in the upright group, with a standard deviation of 3.6. The similarity of the means and the standard deviation between groups indicates that they are very much alike with respect to age.

11. Is there a statistically significant difference in the frequency of lacerations when the upright and

recumbent groups are compared?

To help understand the inconsistent findings, i.e., a positive relationship between lacerations and length of labor within the upright group, and no statistically significant relationship between length of labor and lacerations within the recumbent group, additional correlational analyses were done. A between group analysis showed that women in the recumbent group were more likely to have lacerations than women in the upright group, although the relationship was very slight ($r=.25$, $P \leq .05$). Further, between group analysis showed that lacerations did not relate to length of labor. Yet women who had lacerations in the upright group were more likely to experience a shorter labor than women who did not. The meaning of these findings is unclear but it suggests that lacerations may have some relationship to length of labor that was not tapped in this study.

Although not statistically significant, the mean length of labor for the women in the recumbent group who had lacerations was 38 minutes, a period of 8.6 minutes shorter than the mean length for the entire recumbent group, which was 46.6 minutes. In addition, of the eight women in this group who had lacerations, five also had episiotomies.

Women in the upright group were less likely to have a laceration. However, the mean length of labor

for women in this group, when they did have a laceration, was 33 minutes, approximately one-half the mean time for the entire group, which was 60.1 minutes. Of the four women who had lacerations, two also had episiotomies.

The relationship between episiotomies and lacerations is unclear in both groups. Statistical analysis comparing the frequency of lacerations without episiotomy was not done, either within or between groups, due to the small numbers. However, a greater percentage of women in the recumbent group (62%) who had episiotomies had subsequent lacerations than in the upright group (50%).

Summary of Results. The mean length of the second stage of labor in study subjects who used an upright position was 60.9 minutes. Positive relationships were found between two variables and length of labor, age and lacerations. In both cases the correlations were weak.

The mean length of the second stage of labor in study subjects who used the recumbent position was 46.6 minutes. No statistically significant relationships were found between length of the second stage and any of the variables under consideration.

There was no statistically significant difference in the mean length of labor between upright and recumbent groups. The numerical difference in the mean

length of labor of the two groups was 14.3 minutes.

The only variable that showed a relationship to length of labor between groups was lacerations ($r=.25$, $P \leq .05$). This indicates that women in the recumbent group were somewhat more likely than women in the upright group to have a laceration. Women in the recumbent group also seemed more likely to have a laceration despite an episiotomy than women in the upright group, although this was not a significant difference.

Interpretations of the Results

Introduction. In Chapters I and II it was shown that little scientific evidence exists to justify the routine use of the lithotomy position for labor and birth. This research project, in combination with that of Hayes, was designed to scientifically examine one aspect of this issue--the relationship between length of labor and birth position. What was found is that there was no statistically significant difference in the length of the second stage of labor if primiparous women used an upright or recumbent position ($P \leq .05$).

This section of the chapter contains an interpretation of the finding. First, the results concerning length of labor and upright position are compared to those found in previous studies. Next, combined results are discussed and methodological limitations outlined.

Then, examples to show the way in which the research results support Nightingale's Theory of Nursing are presented. Finally, the relevance of this work to broad social and scientific issues are considered.

Among women who used an upright position during labor, the mean length of the second stage was 60.9 minutes. The questions then become: How does this time compare to accepted standards for the length of the second stage of labor? Why is this mean length different from the length of the second stage of labor reported in 1974 by Liu?

It has been stated in Pritchard and MacDonald (1980) that two hours is the maximum, safe length of time for the second stage of labor for both mother and infant. Although these standards have not been established scientifically, they are the current norms accepted by health care personnel and are used to determine current routine care. The mean for the second stage of labor among women in this study (60.9 minutes) fits well into this accepted norm for safe birth, and only one individual fell outside the 2 hour limit (see Table 12). It is reasonable to conclude then, that the upright position does not interfere with labor progress and thus, is an acceptable alternative to the recumbent position.

A considerable difference was found, however, in

the mean length of labor of women using the upright position in this study and those in Liu's study, who had a mean length of 34.0 minutes. The criteria for upright position, which was the lumbar spine at a 30 degree or greater angle from a flat plane, was identical in both studies. Further, number of subjects in this study and Liu's were approximately equal (25 and 30 respectively). Yet, the women in Liu's upright group had a second stage of labor that was on average 26 minutes less than that of the women in the upright group in this study.

This inconsistency is difficult to unravel because of several limitations inherent in Liu's report of her findings. That is, she neither reports her raw data nor her standard deviation. Thus, the large standard deviation and variability from the mean found in this study cannot easily be evaluated relative to those found by Liu.

Yet another possible explanation for the inconsistency may be age. It was found in this study that a fair to moderate correlation exists between age and length of the second stage ($r=.44$, $P \leq .05$). This means that older women tended to have a longer second stage than younger women. Considering the "second mode" of the bimodal distribution on length of labor shown in Figure 7, seven study subjects fell within this mode.

Of the seven subjects, five of them were older than the mean of 23.8 years of age in the upright group. Perhaps if a study involving a larger number of subjects were done, it would be possible to discern whether older women experience a longer second stage of labor when in an upright position.

Liu limited her study subjects to women between the ages of 20 to 25 and did not report any significant difference between length and position according to age. Nevertheless the fact that the women in her study were younger than those in this study and that older women in this study had a longer second stage may contribute to the difference in mean length of labor found in the two studies.

Further, in Hayes' study, women who used the recumbent position were distributed normally around the mean relative to length of labor, and no statistically significant relationship between age and length of labor was found. Use of the recumbent position among women ages 17 to 33, then, does not affect the length of the second stage. The question becomes: Is there something unique about the upright position and do older women who use it take longer to push their babies out than younger women? The number of study subjects is small and the question cannot be answered. Nevertheless, these results clearly justify further study, both

replication of the current project and creation of new studies involving age and position for labor.

Laceration is the only other variable that was related at a statistically significant level with position and length of labor. Within the upright group, women who had lacerations had shorter labors. The mean for the length of the second stage was calculated for the sub-group who had lacerations and compared to the sub-group which did not have lacerations. Women who had lacerations labored for fewer minutes than women who did not (32.6 minutes and 60.9 minutes, respectively). What this difference suggests is that the mothers' perineum could not stretch quickly enough to accommodate the speed of infant descent, and thus laceration occurred.

It is possible that the greater frequency of lacerations is related to the shorter length of the second stage in the recumbent group, despite the fact that this shorter length was not statistically significant. Additional thought should also be given to the similarity of the length of the second stage for the subjects with lacerations in the upright and recumbent groups. The mean was 32.6 minutes for the upright group, and 39.2 minutes for the recumbent group.

These interpretations need validation in larger studies. The questions raised are important to clinical nursing practice. If faster labor increased the

probability of lacerations (as shown in the upright group and may be shown in the recumbent group in subsequent studies), then nursing care could be adjusted to decrease this probability. Position adjustment or perineal stretching could be done when rapid second stage is identified. If further work supports the finding that an increased number of lacerations occur in the recumbent position with no decrease in labor length, then change of position to upright may be indicated for women at risk for lacerations.

The issue of laceration secondary to episiotomy need only be briefly mentioned as a potential additional research question to be studied. Although the correlation was not statistically significant, a larger percentage of women (62%) in the smaller recumbent group (n=21) had lacerations secondary to episiotomy than the 50% of women in the upright group (n=25). Data are unavailable to explain this finding. One would need to know the extent of episiotomy, when done relative to birth, size of infant, type of pushing mother did, and if perineal massage was done prior to laceration. Nevertheless, it is clearly not desirable to tear after episiotomy. Thus if a statistically higher probability exists of laceration secondary to episiotomy in the recumbent position, then the upright position has merit relative to perineal integrity.

Hayes has found in her study subjects who used the recumbent position, a mean length of labor that was 46.6 minutes, with a standard deviation of 21.1. This length is also within the accepted, safe standard of two hours (Pritchard & MacDonald, 1980). This indicates that the recumbent position is an acceptable posture for the second stage. The mean, reported by Hayes, however, is different from Liu's reported mean of 74.6 minutes.

Limitations similar to those discussed above make comparing these means to those of Liu's study unsatisfactory. While the variability in the recumbent group is less than in the upright group and a normal distribution seems apparent, there is considerable standard deviation away from the mean, and this may have influenced the results and made them different from those of Liu. This is an unknown at this time.

Combined Results. Based on reports on birth in other cultures, speculation on difference in pelvic measurements according to position and Liu's research, it was postulated that women who used the upright position would experience a shorter second stage than women who used the recumbent position. The results show that there is no statistically significant difference in length of labor according to position.

Liu found the second stage of labor to be 74.6 minutes in the recumbent group and 34.0 minutes in the upright, time periods longer than Hayes found for women who delivered in the recumbent position and shorter than this author found for women who used the upright position.

There are several possible explanations for these differences. In addition to known factors such as age, Liu's population may be different in ways not previously considered. For example, geographical differences in populations (i.e., E. Coast vs. Midwest) may be reflected in attitudinal differences between the women that would influence length of labor.

Yet another explanation may be methodological. Liu collected her own data, while staff nurses collected data in these studies. Liu's presence in the Labor and Delivery area could have influenced length via reduced patient anxiety. Timing of vaginal exams during labor also may have influenced the results. For example, vaginal exams are performed intermittently by staff nurses at St. Lawrence Hospital according to clinical judgement. Liu, in contrast, may have used protocols to time vaginal exams. Differences in the time such exams were performed could have influenced results in two ways. First, second stage may have been identified earlier in Liu's study, thus accounting for

longer length, particularly in the recumbent position. Second, since Liu had no staffing responsibilities, her documentation may have been more accurate. Labor and Delivery nurses are subject to unpredictable interruptions in the course of their work, and they may, in some cases, retrospectively estimate either time of the beginning of the second stage, or time of birth. Thus, recording by staff nurses may have seriously altered the validity of the data collected in either or both groups (Roberts, 1983).

In addition to differences in length of the second stage of labor, Liu also found the second stage of labor shorter in the upright position than in the recumbent position. That is, she reports that women who used the recumbent position took 40.7 minutes longer to deliver than women who used the upright position. In contrast, these researchers found that women in the upright group took 14.3 minutes longer to deliver than women in the recumbent group.

The possible reasons for this difference are difficult to unravel but they may reflect group variations that cannot be documented. In her work, Liu does not report standard deviation, raw data, frequencies, or level of statistical significance at which results were accepted.

The large variance from the mean found in both

current studies, then, may be a product of outliers in either group who have skewed the data. Such outliers, particularly in the upright group, may account for the bimodal distribution of length of labor and has significance that is not understood.

Despite the variability of these research results from that of Liu's, the researchers are unwilling to accept the conclusion that the current work does not reflect trends in the larger population or that Liu's results are more accurate. The studies need to be replicated, with larger sample size and under stricter methods of control. Details of Liu's research need to be gathered if available and possibly a collaboration with Liu considered.

Methods. Problems of methodology have been alluded to earlier in the text, specifically as they relate to the limitations of staff nurses recording data and inconsistent frequency of vaginal exams to determine beginning of the second stage of labor. In addition to these limitations, that of the use of retrospective data also must be noted. In retrospective survey design one is dependent on others recording the data and has no absolute control over recording accuracy. Given the scope of master's thesis work, and the unpredictability of birth, this retrospective work was the most pragmatic approach to the research questions. Given

greater resources and time, a prospective design may produce more consistent, or different, results.

Yet other methodological problems are apparent. Data on infant weight were not collected. Although length of labor is not entirely or even predominantly dependent on infant weight, there is some correlation between this factor and length of labor noted in the literature (Pritchard & MacDonald, 1980).

In the first section of this chapter, length of the first stage of labor was noted to be very similar between groups. What was not measured in these studies was the labor phase at which women were admitted to the hospital and how first stage length correlated to second stage length. The posibility exists that a prolonged first stage would correlate with a longer second stage. This could occur because of fatigue and/or dehydration of the study subject. These factors could decrease the woman's ability to effectively push in the second stage and considerably influence length. In subsequent studies it is a factor that should be measured.

Finally, the definition of recumbent and upright position (the lumbar spine less than or greater than 30 degrees) may not have been adequate. The definition used in these studies was based on Liu's and were accepted for three reasons: 1) when applied to Liu's

work a significant difference in length of labor was shown, 2) they were the only definitive definition of upright and recumbent positions in the literature and 3) it offered a standard by which to measure position objectively. In retrospect, 30 degrees may not have been a great enough angle to truly represent an upright position and the postulated pelvic measurement changes that accompany upright position. The researchers now believe that upright position should have been set at 50 or 60 degrees. Further, several variants of upright could have been defined and measured. For example, slight upright at 30 degrees, semi-upright at 60 degrees, and complete upright at 90 degrees could have been used. Then, if pelvic measurements do enlarge as patients approach the upright position, this factor might be more accurately reflected in the results.

Relationship to Nightingale's Theory of Nursing. Nightingale has written that nurses put mothers and infants in condition for nature to act and that they do this by creating an optimal environment. She also stated that if one achieves an optimal physical environment, then psychological, social and spiritual aspects of the environment can also be addressed as a part of the intervention process (Torres, 1980).

The results of these studies support Nightingale's Theory. Position in labor and birth is a factor in

the environment. It has been shown that there is no difference in length of the second stage of labor according to position. Therefore it is reasonable to encourage women to choose the position that feels best for them at the time of birth. Thus, by allowing flexibility, one facilitates "putting the mother in a condition for nature to act." In addition, if their physical needs are met, women can address psychological, social, and spiritual needs. This would occur if women have choices in position for labor and birth, through an increased sense of control, and ability to relate to support persons and health care persons from a position of personal comfort. That is, through flexible options in the birth process, women can make choices, leading to increased feelings of control, and pursue choices that are consistent with physical, psychosocial and spiritual needs.

The outcome of analysis on lacerations is also relevant to Nightingale's position that nature acts to heal the body. Although not correlated to length of labor, a greater frequency of lacerations occurred in women who used the recumbent position than in women who used the upright position. Further, among the upright subjects, lacerations were associated with shorter labor lengths. It is possible, then, that nature acts more effectively in the upright position; as a result of lacerations (an opening of the vaginal outlet)

infants are delivered more quickly, thereby decreasing neonatal stress. There is potential for greater knowledge from additional study of the relationship between laceration, position, and length of labor.

Conclusion

In summary, the mean length of labor in the upright position was 60.9 minutes with a standard deviation of 35.4. The mean length of labor in the recument position was 46.6 minutes with a standard deviation of 21.1. There was no statistically significant difference in the mean lengths of labor between the two groups.

In the upright group, age and laceration correlated with length of labor. Analysis of variables related to length of labor between groups indicated there was a greater frequency of lacerations in the recumbent group than in the upright group.

It is fitting to conclude this section by briefly returning to the points made in Chapter I. In that chapter, it was shown that very little scientific justification exists for many routine practices surrounding hospital birth. One of these practices is use of the lithotomy position. These current studies have contributed to increased knowledge of the relationship between position and length of labor. Primarily they

have demonstrated that no statistical difference exists in length of the second stage of labor by position. Therefore it is reasonable to consider flexibility in position requirements for birth in hospitals. In addition, these studies raise many questions that require further study.

No simplistic answer to the effectiveness of either position is forthcoming, particularly when one compares the work of these theses to the work of Liu (1974), a researcher who has published recently on the relationship between position and the second stage of labor.

The following is a summary list of questions generated by these combined works. Studies addressing these questions would contribute to further understanding of the relationship between birth position and the length of the second stage of labor.

1. If these studies were replicated with a larger sample, would the variability from the mean be as great? Would a bimodal pattern still show in length in the upright position?
2. What is the relationship between age and length of labor in the upright position? Do older women have longer labors in an upright position, while younger women have similar lengths, despite position?
3. Is there a greater number of lacerations secondary

to episiotomies in the recumbent position than in the upright position?

4. If lacerations occur in both positions, but are associated with decreased length of the second stage in an upright position, is that justification for increased use of the upright position?

5. Would the results of similar studies be more consistent with Liu's results (1974) if the researchers collected the data rather than staff nurses?

6. Is there a relationship between length of the first stage of labor to length of the second stage of labor according to position?

7. If a prospective study were done, with control and experimental groups assigned to position, would the length of labor be different if all other factors were kept constant?

8. How would infant weight correlate with length of second stage of labor, according to position?

9. If upright position were defined as 60 to 90 degrees and recumbent position as less than 30 degrees, would length of the second stage of labor be shorter in the upright or recumbent position?

10. In what ways other than position does Nightingale's Theory of Nursing apply to labor and birth?

CHAPTER VI

SUMMARY

Introduction

This last chapter contains a review of the thesis content. First the findings are presented and conclusions discussed. Then, recommendations on the relevance of the study to nursing education, service and research are offered.

The purpose of this research was to assess the length of the second stage of labor in primiparous women with uncomplicated pregnancies and to explore the relationship between this length and specific variables thought to influence it, such as upright position. The results have been compared to a similar study done by Hayes (1983) who measured length of the same stage of labor in women who used the recumbent position.

Analysis of the combined data indicates that there is no statistically significant difference in the mean length of labor between women who use the upright or recumbent position ($P \leq .05$). However, the results approached significance in an unexpected direction. The difference in the mean length of labor between upright and recumbent groups was 14.3 minutes, and among women in the upright group the mean length was longer.

The application of these findings is best discussed in the context of the original impetus for the study. This impetus is consumer dissatisfaction with current hospital practices concerning labor and delivery. Women perceive these practices to be inflexibly focused on use of technology and are desirous of change to approaches which are supportive, noninterventionist, and respectful of the natural birth process.

Review of Previous Chapters

In the 1960s it became apparent to doctors and nurses that consumers began to form coalitions to deal with their social and political concerns. Among these concerns, health care came under particular scrutiny. Women were critical of many childbirth practices in hospitals imposed arbitrarily by health care personnel. Consumers expressed feelings of loss of control of the birth process as a result of the routine application of rigid protocols to laboring women, despite lack of scientific justification. More specifically, they perceived the routine enforcement of technological interventions and multiple protocols as inflexible.

Investigation of these protocols by consumers, and to some extent by providers, reveals that much of the technology routinely applied during the birthing process in hospitals has no scientific basis. These

practices evolved out of provider convenience and because it was thought they could enhance the safety of birth. One such practice is the routine use of the recumbent posture, specifically lithotomy position, for childbirth.

Consumers opposing the routine use of lithotomy position have noted that in many other cultures upright postures are encouraged. They cite increased feelings of control and participation in the birth process reported by women who use upright positions.

To support their demands for alternatives in childbirth, some women have been able to successfully negotiate with physicians and nurses to achieve choices in their births. Others have grudgingly endured traditional interventions and, as a result of their objections to protocols, are described by some nursing staff as "hostile or difficult" patients (Baker, 1983). Still others have chosen to deliver at home. In the state of Michigan, out-of-hospital births have increased from 311 in 1971 to 625 in 1979 (Conklin & Simmons, 1979).

Families who choose home births do achieve increased flexibility and control. Yet they achieve these benefits at a cost. Should an obstetrical emergency occur, the well being of mother and/or infant is in jeopardy. The compromise of their safety is the result of contemporary political, social, and medical policy that creates a

situation in which only lay midwives with poor hospital backup systems will attend home birth. The movement toward home birth, plus lack of scientific justification for lithotomy position were the primary factors that determined the subject of this study.

In the second chapter of this thesis the concepts of recumbent (lithotomy) and upright position were defined, and the advantages and disadvantages of these positions presented. It was noted that the lithotomy position has not been shown to have any physiological or psychological merit for women who have normal births. Nevertheless, the position is used extensively and arbitrarily throughout many areas of the United States.

A conceptual framework derived from Nightingale's Theory of Nursing also was presented in Chapter II. Nightingale's focus of care was on the physical environment. She believed that nurses alter the environment to facilitate the healing of the body through natural means. Interpreters of Nightingale's writing have expanded her concept of physical environment to include a holistic overview, including the psychosocial and spiritual spheres of Man. Torres, quoting Nightingale, refers to the environment as "all external conditions and influences" (1980, p. 30).

In addition to her nursing care and education, Nightingale kept detailed notes of her nursing outcomes

and used statistical analyses of these outcomes to justify her interventions. Manipulation of the environment to allow patients to "heal themselves" and scientific justification of the type of manipulation are both relevant to the goals of this study: the scientific measurement of outcomes of position during the second stage of labor and the assessment of alternative environments (alternative positions to lithotomy) that allow nature to act effectively.

In Chapter III the literature reviewed revealed that very little research exists that measures factors related to position and length of second stage of labor. Several current review articles include discussions of postulated merits of the upright position for labor and birth, but only Liu (1974) has done definitive research on this issue. Further, a review of lay and scientific literature concerning selected variables related to length of labor, as well as historical and cross-cultural research about childbirthing, showed that little research has been done to examine which variables affect birth positively or negatively or how flexibility can be safely implemented in hospitals.

This review of the literature was followed by Chapter IV which contains an explanation of study methods for this retrospective chart review. A description of population and sub-population selection

is given, along with justification for exclusion or control of specific variables. Field procedures are presented, and it is shown that this study and the study by Hayes (1983) were implemented with identical methods. Statistical methods also are described, including both descriptive and inferential techniques.

Finally, in Chapter V the data results were presented. Analysis of the data provided the following results. The mean length of the second stage of labor in the upright position was not statistically different from the mean for the recumbent group. The difference approached a significantly longer mean in the upright group. This finding is unexpected and different from that of Liu (1974).

Within the upright group, two variables were related at a level of statistical significance to length of the second stage of labor: age and lacerations. Within the recumbent group in the Hayes study (1983), these same variables did not correlate with length. Analyses was done between groups on the relationship of length of the second stage of labor and age and laceration. The results indicate that women in the recumbent group were more likely than women in the upright group to have perineal lacerations. There was no relationship between the upright and recumbent groups, the length of the second stage of labor, and age.

Conclusion

What do these results mean? Clearly they do not add a piece to a large and complicated puzzle as is the case when a specific dimension of a frequently studied problem is examined.

The results from these combined studies are more limited, but nonetheless important. First, they provide a beginning answer, a tentative exploration into the vast field of human response to birth. Second, from these studies a multitude of further research questions can be generated.

The "beginning answer" to the issue of position affecting length of the second stage of labor is that there is no difference in length according to position. Therefore, either position is an appropriate alternative for labor and birth. However, a modest relationship was found between age and length of the second stage of labor within the upright group. The women in the upright group who had a longer second stage of labor tended to be older than the women who had a shorter second stage in the upright position. These findings indicate it may be less advantageous for older women to use the upright position than for younger women.

The results concerning lacerations and the upright group are somewhat more difficult to interpret. Women who had lacerations tended to have shorter labors. Women

in the recumbent group, however, had a greater number of lacerations, even though their labors were not shorter. In addition, there were a greater percentage of lacerations secondary to episiotomy in the recumbent group than in the upright group. The number of women in either group who had lacerations is too small to make any generalizations, but further study may show that this finding has significant clinical importance.

If all the data on lacerations is clarified with further research and larger sample numbers, the results may indicate a clear direction for clinical application. Lacerations are not perceived as desirable, particularly secondary to episiotomy. Shorter second stage <u>is</u> perceived as desirable. The question becomes then: What is the nature of the relationship between position during second stage of labor in the upright or recumbent position and lacerations? The results indicate that although lacerations occurred in the recumbent group, they did not shorten length as was shown in the upright group. If lacerations are inevitable in either position, should patients use an upright position to labor and possibly have a shorter second stage?

The issue of laceration leads to the second contribution of this study and that is the generation of many more research questions. Only these studies and that of Liu (1974) have investigated the relationship between

birth position and length of the second stage. The results were contradictory. It is difficult to resolve this contradiction because Liu's raw data are unavailable. Thus, only the mean times for the second stage of labor and research methods can be compared.

Many additional questions have been generated (see Chapter V). These studies should be improved with larger samples to answer some of the questions. This work can appropriately be considered a pilot study, a beginning exploration of the variables affecting normal labor and birth.

Recommendations

This is the final portion of the thesis. It contains application of the results of this study, combined with the work of Hayes (1983). Specifically discussed is the relevance of the results to nursing education, service, and research.

The results of nursing research are of little use unless they are described to both health care providers and consumers. The most effective way to disseminate results to these groups is through publication. There is no one nursing journal that is read by all levels of and specialists in obstetrical nursing. Obstetrical care may be provided on one level by a licensed practical nurse and on another level by a certified nurse midwife.

Therefore, articles should be submitted to several types of nursing publications, reporting the methodology and results in ways that are comprehensible and relevant to individual readerships. Medical journals that focus on broad health care issues should also be targeted for nursing research articles.

In addition, recent consumer publications are publishing many articles in which issues are presented on the birth process. What better way to increase nursing visibility and disseminate accurate, relevant information than to publish results of research motivated by consumer needs?

Nursing Education. In this section, primarily the needs of Baccalaureate educational programs are addressed, as it is the opinion of this author that future entry into nursing practice should be at the Baccalaureate level. At this time only nurses with Baccalaureate degrees or higher are educated to apply research results to practice. It is in the context of this reality that recommendations for nursing education are offered.

Nursing faculty have multiple educational responsibilities tied to research production and application. Theoretically, all nursing faculty should be actively involved in research. Such involvement would insure that in their area of specialty faculty are familiar

with current literature, contribute to the advancement of the science of nursing, understand the research process, and provide this understanding to their students. In some settings the demands of teaching responsibilities and inadequate funding sources make this active participation in research impossible. When this is the case, the application of research results is an essential facet of nursing education.

Faculty members, in their clinical capacity, are role models for students. It is in the clinical setting that students can see their teachers apply flexibility and individualized clinical judgement to women in labor. It has been shown that there is no statistical difference in second stage labor length according to position. Nursing faculty can demonstrate the application of these results by providing care to patients in labor based on their needs and wishes, and by encouraging each laboring woman to find a position that enables her to cope optimally with the pain and effort of labor.

Faculty must also identify and overcome barriers between staff nurses and physicians, who must cope with the realities of daily patient care, and the students, who come to the clinical setting to learn optimal professional nursing practice. Nursing educators need awareness of effective ways to integrate and facilitate

mutual student and staff nursing care rather than hamper it. Clinical competence, as well as awareness of this issue, will help faculty achieve this difficult task.

Faculty can achieve this delicate balance between compromise and excellence primarily through example. Research results such as position change and flexibility must be implemented with tact and judgement. Instructors must be astute enough to apply nursing interventions in such a way that they minimally interfere with required staff nurse and physician tasks.

Nursing students should be taught about research in creative and relevant ways. In addition to a core course of research principles, small clear studies should be presented with each field of practice. Since obstetrics is a field involving normal developmental and maturational occurrences, it is an optimal area in which to show students the application of flexibility of position in labor. This issue of position for labor and birth incorporates many principles of holistic care that are important to nursing education. Position change may affect patient communication with family and providers, feelings of control and competence, and feelings of increased participation in birth.

Students should be helped to achieve feelings of competence and autonomy for these characteristics are essential if one is to apply new principles of care

based on nursing research. If students have had practice interpreting and applying research results to their clinical practice throughout their education, they will complete their education with the confidence that nursing research is an important contribution to excellence in nursing. This knowledge and the research based standards upon which students orient their practice will give new graduates the competence and autonomy needed to communicate with other health care providers. If physicians and/or staff nurses insist on lithotomy position despite patient requests for an upright position, the ability to discuss and defend research results will be a useful approach which students can use to create change in practices of inflexible health care providers.

Nursing Service. It is well known that in most hospitals nurses are the primary care givers for women in labor. Physicians usually participate in the hour or two that it takes to deliver the baby, but nurses provide care during the longer labor process.

The educational preparation of licensed nurses varies. While it is beyond the scope of this section to elaborate on this issue, the application of research results to nursing service must be applied realistically to the primary obstetrical care givers in hospitals--the nurses. These nurses not only have varied

educational preparation but varied motivation and skills for the care they give.

Head nurses are in a position to help their staff overcome their educational differences. It is important that these nursing leaders are well educated, ideally on a graduate level. Adequate education insures that nursing administrators understand the importance of nursing research and can apply it. It has previously been stated that lithotomy position has become a tradition embedded in obstetric routine in hospitals. If head nurses have the incentive and ability to sort out the inappropriateness of this routine practice, they can act as role models for their staff by promoting flexibility among physicians.

Head nurses need an additional characteristic to insure quality care and bring about change and that is the ability to gain power and establish autonomy. This will allow them to hire staff nurses who are well educated and have a professional orientation. This staff professionalism in turn creates an additional climate for interpretation and application of research. Power often insures adequate budgets so that Labor and Delivery units can be adequately staffed and have comprehensive orientations for new nurses. Adequate budgets allow for inclusion of a Clinical Nurse Specialist on staff or at least frequent consultations about

areas of education and practice for staff nurses.

Quality staffing helps establish the time and atmosphere for creative nursing practice. This includes frequent educational programs on current research and a milieu in which nurses are encouraged to practice individualized care. This individualized care can be further encouraged by educational programs presenting the results of these research projects. The clinical application is two-fold. First it is important for nurses to realize there is no scientific justification for currently used lithotomy position. Second, staff nurses will benefit from knowing that no adverse affects of either upright or recumbent position were identified by these studies. This information can help to decrease barriers to inflexible nursing care based on erroneous information or personal opinion.

If staff nurses are well versed in the rationale for change from a traditional to a research based practice, they may be better able to deal effectively with arbitrary physicians who routinely place their patients in lithotomy position for birth. Under these conditions staff nurses may also be willing to participate in further clinical research that is needed to clarify the relationship between position and length of labor.

The second stage of labor is an intense, stressful experience for most women. It is a time when nurses

can be most effective as patient advocates. If nurses approach patient care based both on expressed family needs and research based practice, then encouragement and support during the second stage of labor could be optimally effective. This type of care would be enhanced by application of the results of this study. If this process increases flexibility and consumer participation in birth, the frustration consumers are currently expressing may be dissipated. Increasing satisfaction among consumers with their hospital birth experience may decrease the number of home births and accompanying risk to mother and infant.

An additional area of service in which research results can be applied is that of childbirth education. Characteristically, patients who wish knowledge and participation in the childbirth process attend birth preparation classes. In anticipation of the stress of the second stage of labor and to facilitate realistic expectations, issues related to alternative positions for bearing down and birth can be presented. The support person (who usually attends classes) can learn that many positions are acceptable and that reminders to the patient in the last stages of labor may serve to increase comfort and in some cases decrease length of the second stage of labor.

Nursing research. The implications for nursing research are multiple. The results, combined with those of Hayes (1983), show that there is no statistically significant difference in the mean length of the second stage of labor according to position, although the results approach a statistically longer length in the upright position. It is possible that for older women the upright position may increase length of labor. It is also possible that although there is a greater tendency for perineal lacerations in the recumbent position, these lacerations were not associated with shorter labors whereas in the upright group the women who lacerated did have shorter labors.

As there is no difference in labor length according to position, it is reasonable for women in normal labor to assume whatever position they prefer. It is important to bear in mind, however, limitations inherent in this seemingly reasonable conclusion. First, physicians and nurses who provide obstetrical care according to tradition rather than scientific principles may be unwilling to change their attitudes based on the results of one study which shows upright position is an acceptable alternative to recumbent. Second, with larger samples studies may show somewhat varying results. This is the greatest reason to replicate this work, to determine if the results occurred by

chance or are representive of larger population trends.

It is confusing that the results are different from those of Liu (1974). The mean length of the second stage in upright and recumbent groups, the difference in length between groups, and the direction of the differences are all dissimilar. Although only superficial comparisons between Liu's results and these are possible, the differences are curious and certainly justify further study.

As so little work has been done on this subject, it may be productive for nurses from different settings who have mutual interest in variables affecting the length of labor to collaborate. This would allow pooling of resources and expertise and increase continuity of nursing research projects. If data were gathered from several clinical settings, the larger sample size may yield more definitive results than these modest studies. Data gathered from several settings would also increase the generalizability of the results.

An issue raised by Roberts (1983) is important relative to further study. One must consider if position related to length of the second stage of labor is the primary issue to study. Perhaps fatigue, length of the first stage, type of support person, or anxiety are more important variables to assess. These variables could be assessed separately in different studies or measured as part of a larger research project that

includes multiple variables and measures their effect on length by the use of multi-factorial statistical analyses.

This idea of Roberts (1983) leads to another approach to the identification of factors important to length of labor. As has been previously mentioned, very little research has been done on variables that affect the length of the second stage of labor. A research method that could be used to identify multiple influencing factors would be a large epidemiological study. In many settings, with large samples, length could be measured according to position and the variables suggested above. Many other factors could be included such as multiparous pregnancies, prenatal care, medications and infant weight. The analysis of the data could then measure the strength of the relationships to length of labor and generate a greater knowledge base on the entire subject of variables affecting length of labor.

Methodology. One of the primary limitations of this study and the work done by Hayes (1983) are the sample sizes of 25 and 21, respectively. It is a well known fact that small sample size can cause statistical analysis of the data to be either misleading or inconclusive. For example, in this study, in the upright group the labor lengths were not normally distributed

about the mean, and when plotted indicate a bimodal distribution. It appears that many of the older women in the upright group fell into the second, or longer, labor length group. This may be an erroneous finding resulting from the sub-sample size of 25 and needs to be validated by further work with a larger sample. Many women are now planning to begin their families after the age of thirty, and it is also possible that further work will confirm that position affects length of labor in older women in ways that are different than women in their twenties.

It is recommended that in subsequent studies on this subject the recording of data by trained independent observers would contribute to increased reliability of the findings. As opposed to staff nurses who collected data in this study, independent observers would have no disruptions in the recording of data brought about by patient needs. This lack of distraction would facilitate greater accuracy in both observation and recording of data.

It is a known limitation of the retrospective chart review method that the researchers have no control over the accuracy of data collection. While this method was entirely appropriate for a pilot study, future work should include provision for prospective data collection by researchers who are formally educated in the process

of data collection.

Finally, position should also be redefined. Rather than using Liu's definition of upright, which is a thirty degree angle between the lumbar spine and a horizontal plane, an upright position of sixty and/or ninety degrees should be considered. Liu (1979) in her review of labor and birth positions alludes to increased pelvic size in women who use an upright position. This increased size and subsequent decreased length of the second stage of labor may be found in future studies using an upright position of greater than thirty degrees.

Dissemination of Results. It is appropriate to end this section on recommendations relative to nursing research by addressing the issue of dissemination of the results to other nurses. The academic community of nurse researchers should have a visible, dynamic, working relationship with nurses in service. This is one way to narrow the gap between nurses with varied educational preparation. Enhancing the relationship between nurses in different fields can be facilitated if the results of nursing research are made available to clinical nurses in appropriate ways. First, the research problems must address issues of concern to nurses in practice. Second, the results must be understandable, free of jargon and statistical "buzz words." Nursing research should be relevant to

nursing practice and able to be realistically integrated into nursing care.

The results of these studies are easily integrated into practice. Either position is acceptable because the length was shown to be within safe time limits. Flexibility in position for the second stage of labor is desired by consumers and should be acceptable for nurses and physicians. What does not seem acceptable, based on these research results, is routine use of any position for provider convenience, particularly if it is objectionable to the consumer.

Birth is a naturally occurring biological event. It is also potentially life threatening. Birth is a social and developmental transition which is perceived as a major life event for most mothers. Women recount the events surrounding their children's birth for their entire lives--an indication of the magnitude of this event both biologically and psychologically.

In this society most births occur in hospitals. Nurses are the primary care givers during a great part of the birth. Nurses are both a component of the hospital environment as well as a creator of other components of the environment. This environment determines to a great extent how effectively the natural process of childbirth occurs. It has been the goal of this study to establish a scientific basis for patient care

and to help apply the results of scientific investigation to improve the hospital birthing environment.

APPENDIX A

PERMISSION FOR RESEARCH PROJECT

Figure A1. Letter Concerning Confidentiality

ST. LAWRENCE HOSPITAL
A DIVISION OF
SISTERS OF MERCY HEALTH CORPORATION

May 3, 1982

TO: Diane Torres, R.N.

FROM: Scott Swisher, M.D.
Chairman, HSRC

RE: Proposal submitted: Second stage of labor

I have reviewed this proposal and have only one concern - that is how confidentiality is to be protected.

The researchers should include a statement indicating no identified protocols which include the name and address will leave the record room.

Figure A2. Communication From Nursing Office

St. Lawrence Hospital
1210 West Saginaw
Lansing, Michigan 48914

May 11, 1982

Barbara Taylor Sparks
7966 Lovejoy Road
Perry, Michigan 48872

Dear Barbara:

You know from our recent telephone conversation that the St. Lawrence Hospital Human Subjects Research Committee has approved your proposed research project on "The Second Stage of Labor/Birthing Chair."

This approval is contingent to the receipt from you and your colleague, Sandy Hayes, of a letter in which you answer the committee's concern regarding how patient confidentiality will be protected. As you can see from the attached memo, they ask that you include a statement identifying protocols which insure the name and address will not leave the record room. Please send the letter addressed to Scott Swisher, M.D., Chairperson, H.S.R.C., St. Lawrence Hospital; attention of Dawn Gribben, Medical Staff Secretary, with a copy to me.

At that time then, Myra Bayes will contact you to set up a mutual time to introduce you and the data collection to Labor & Delivery Nursing Staff. You mentioned before that you would compose a letter to our staff explaining briefly the research project and how they will take part in it. We will distribute the letter before your introduction to the staff.

Let me say again, I am pleased that you brought the opportunity to do this project here to St. Lawrence and look forward to watching it develop and seeing the conclusions drawn from it. The greatest benefit we will derive will be the introduction and participation in "Nursing Research" at the staff nurse level. That excites me!

Sincerely,

Margaret E. Curtin RN
Assistant Director--Nursing
Department Head, Labor & Delivery

MEC/mw
cc:
D. Torres
M. Bayes

Figure A3. Letter to Hospital Research Review Committee

May 13, 1982

Scott Siwsher, M.D.
Chairman, Research Committee
St. Lawrence Hospital
Lansing, Michigan

Dear Dr. Swisher,

My colleague and I are pleased that we can move ahead on our research project at St. Lawrence Hospital. We are now in the process of submitting our proposal to the Human Subjects Review Committee at Michigan State, and have also scheduled our thesis proposal defense within the School of Nursing. We hope to do all data collection this summer.

Margaret Curtin mentioned to me that you wishes information about how we will protect patient confidentiality in our study. We have considered this issue carefully and believe we have insured confidentiality in the following ways.

All charts will be audited within the medical records department. Only Sandra Hayes and myself will be collecting data.

We will initially examine all charts of primagravidas to determine which patients meet our research criteria. Once we have picked the suitable charts, we will transcribe data from them to our research tool. I have included a copy of this tool for you to examine.

No patient name or address will be copied from the chart to our research instrument. We will use only a coding number for use in our data analysis.

I hope I have satisfied your concerns about patient confidentiality in our research project. If you have any further questions, please call me, either at work (353-4964) or at home (655-4449).

We plan to complete this project, including data analysis and conclusions Winter term, 1983. We will send you a copy of our results at that time.

Thank you again for your help.

Sincerely,

Barbara Sparks

cc: Margaret Curtin

Figure A4. Communication to Nursing Office

Margaret E. Curtin, RN
Assistant Director-Nursing
Department Head, Labor &
Delivery
St. Lawrence Hospital
Lansing, MI 48914

May 13, 1982

Dear Maggie,

We have enclosed a copy of our letter to Dr. Swisher, plus a copy of the tool we will be using to collect data.

Our thesis proposal defense is scheduled for May 26. Spring term is finished June 12. Hopefully by that time our project will be approved by Human Subjects Review.

Shortly after that we will be contacting you and Myra about several process issues, like who we work with in medical records, meeting with the staff nurses in L & D, and our projected timetable. We are still hoping to spend some hours in the Labor & Delivery area, as you suggested. Summer should give us both more time to arrange that.

As always, if you have any questions, please feel free to call. We are delighted to be moving foreward on this project, particularly at St. Lawrence!

Sincerely,

Barbara Taylor Sparks

Sandra Hayes

Figure A5. Communication to Human Subjects Review Committee, M.S.U.

May 10, 1982

Dr. Henry E. Bredick
Chairman, UCRIHS
238 Administration Building
Michigan State University
East Lansing, Michigan 48824

Dear Dr. Bredick:

My colleague, Barbara Sparks, and I are graduate students in the MSU College of Nursing. We are conducting a research project for partial fulfillment of the requirements for a Masters degree in Nursing Science.

As is required by University policy, we are now applying to UCRIHS for approval of our data collection procedures.

We are applying for exempt status according to category #5 as listed in the January, 1981 issue of the Federal Register, Research Development Memo July 10, 1981.

Our study is a retrospective chart review of obstetric patients who have delivered at St. Lawrence Hospital, Lansing, Michigan. We will have no contact with the patients and there will be no way to identify the patient from the information abstracted onto our data collection tool.

We have already received a consent from Dr. Scott Swisher, Chairman, Research Committee, St. Lawrence Hospital for data collection at that institution.

If you have any further questions concerning our project, please contact me or my colleague.

Thank you for your consideration in this matter.

Sincerely,

Barbara Sparks
7995 Lovejoy Road
Perry, Mich 48872
655-4449

Sandra Lee Hayes
2412 Post Oak Lane
Lansing, Mich 48912
484-3306

Figure A6. Permission From Human Subjects Review Committee, M.S.U.

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824

June 1, 1982

Ms. Sandra Lee Hayes
2412 Post Oak Lane
Lansing, Michigan 48912

Ms. Barbara Sparks
7996 Lovejoy Road
Perry, Michigan 48872

Dear Ms. Hayes and Ms. Sparks:

Subject: Proposal Entitled, "The Relationship Between the Length of The Second Stage of Labor, and Birthing Position"

I am pleased to advise that I concur with your evaluation that this project is exempt from full UCRIHS review, and approval is herewith granted for conduct of the project.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to June 1, 1983.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to my attention. If I can be of any future help, please do not hesitate to let me know.

Sincerely,

Raymond W. Frankmann
Vice Chairman, UCRIHS

jms

cc: Dr. Given

APPENDIX B

COMMUNICATION WITH NURSING STAFF ST. LAWRENCE HOSPITAL

Figure B1. Communication From Nursing Office to Labor and Delivery Department

MEMO

TO: Myra Bayes RN, Head Nurse--L & D
Nursing Staff, L & D

FROM: Margaret E. Curtin RN, Assistant Director--Nursing

DATE: July 1, 1982

SUBJECT: Nursing Research Project

"Compares timing of second stage of labor in women using the recumbant/upright position."

It is with pleasure and anticipation that I introduce to you Barbara Sparks RN and Sandra Hayes RN, nurses in the graduate program at Michigan State University. The St. Lawrence Hospital Human Subjects Research Committee has authorized their research on "the Second Stage of Labor/ Birthing Chair" to be done thru the facilities of the Labor/Delivery Unit.

My pleasure is in seeing their involvement with our units, and my anticipation is the outcome of their work. I ask that you all cooperate with them by documenting the information they need to be retrieved in this manner:

The position of the patient will be documented on the line for comments on "2nd stage labor" of the Delivery Record form.

The use of the Birthing Chair will be noted by circling "chair" at the top of the Delivery Record form.

Thank you for your interest and cooperation.

MEC/mw

Figure B2. Introductory Letter to Labor and Delivery Staff

1210 WEST SAGINAW
LANSING, MICHIGAN 48914

TELEPHONE
AREA CODE 517/372-3610

July 5, 1982

Nursing Staff
Labor & Delivery Unit
St. Lawrence Hospital

This letter is a brief introduction, to tell you who we are, and what our involvement with St. Lawrence Hospital is about.

We are graduate students in the College of Nursing at Michigan State University. Both of us have worked with obstetrical patients, and are interested in current controversies concerning their care.

We are particularly interested in the issue of patients' position in the second stage of labor. We plan to measure the timing of the second stage of labor, in both a recumbent position (on a delivery table) and an upright position (in a birthing chair). We wish to determine if the timing of the second stage is shorter in an upright position than in a recumbent position.

We plan to collect this information from charts of the Labor and Delivery Unit at St. Lawrence Hospital. We also understand there is some concern about perineal edema in women who use the birthing chair. We will compile information about this issue also.

We hope the information we gather about patients in your Labor and Delivery unit will be useful to you, to help you provide optimum nursing care and teaching to patients considering various positions for labor and birth.

Most of the information we need is routinely documented on your charts. We need to ask you to document just two more things: position used in the second stage of labor, and use of the delivery table or birthing chair.

We plan to meet with you next week during your report times. Our goal is two fold:

1. To meet you and describe our study to you.
2. To hear your suggestions concerning our study, and to find out from you how we can gather the information we need in the most efficient way.

We are both aware of the pressure of your job, and that patient care needs are unpredictable in Labor and Delivery. Although we need your help to accomplish our study, we plan to set it up so that it takes very little extra time or documentation on your part.

Table B2 (Con't)

Perhaps next week we can also discuss the best way to share the results of this study with you, so that they can be easily applied to the patient care issues that you deal with in your work.

Sincerely

Barbara Sparks RN

Barbara Sparks RN

Sandra Hayes, R.N.

Sandra Hayes RN

BS/SH/mw
cc: Dr. Swisher

APPENDIX C

STATISTICAL INFORMATION ON STUDY BY HAYES

Table C1

Age Distribution of Women
in the Recumbent Position (N = 21)

Age, Years	Number of Subjects	Percentage
17	1	4.8
18	2	9.5
22	1	4.8
23	5	23.8
24	5	23.8
25	1	4.8
26	2	9.5
28	2	9.5
31	1	4.8
33	1	4.8
	TOTAL 21	100.0

Mean = 24.1 years

Median = 23.8 years

Mode = 23.0 years

Standard Deviation = 3.8 years

Table C2

Frequency Distribution of the Intervening Variables in the Recumbent Position (N = 21)

Variable	Number of Subjects	Percentage
Marital Status		
Married	19	90.5%
Single	2	9.5%
Total	21	100.0%
Race		
White	20	95.2%
Unknown	1	4.8%
Total	21	100.0%
Type of Physician		
OB/GYN	18	85.7%
Family Practice	3	14.2%
General Practice	0	
Total	21	100.0%
Type of Classes		
Lamaze	8	38.1%
Expectant Parents	11	52.4%
Type Unknown	2	9.5%
Total	21	100.0%

Table C2 (Con't)

Variable		Number of Subjects	Percentage
Episiotomy			
Yes		18	85.8%
No		3	14.2%
	Total	21	100.0%
Laceration			
Yes		8	38.1%
No		13	61.9%
	Total	21	100.0%
Fetal Monitor			
Yes		18	85.8%
No		3	14.2%
	Total	21	100.0%
Rupture of Membranes			
Artificial		9	42.9%
Spontaneous		12	57.1%
	Total	21	100.0%
Physician			
Own		18	85.8%
On Call		3	14.2%
	Total	21	100.0%

Table C3

Frequency Distribution of the Incidental Variables in the Recumbent Position (N = 21)

Variable	Number of subjects	Percentage
Gravidity		
Gravida 1	18	85.7
Gravida 2	3	14.2
Total	21	100.0
Source of Patient		
Clinic patient	0	
HMO patient	8	38.1
Private patient	13	61.9
Total	21	100.0
Fetal Position		
LOA	6	28.8
LOP	1	4.8
ROA	3	14.2
OA	10	47.4
Unknown	1	4.8
Total	21	100.0

Table C3 (Con't)

Variable	Number of subjects	Percentage
Monitor type		
External only	15	71.5%
Internal only	1	4.8%
Both	2	9.5%
Neither	3	14.2%
Total	21	100.0%
Apgar @ 1 minute		
5	1	4.8%
6	0	
7	2	9.5%
8	14	66.6%
9	4	19.1%
Total	21	100.0%
Apgar @ 5 minutes		
8	4	19.2%
9	16	76.0%
10	1	4.8
Total	21	100.0%

Table C3 (Con't)

Variable	Number of subjects	Percentage
Stage of ROM		
1st	14	66.7%
2nd	1	4.8%
Before 1st	6	28.5%
Total	21	100.0%
IV fluids		
Yes	3	14.2%
No	18	85.8
Total	21	100.0%

Table C4

Length in Minutes of the Second Stage of Labor of Women in the Recumbent Position (N = 21)

Time in Minutes	Number of Subjects	Percentage
14	1	4.8
20	1	4.8
22	1	4.8
30	2	9.5
31	1	4.8
32	1	4.8
36	1	4.8
40	1	4.8
41	1	4.8
42	1	4.8
43	1	4.8
51	2	9.5
54	1	4.8
61	1	4.8
67	1	4.8
68	1	4.8
69	1	4.8
78	1	4.8
98	1	4.8
Total	21	100.0

Mean = 46.6 minutes

Median = 42.0 minutes

Mode = 30.0 minutes

Standard deviation = 21.1 minutes

Table C5

Correlation Values for Variables and the

Length of the Second Stage of Labor

Recumbent Position

Variable	r value	P value
Episiotomy	.02	.46
Age	.04	.44
Marital	.03	.44
On call MD	.22	.16
Childbirth ed	.08	.38
Laceration	.29	.11
Fetal monitor	.31	.09
Weight @ term	.07	.39

*Level of significance $P \leq .05$

REFERENCES

References

American Friends Service Committee: Society of Friends. Who Shall Live? Man's Control over Birth and Death; A Report. New York: Hill & Wang, 1970.

Andrews, C. Changing Fetal Position. Journal of Nurse-Midwifery, 1980, 25(1), 7-11.

Arms, S. Immaculate Deception. Boston: Houghton Mifflin Co., 1975.

Atlee, H. Natural Childbirth. Springfield, Illinois: Charles C. Thomas Publisher, 1956.

Atwood, R. Parturitional Posture and Related Birth Behavior. ACTA Obstetrics Gynecology Scandinavia (Sweden). Supplement #57, 1976.

Bainbridge, M., Nixon, W. & Smyth, C. The Effect of Rupture of Membranes Upon Length of Labour. Journal of Obstetrics and Gynecology of the British Commonwealth, 1958, 65, 189-199.

Baker, I., Personal Communication. May, 1983.

Banta, H. & Thacker, S. Costs and Benefits of EFM: A Review of the Literature. NCHSR Research Report Services, Washington, D.C.: DHEW, Publication #79-3245, 1979.

Bayes, M. & Curtin, M. Personal Communication. May, 1982.

Beck, C. Patient Acceptance of Fetal Monitoring as a Helpful Tool. JOGN Nursing, 1980, 9(6), 350-353.

Beck, N. & Siegel, L. Preparation for Childbirth and Contemporary Research on Pain, Anxiety, and Stress Reduction: A Review and Critique. Psychosomatic Medicine, 1980, 42(4), 429-447.

Bergsjo, P., Bakketeig, L., & Eikhom, S. Duration of Labour with Spontaneous Onset. ACTA Obstetrics Gynecology Scandinavia, 1979, 58, 129-134.

Bergsjo, P., & Halle, C. Duration of the Second Stage of Labour, ACTA Obstetrics Gynecology Scandinavia, 1980, 59, 193-196.

Borg, W. & Gall, M. Educational Research (3rd ed.). New York: Longman, Inc., 1979, 404-430, 474-490.

Boston Women's Health Collective. Our Bodies, Our Selves (2nd ed.). New York: Simon & Schuster, 1979.

Bryant, R. & David, D. Conduct of Normal Labor. In David N. Danforth (Ed.), Textbook of Obstetrics and Gynecology (2nd ed.). New York: Harper & Row, Publishers, 1971.

Buchan, P. Emotional Stress In Childbirth, and its Modification by Variations in Obstetrical Management. ACTA Obstetrics Gynecology Scandinavia, 1980, 59, 319-321.

Caldeyro-Barcia, R. The Influence of Maternal Position on Time of Spontaneous Rupture of the Membranes, Progress of Labor, and Fetal Head Compression. Birth and the Family Journal, 1979, 6(1), 7-15.

Caldwell, N. & Moloy, M. Anatomical Variations in the Female Pelvis and Their Effect on Labor With a Suggested Classification. American Journal of Obstetrics and Gynecology, 1933, 26(4), 479-502.

Clark, A. & Affonso, D. (with Harris, T.) Childbearing: A Nursing Perspective. Philadelphia: F. A. Davis Company, 1979, 345-471.

Clark, M. & Gosnell, M. Childbirth Sitting Up. Newsweek, March 2, 1981, 79-80.

Cogan, R. & Edmunds, E. The Unkindest Cut? Journal of Nurse-Midwifery, 1978, 23(3), 17-20.

Conklin, M. & Simmons, R. Planned Home Childbirths: Parental Perspectives. Health Monograph Series No. 2, Lansing, Michigan: Michigan Department of Public Health, 1979.

Corea, G. The Hidden Malpractice: How American Medicine Treats Women As Patients and Professionals. New York: Morrow, 1977.

Cumulative Index to Nursing and Allied Health Literature. DeLauna Lockwood, Editor. Glendale, California: Glendale Adventist Medical Center, 1970-May/June, 1982.

Devitt, N. The Transition from Home to Hospital Birth in the U.S., 1930-1960. Birth and The Family Journal, 1977, 4(2), 47-58.

Dorland's Illustrated Medical Dictionary (24th ed.). Philadelphia: W. B. Saunders Company, 1965.

Duignan, N., Studd, J. & Hughes, A. Characteristics of Normal Labor In Different Racial Groups. British Journal of Obstetrics and Gynecology, 1975, 82(8), 593-601.

Dutton, A. Excesses of Modern Obstetrics: The Mother's Dilemma. Nursing Mirror, January 26, 1978, 146, 28-29.

Dye, N. History of Childbirth in America. Signs: Journal of Women in Culture and Society, 1980, 6(10), 97-108.

Fitzpatrick, E., Reeder, S. & Mastrone, L. Maternity Nursing (12th ed.). Philadelphia: J. B. Lippincott Company, 1971, 258, 631.

Friedman, E. & Sachtleben, M. Ammiotomy and the Course of Labor. Obstetrics and Gynecology, 1963, 22(6), 755-770.

Garcia, C. & Garcia, E. Epinepherine-Like Substances in the Blood and Their Relation to Uterine Inertia. American Journal of Obstetrics and Gynecology, 1955, 69(4), 812-817.

Gilder, S. Posture in Labour (Editorial). South African Medical Journal, 1977, 52(12), 467.

Gillette, E. Point of View. Ethicon, 1982, 19(1), 7.

Given, B. Florence Nightingale--Class Lecture, NE 570, East Lansing, Michigan: Michigan State University, October 21, 1981.

Green, M. Centers for Natural Childbirth. Country Journal, 1983, 10(2), 34-39.

Gross, T., Sokol, R. & King, K. Obesity in Pregnancy: Risks and Outcomes. Obstetrics and Gynecology, 1980, 56(4), 446-450.

Haire, D. The Cultural Warping of Childbirth. Special Report to the International Childbirth Education Association. Larimie, Wyoming: ICEA, 1972. 1-35.

Harrison, M. A Woman in Residence. New York: Random House, 1982.

Hayes, S. An Investigation of the Relationship Between the Recumbent Position and the Second Stage of Labor. Unpublished masters thesis, Michigan State University, 1983.

Hays, W. Statistics for the Social Sciences (2nd ed.). New York: Holt, Rinehart and Winston, 1973, Chapter 10.

Hellman, L. & Prystowsky, H. The Duration of the Second Stage of Labor. American Journal of Obstetrics and Gynecology, 1963 61(6), 1223-1233.

Holmes, R. The Fads and Fancies of Obstetrics. American Journal of Obstetrics and Gynecology, 1921, 2, 228.

Howard, F. Delivery in the Physiologic Position. Journal of Obstetrics and Gynecology, 1958, 11(3), 318-323.

Hugo, M. A Look at Maternal Position During Labor. Journal of Nurse-Midwifery, 1977, 22(2), 22-26.

International Childbirth Education Association Review. Susan McKay, Editor. 1978, 2(3).

Index Medicus. Bethesda, Maryland: U.S. Department of Health and Human Services, Public Health Service, National Institute of Health, 18-23(6).

International Nursing Index. Philadelphia: Thelma Schorr, Publisher, American Journal of Nursing Company, 5-17(2).

Isselbacker, K., Adams, R., Braunwald, E., Petersdorf, R. & Wilson, J. Harrison's Principles of Internal Medicine (9th ed.). New York: McGraw-Hill Book Company, 1980, 1342.

Jensen, M., Benson, R., & Bobak, I. Maternity Care: The Nurse and The Family (2nd ed.). St. Louis: C. V. Mosby Company, 1981, 316, 432, 956.

Jordon, B. Birth In Four Cultures. Montreal, Canada: Eden Press Women's Publication, 1980.

Juhasz, J. & Kelker, R. High Risk Pregnancy. In J. Clausen et al., (Editors), Maternity Nursing Today. New York: McGraw-Hill Book Company, 1973, 486-499.

Kaplan, E. Family Weekly. Lansing State Journal, May 2, 1982, 26.

Kirschbaum, T. Personal Communication, December, 1982.

Lansing Area Doctors Directory. Lansing, Michigan: Michigan State University College of Urban Development--Impression Five, 1979/1980.

Laros, R., Work, B. & Witting, W. Amniotomy During the Active Phase of Labor. Obstetrics and Gynecology, 1972, 39(6), 702-704.

Lederman, R., Lederman, E., Work, B. & McCann, D. The Relationship of Maternal Anxiety, Plasma Catecholamines, and Plasma Cortisol to Progress in Labor. American Journal of Obstetrics and Gynecology, 1978, 132(5), 495-500.

Lederman, R., Lederman, E., Work, B. & McCann, D. Relationship of Psychological Factors in Pregnancy to Progress in Labor. Nursing Research, 1979, 28(2), 94-97.

Leitch, C. & Tinker, R. Primary Care. Philadelphia: F. A. Davis Company, 1978, 251-253.

Lerch, C. Maternity Nursing (2nd ed.). St. Louis: C. V. Mosby Company, 1974, 48, 121-145, 224-229.

L'Esperance, C. Home Birth--A Manifestation of Aggression? JOGN Nursing, 1979, 8(4), 227-230.

Levy, B., Wilkerson, F. & Marine, W. Reducing Neonatal Mortality Rates with Nurse Midwives. American Journal of Obstetrics and Gynecology, 1971, 109(1), 50-58.

Liu, Y. Effects of An Upright Position During Labor. American Journal of Nursing, 1974, 74(12), 2202-2205.

Liu, Y. Position During Labor and Delivery: History and Perspective. Journal of Nurse-Midwifery, 1979, 24(3), 23-26.

Lowensohn, R., Paul, R., Fales, S., Yeh, S. & Hon, E. Intrapartum Epidural Anesthesia: An Evaluation of Effects on Uterine Activity. Obstetrics and Gynecology, 1974, 44(3), 388-393.

Lynaugh, K. The Effects of Early Elective Amniotomy on the Length of Labor and the Condition of the Fetus. Journal of Nurse-Midwifery, 1980, 25(4), 3-9.

McKay, S. Maternal Position During Labor and Birth. ICEA Review, 1978, 2(3), 1-2.

McKay, S. Maternal Position During Labor and Birth: A Reassessment. JOGN Nursing, 1980, 9(5), 288-291.

McKay, S. Humanizing Maternity Services Through Family Centered Care. Minneapolis, Minnesota: International Childbirth Education Association, 1982.

McManus T. & Calder, A. Upright Posture and Efficiency of Labor. Lancet (Letter), 1978, 8055(1), 72-74.

Martin, L. Health Care of Women. Philadelphia: J. B. Lippincott Company, 1978, 153.

Maslow, A. Motivation and Personality. New York: Harper and Row, Inc., 1954.

Miller, B. & Keene, C. Encyclopedia and Dictionary of Medicine and Nursing, Philadelphia: W. B. Saunders and Company, 1972, 541.

Moir, J. Munro Kerr's Operative Obstetrics (7th ed.). Baltimore: The Williams and Wilkins Company, 1964.

Murray, R. & Zentner, J. Nursing Concepts For Health Promotion. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1975, 135-155.

Naroll, F., Naroll, R. & Howard, F. The Position of Women in Childbirth. American Journal of Obstetrics and Gynecology, 1961, 82(4), 953.

Nightingale, F. Notes on Nursing: What It Is and What It Is Not. London: Harrison, 59, Pall Mall, Bookseller To The Queen, 1859, Reprint, Philadelphia: J. B. Lippincott Company, 1946.

Noble, E. Controversies In Maternal Effort During Labor and Delivery. Journal of Nurse-Midwifery, 1981, 26(2), 13-22.

Nolan, H. Lay Midwives Fill the "Natural Void". Health Care News, May 26, 1982, 14-15.

Norwood, C. Delivering Babies the Old Fashioned Way. New York, August 23, 1982, 66.

Notelovitz, M. Commentary. ICEA Review, 1978, 2(3).

Olds, S., London, M., Ladeqig, P. & Davidson, S. Obstetric Nursing. Menlo Park, California: Addison-Wesley Publishing Company, 1980, 234, 344, 432.

Otten, C. Rebirth of the Birthing Chair. Saturday Evening Post, January/February, 1982, 69-73.

Oxorn, H. & Foote, R. Human Labor and Birth (2nd ed.). New York: Appleton-Century-Crofts, 1968, 32-37.

Palmer, I. Florence Nightingale--Reformer, Reactionary, Researcher. Nursing Research, 1977, 26(2), 84-89.

Pearse, E. The Image of the Obstetrician Gynecologist. Obstetrics and Gynecology, 1976, 48(5), 611-612.

Polit, D. & Hungler, B. Nursing Research, Principles and Methods. Philadelphia: J. B. Lippincott Company, 1978, 507-526, 537-561.

Pridham, K. & Schutz, M. Parental Goals and the Birthing Experience. JOGN Nursing, 1983, 12(1), 50-55.

Pritchard, J. & MacDonald, P. Williams Obstetrics (16th ed.). New York: Appleton-Century-Crofts, 1980, 415, 684-685, 695, 740.

Roberts, J. Alternative Positions for Childbirth--Part II: Second Stage of Labor. Journal of Nurse-Midwifery, 1980, 25(5), 13-19.

Roberts, J. Personal Communication, April, 1983.

Roberts, J. & Mendez-Bauer, C. A Perspective of Maternal Position During Labor. Journal of Perinatal Medicine, 1980, 8, 255-263.

Roux, J. Labor Monitoring and Fetal Outcome. Obstetric and Gynecologic Annual, 1976, 5, 139-165.

Russell, J. The Rationale of Primitive Delivery Positions. British Journal of Obstetrics and Gynecology, 1982, 89(9), 712-715.

Sosa, R., Kennell, J., Klaus, M., Robertson, S. & Urrutia, J. The Effect of a Supportive Companion on Perinatal Problems, Length of Labor, and Mother-Infant Interaction. The New England Journal of Medicine, 1980, 303(11), 597-600.

Sparks, B. The Use of Technology in Childbirth. Unpublished paper, 1981, NE 566, Michigan State University.

Sparks, B. An Investigation of the Relationship Between the Upright Position and the Second Stage of Labor. Unpublished masters thesis, Michigan State University, 1983.

Stanton, M. The Myth of Natural Childbirth. Journal of Nurse-Midwifery, 1979, 24(2), 25-29.

Thom, M., Chan, K. & Studd, J. Outcome of Normal and Dysfunctional Labor In Different Racial Groups. American Journal of Obstetrics and Gynecology, 1979, 135(4), 495-498.

Torres, G. Florence Nightingale. In J. George (Chairperson), Nursing Theories: The Base for Professional Nursing Practice. New Jersey: Prentice-Hall, Inc., 1980, 27-38.

Walczak, J. Personal Communication, December, 1982.

Wilkerson, B. The Second Stage of Labor. In J. Clausen et al., (Editors), Maternity Nursing Today. New York: McGraw-Hill Book Company, 1973, 727-761.

Willis, S. Hypertension in Pregnancy: Pathophysiology. American Journal of Nursing, 1982, 82(5), 791-797.

Willson, I., Beecham, C. & Carrington, E. Obstetrics and Gynecology (5th ed.). St. Louis: C. V. Mosby Company, 1975, 460-480.

World Health Organization Statistics Annual. Pregnancy Outcome Statistics for Selected Countries, 1979, Table 5, 16ff.