THE EFFECTS OF EFFLEURAGE
AS A NURSING INTERVENTION
TO PROMOTE PRENATAL ATTACHMENT

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THE EFFECTS OF EFFLEURAGE AS A NURSING INTERVENTION

TO PROMOTE PRENATAL ATTACHMENT

by

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ABSTRACT

The purpose of this study was to examine the effects of effleurage on prenatal attachment. A quasi-experimental research design was used for the study. A group of 49 pregnant women who attended childbirth education classes at a medical center in the Midwest participated in the study. The experimental group consisted of 16 pregnant women who were taught the intervention of effleurage. The control group consisted of 33 pregnant women who were not taught the intervention.

Three research hypotheses were posed for the study. The first research hypothesis was: Pregnant women in the experimental group who use the intervention of massage will demonstrate a significantly greater increase between pretest/posttest PAI scores than pregnant women in the control group. With an alpha set at .05, an independent t-test of the mean differences between the pretest/posttest scores for the experimental and control groups revealed $t = 1.634$, $p = 0.056$. This hypothesis was not supported.

The second research hypothesis was: Pregnant women in the experimental group who use the intervention of massage will have significantly higher posttest scores than women in the control group. With an alpha set at .05, an independent t-test revealed $t = 1.11$, $p = 0.14$. There was no significant difference between the posttest PAI scores of the experimental and control groups.

The third hypothesis was: There is no relationship among the demographic variables of maternal age, marital status, education level, perceived social support, number of other living children, and race/ethnicity and PAI scores. Social support was the only moderate correlation noted ($r = 0.311$). There was no statistically significant relationship between PAI scores and the demographic variables of maternal age ($r = -0.105$), marital status ($r = -0.006$), educational level ($r = -0.015$), number of children ($r = -0.113$), race/ethnicity ($r = -0.008$), or gestational age ($r = 0.028$).

The literature revealed a lack of prenatal attachment intervention studies and conflicting results of studies correlating prenatal attachment and demographic variables. Recommendations were made for more studies that test a variety of nursing interventions that promote prenatal attachment. Conceptual clarification is needed, which would enhance both tool refinement and prenatal attachment theory development.

Implications of the study for advanced nursing practice include incorporating emerging prenatal attachment interventions into general nursing practice, nursing education, and childbirth education. Intervening through social support as a way to promote prenatal attachment was discussed.

Supportive care during pregnancy and beyond is best accomplished with the help of an advanced practice maternal-child nurse. With a focus on the developing attachments throughout pregnancy, the nurse can "mother the mother" throughout her pregnancy and significant contributions can be made to the health of society by strengthening families.
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"With God, all things are possible." Matthew 19:26.
CHAPTER 1
INTRODUCTION
Scope of the Problem
"Loving a child is a circular business...the more you give, the more you get, the more you get, the more you want to give" (Leach, 1991, p. 103). Bonding and attachment are common concepts discussed in the healthcare and lay literature. The increased body of knowledge of attachment has resulted in many changes in healthcare practices during the past two decades. These changes include involving fathers and other family members during the puerperium, immediate contact between mother and baby following birth, and an increased amount of contact between families and baby during the newborn period.

Healthy postnatal attachments are correlated with emotionally, physically, and cognitively healthier babies (Ainsworth, 1982; Bowlby, 1988; Brazelton, 1982; Klaus & Kennell, 1982; Mercer, 1977; Trowell, 1982; Verny & Kelly, 1988). Sroufe (1983) reported that children with secure maternal attachments were more affectively positive and empathic toward others. Skolnick (1986) found that the quality of personal relationships across the life span were positively influenced by the maternal-infant relationship.

A review of the nursing literature reveals a limited number of research studies that have examined prenatal attachment. The studies that do exist provide conflicting conclusions with regard to the identification of variables that correlate with prenatal
attachment.

Cranley (1981) reported a strong positive correlation \( r = .51 \) involving social support and prenatal attachment. Mercer, Ferketich, May, DeJoseph, & Sollid (1988), however, reported only a modest positive correlation \( r = .23 \) that applied to low risk women only. Studies examining the relationship among demographic variables and attachment also have been inconclusive. Cranley (1981), Kemp & Page (1987), and Koniak-Griffin (1988) found no correlation among the demographic variables of number of pregnancies, self-esteem, socioeconomic status and prenatal attachment. Mercer et al. (1988) identified a positive correlation, but only for certain subgroups.

There are even fewer studies that have researched nursing interventions that might promote prenatal attachment. Kohn, Nelson, & Weiner (1980) and Milne & Rich (1981) researched the effect of ultrasound visualization of the unborn baby and prenatal attachment. Both studies found an increase in prenatal attachment following implementation of the intervention. Heidrich & Cranley (1989) and Kemp & Page (1987), however, found no correlation between ultrasound visualization of the unborn baby and prenatal attachment.

Carter-Jessop (1981) found a significant increase in postnatal attachment after implementing an intervention designed to make women more aware of their unborn babies. She developed a three-part nursing intervention that included: (1) maternal awareness of the unborn baby by use of palpation of the unborn
baby's parts and determination of position; (2) maternal awareness of the unborn baby's activity and how the mother can affect the activity; and (3) gentle abdominal massage over the unborn baby performed by the mother, especially during times of increased activity of the unborn baby. Replication of this study by Carson & Virden (1984) and Davis & Akridge (1987), however, found no such increase in postnatal attachment.

The intervention of massage has been used for thousands of years to heal and soothe the sick (Lidell, 1984). Massage has been known to benefit both the giver and receiver with increased relaxation and self-awareness (Harrison, 1986; Lidell, 1984). Other documented benefits of massage include improved sleep (Hefferman & Mott, 1984); improved oxygen capacity of the blood and improved lymph and blood circulation (Lawrence, 1986); decreased isolation (Dobbs, 1985); and facilitation of communication between practitioner and client (Dunbar & Redick, 1986).

Snyder (1992) defined the nursing intervention of massage as the manipulation of soft tissue for therapeutic intent. There are six strokes that can be used in massage. They are effleurage, petrissage, friction, vibration, percussion, and compression (Francon, 1960). Of particular interest in this study was the stroke of light effleurage. It has been reported to produce a soothing, calming effect (Cyriax, 1980). Francon (1960) recommended using effleurage for 5 to 20 minutes at a rate of about 15 strokes per minute for maximum benefit.
Nursing intervention studies promoting prenatal attachment, communication, and interaction between a mother and her unborn baby are relatively few. Although the relationship between massage and attachment postnatally is highly supported (Ainsworth, 1982; Bowlby, 1969; Brazelton, 1982; Klaus & Kennell, 1982; Rubin, 1977; Verny & Kelly, 1988), no studies have specifically examined the relationship between massage and prenatal attachment. It would seem that because of the potential benefits that may result from the implementation of massage postnatally, a study that examined the relationship between massage and prenatal attachment could provide valuable knowledge to enhance the nursing care of the maternal-child population.

Purpose of the Study

The purpose of this study was to explore if prenatal attachment is enhanced through increased (purposeful) communication and interaction between pregnant women and their unborn babies. Specifically, the study examined if implementation of the intervention of massage would increase prenatal attachment of pregnant women. In addition, the relationship among demographic variables of pregnant women and prenatal attachment was examined.

Research Hypotheses

The three hypotheses tested in this study were:
1. Pregnant women in the experimental group who use the intervention of massage will demonstrate a significant increase between pretest/posttest Prenatal Attachment Inventory (PAI)
scores than pregnant women in the control group.
2. Pregnant women in the experimental group who use the intervention of massage will have significantly higher posttest PAI scores than the pregnant women in the control group.
3. There is no relationship among the demographic variables of age, marital status, education level, perceived social support, number of other living children, and race/ethnicity and PAI scores.

Definition of Terms

The terms used for this study were defined as follows:

**Experimental group** - Pregnant women, with uncomplicated pregnancies, who attended a prenatal childbirth education course offered by a medical center located in the Midwest. The women were instructed to perform effleurage for five minutes, two times a day.

**Control group** - Pregnant women who attended a prenatal childbirth education course offered by a medical center located in the Midwest. The women were not instructed to perform effleurage.

**Pregnant woman** - Third trimester with no significant health concerns.

**Unborn baby** - An in utero singleton, with no significant health concerns.

**Prenatal childbirth education course** - A course that meets once a week, for two hours, and lasts for six weeks. Content presented during the course included information on emotional changes and basic anatomy and physiology of the pregnant woman during
pregnancy, labor, and delivery. Comfort measures, such as position changes, breathing and relaxation techniques, and back massage also were discussed.

**Prenatal attachment** - Prenatal attachment was conceptually defined as a developmental affectional relationship between a pregnant woman and her unborn baby. Prenatal attachment was operationally defined as a score that was measured by the **Prenatal Attachment Inventory (PAI)** (Muller, 1989).

**Massage** - Massage was defined as "any systematic form of touch which has been found to give comfort or to promote good health" (Maxwell-Hudson, 1984, p. 7). The specific massage stroke used was effleurage. It was performed for five minutes, two times each day, according to a protocol developed by the researcher.

**Demographic variables** - For the purposes of this study, age, marital status, education level, perceived social support, number of other living children, and race/ethnicity were the demographic variables studied.

**Overview of Conceptual Framework**

The conceptual framework for this study was the concept of attachment. Ainsworth (1973) defined attachment as "an affectional tie that one person forms to another specific person, binding them together in space and enduring over time" (p. 1). Rubin (1977) described the process of binding-in, which is her term for bonding or attaching. She viewed it not as a state but a process that begins prenatally. Attachment is described as rhythmical, interactive, and reciprocal between mother and baby
(Brazelton, 1978). The communication pathways developed prenatally influence the rhythmicity after delivery. Fuller (1990) believed that concern for and awareness of the unborn baby positively influenced the relationship between mother and baby after delivery.

Bowlby (1980) described attachment behavior as actions that result in maintaining proximity to a preferred person. This behavior then leads to the affective attachment bond. Attachment behavior serves the purpose of species survival (Bowlby, 1969) and is viewed as crucial to the survival and health of the baby and development of future relationships. It is believed that initially, attachment forms between baby and parent and later between adults. Attachment behavior and attachment bonds exist throughout the life cycle (Bowlby, 1969).

Klaus and Kennel (1976) noted a sensitive period immediately after birth. They stated that a close attachment between a mother and her baby is crucial in the survival and health of the baby. The quality of this bond is thought to affect future relationships of the baby.

Initial Review of the Literature

Several studies have reported a correlation between prenatal attachment and postnatal attachment. Hauck (1986), Leifler (1977), and Shereshefsky & Yarrow (1973) reported that prenatal attachment was found to be a good indicator of postnatal attachment. In a qualitative study, Stainton (1990) concluded that sensitivity to the unborn baby develops prenatally. This
sensitivity becomes a part of attachment.

Mercer & Ferketich (1994) studied differences in maternal-infant attachment between primiparas and experienced mothers. Several different instruments were used to obtain data about a variety of variables. Some of the variables examined included maternal competence, self-esteem, depression, state anxiety, maternal attachment, and prenatal attachment. Maternal attachment postpartum was measured by Leifer’s (1977) scale, How I Feel About My Baby Now. Prenatal attachment was measured by Cranley’s (1981) Maternal-Fetal Attachment Scale (MFAS). The researchers found that in primiparas, attachment and involvement with the unborn baby is a predictor of postnatal attachment, whereas multiparas had low prenatal attachment scores. Primiparas and multiparas had similar maternal-infant attachment scores.

Another study that is cited frequently in the literature is that of Carter-Jessop (1981). The purpose of this study was to determine how the three-part prenatal attachment intervention, discussed earlier, increased maternal attachment behaviors postnatally. The sample included 10 primiparas, five in the control group and five who were administered the prenatal intervention. The number of attachment behaviors was noted in each mother two to four days postpartum. A significant difference was found between the frequency of attachment behaviors in the two groups. The experimental group had twice as many attachment behaviors as the control group.
The tool used for measurement of attachment behavior was developed by Carter-Jessop and called the Postnatal Attachment Test (1981). The tool consisted of a list of nine categories of attachment behaviors that were identified by Klaus, Kennell, Plumb, & Zuehlke (1970). Validity and reliability testing were not reported on this tool.

Fuller (1990) found that prenatal attachment was related positively to mother-infant interaction. Cranley's (1981) Maternal Fetal Attachment Scale (MFAS) was administered to 32 low risk mothers who were in their third trimester. Each mother was observed two times while feeding her baby, once on the second day and once on the third day postpartum. The subjects were then rated on two instruments, the Nursing Child Assessment Feeding Scale (NCAFS) (Barnard, 1978) and the Funke Mother-Infant Interaction Assessment (FMIIA) (Funke-Furber, 1978). Quantitative data also were gathered so that personal meaning could be given to the observed behaviors. Results showed strong positive correlation between the MFAS and the postpartum scores of the NCAFS \( r = .73 \) and the FMIIA \( r = .69 \). The qualitative information was gathered prenatally and also postpartum. Most mothers were stimulated to give unsolicited details and ask questions related to their interest in the baby at each interview. The mothers who asked fewer questions were ones who scored lower on the postpartum instruments. Fuller concluded that the prenatal involvement or attachment may assist the mother to be more sensitive to the baby after delivery.
Significance for Advanced Nursing Practice

The rapidly changing health care system is creating many maternal-child attachment issues. The concept of family is now being recognized by the government and society as an integral, important part of being and growing. The long-awaited Family Leave Act is but a small step in efforts toward effective attachment among all family members. Also recognized is an increased awareness of violence, not only in the streets, but within families. Stronger attachment ties, beginning prenatally, may promote a decrease in child abuse and neglect (Cranley, 1981; Gaffney, 1988a; Gaffney, 1988b).

Many maternal-child populations have limited access to prenatal care. In lower socioeconomic inner city and rural areas where there are limited obstetrical physicians or advanced practice nurses, such as nurse practitioners or certified nurse midwives, and a lack of transportation, some pregnant women may be unable to attend essential prenatal visits. Many pregnant women are uninsured or underinsured, therefore making it economically difficult to attend prenatal visits. In addition, some pregnant women may seek prenatal care late in their pregnancy due to cultural issues. This lack of prenatal care may result in a significant decrease in the amount of time that prenatal nursing care can be delivered to pregnant women.

Third party reimbursement also has influenced the limited medical and nursing contact that some pregnant women have due to shorter hospital stays. Specifically, postpartum stays can be
less than eight hours. There is limited in-hospital postpartum time to perform assessments of attachment and teach attachment interventions. Essential postpartum self-care and baby-care information must, therefore, be presented prenatally.

With the shortened hospital stays, studies are needed that examine nursing interventions that can be taught and implemented during the prenatal period to promote attachment. By increasing the body of knowledge of prenatal attachment, risk factors that may disrupt attachment may be identified and effective nursing interventions may be offered that promote attachment during the intrapartum period.

Just as a baby’s life does not begin at birth, neither does the relationship between a mother and her unborn baby. "Birth, rather than being the beginning, may represent an important event in a process that has begun during pregnancy and evolves as the child grows" (Fuller, 1990, p. 434). Trowell (1982) proposed that by understanding all parts of attachment, there can be facilitation of its growth and development, and interventions can be used when necessary.

"The mother is the most precious possession of the nation, so precious that society advances its highest well-being when it protects the functions of the mother" (Key, 1991, p. 68). The well-being of our society is advanced by providing scientifically-based prenatal nursing interventions to enhance the attachment functioning of mothers.
CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this study was to explore the effects of effleurage on prenatal attachment. This chapter contains two sections. Section one describes the conceptual framework used for the study. The second major section provides a pertinent review of the literature. A brief summary concludes the chapter.

Conceptual Framework

The conceptual foundation for this study was attachment. Knowledge from four researchers who have made significant contributions to the conceptual development of attachment were examined to facilitate understanding of the concept. The researchers included Bowlby, Ainsworth, Erikson, and Rubin.

The literature revealed that there are varied definitions of attachment. Webster's dictionary (1984) defined attachment as "a tie of loyalty or affection" (p. 46). Kennedy and Pfeifer (1979) defined the concept as desiring and maintaining nearness to another person. Ainsworth (1973) stated that attachment is "an affectional tie that one person forms to another specific person, binding them together in space and enduring over time" (p.1).

Koniak-Griffin (1988) conceptualized parent-child attachment as a compelling human experience influencing the affectional tie between mother and child. Olds, London, Ladewig, and Davidson (1980) described it as an attraction and tendency to nurture an infant. They proposed that the actions are consistent, intelligent, and sensitive. Positive feelings predominate.
Denehy (1992) more distinctly described attachment as an interactive, affectional bond between the infant and the primary caregiver.

Klaus and Kennell (1976) viewed attachment as a relationship between two people that is specific and continuous through time. They noted a critical period of attachment in the immediate postnatal period. Klaus and Kennell (1976) termed these first minutes and hours following birth as the maternal sensitive period in which the parents' attachment to their infant flourishes. During this time a sequencing pattern of touch characteristically begins (Klaus, Kennell, Plumb, and Zuehlke, 1970). First, the mother uses her fingertips to touch the infant's extremities. Touching then proceeds to palmar contact of the infant's body, with progression to encompassing the infant with her whole hand and arms.

Coffman (1992) delineated differences between attachment and the related concept of bonding. Attachment is viewed as the life-long bond of affection between a parent and child. Bonding, on the other hand, is perceived as the immediate parent-to-baby tie. Olds et al. (1980) concurred that bonding is the attraction peak that results immediately after delivery, when there is the first contact. Klaus and Kennell (1976) defined bonding as the process that occurs shortly after delivery in which a mother forms an affectionate attachment to her newborn. Successful bonding has been described as the development of parents' emotional relationship to their child, in which love predominates.
(Hopkins, 1988).

Koniak-Griffin (1988) identified that Deutsch (1945) originally proposed that pregnant women develop an emotional bond to their unborn baby. Rubin (1975) and Fuller (1990) agreed that attachment is a developmental process that begins in pregnancy. Mercer and Ferketich (1990) thoroughly described attachment as an interactive process that begins in pregnancy and involves behaviors that pursue and maintain closeness to and exchange gratifying experiences with the infant. The parent develops a life-time dedication to the infant.

Attachment theory was developed by Bowlby (1969), with major conceptual and methodological contributions from Ainsworth (1973). Bowlby used principles from a broad spectrum of disciplines including psychoanalysis (Freud), developmental psychology (Piaget), ethology (Hinde), evolution (Darwin), information processing, and cybernetics in formulating his theory (Bowlby, 1969; Bretherton, 1992).

As previously stated, Bowlby's attachment theory is heavily based in psychoanalytic theory. Concepts central to attachment theory that are grounded in psychoanalytic thinking are separation anxiety, object relations, defense, mourning, trauma, and sensitive periods in early life (Bowlby, 1969). Generally, psychoanalysts have agreed that a child’s first relationship is a critical foundation for personality development. There have been disagreements, however, on the origin and nature of this relationship.
Before the development of attachment theory, Bowlby was commissioned by the World Health Organization to write a report describing the mental health of postwar European homeless children. He studied with many researchers and practitioners in the United States and Europe (Bretherton, 1992).

In the report, Bowlby’s major proposition was that there needs to be a continuous relationship between baby (and young child) and the mother, or a permanent substitute for her, for healthy mental development to occur. This relationship needs to be mutually satisfying, involving intimacy and warmth (Bowlby, 1951).

This proposition was antithetical to psychoanalytic thinking. At that time, the most widely accepted thought of psychoanalysts and learning theorists was the Secondary Drive Theory, also known as "the cupboard-love theory of object relations" (Bowlby, 1969, p. 178), where the object is the mother. This theory stated that the baby becomes attached to the mother because she meets the physiological needs of the baby, particularly feeding. The baby learns that the mother will be the source of gratification. The satisfaction of needs is seen as primary (developing autonomously), whereas the child’s tie to the mother is seen as developing secondarily (derived as a learned process from a more elementary system, specifically, needs satisfaction). This major difference led Bowlby to develop the theoretical explanation of attachment behavior.
Bowlby (1969; 1980) viewed attachment behavior as an instinct. His concept of instinct differed from Freud's in that he believed instinctive behavior could change, depending on the internal and external environment of the organism. The ability to alter instinctive behavior was viewed as accomplished through control systems (Bowlby, 1969).

Control systems use feedback to constantly process information that comes in and relate it to the current behavior. In complex organisms such as humans, this control system leads to goal-corrected behavior (behavioral changes regulated by processing information, through insight, and adjusting behavior accordingly). The information can be assessed at a high level in the central nervous system, so that the behavior can be selected and organized as a plan with a set-goal. There may be a hierarchy of plans or many sub-plans (each with its own set-goal) that contribute to the master plan (Bowlby 1969).

With control systems, instinctive behavior is not rigid. A person develops the ability to plan and construct internal models of themselves and their environment. These working models or hypotheses make it possible for the person to understand and predict the behavior of others and how set-goals might be achieved (Bowlby, 1969).

Bowlby (1969) maintained that attachment is a social behavior that is independent of other behavioral systems, such as feeding behavior and sexual behavior, yet equally valuable to human survival. He viewed attachment behavior as having a
"biological function specific to itself" (p. 179). The ultimate outcome of any instinctive behavioral system is survival of the population. The specific function that attachment contributes to survival of the population is by reducing the risk of harm from predators through maintenance of proximity (Bowlby, 1969). In the adult, there is a complementary system called maternal or parental behavior that facilitates caregiving and protection of the baby.

Bowlby (1980) defined attachment behavior as "any form of behavior that results in a person attaining or retaining proximity to some other differentiated and preferred individual" (p. 39). He stated that the behavioral systems controlling attachment behavior become goal-corrected early in life. Thus survival is promoted through maintaining proximity of the mother to the child and the child to the mother.

As with any instinct, it is believed that attachment behavior occurs only when needed. Attachment behavior is needed when certain behavioral systems are activated. The behavioral systems responsible for attachment are activated by certain conditions, such as an unfamiliar person or situation, fatigue, fear, and unavailability or unresponsiveness of the attachment figure. They are terminated under other conditions, such as being in a familiar environment and the availability and responsiveness of an attachment figure.

Bowlby (1969) applied the control systems theory to attachment theory. He explained that behavioral systems develop
in a baby resulting from interaction with the environment, particularly, interaction with the mother. Attachment to the mother results from the activation of several of these behavioral systems that have proximity to the mother as the set-goal. When behavioral systems that are responsible for attachment are activated by the conditions mentioned earlier, such as fear, the baby uses attachment behaviors, such as crying. The predictable outcome of activation of these behavioral systems is proximity to the mother. Survival is enhanced by keeping the baby in touch with caregivers who reduce risk of harm.

As the baby develops, the goal-corrected systems become more sophisticated and organized. Increased ability to plan and guide goal-corrected behavior is enhanced with the use of internal working models of the self, the attachment figure, and the environment. This enables the baby’s behavior to become more goal-corrected. The set-goal continues to be proximity to that person, who is usually the mother.

The sensitive period for attachment occurs during the first year of life. Attachment behaviors continue to be very common during the first three years. Bowlby (1969) proposed that the development of attachment is divided into four phases. Time frames that he identified are approximate. Phase 1 involves a baby from birth to twelve weeks old. Attachment behaviors are not directed toward any particular person. Phase 2 lasts from twelve weeks to six months. The baby is able to discriminate between people. Attachment behaviors are directed toward the
preferred attachment figure. Phase 3 begins at six or seven months and continues into the third year. During this time, the baby increases discrimination of people and preference for the mother. Strangers are treated cautiously and sometimes with alarm. The baby uses locomotion to maintain proximity to the mother. Behavioral systems mediating attachment begin to organize behavior to be goal-corrected. Attachment occurs in Phase 3, and possibly Phase 2.

Phase 4 begins usually after the third year. A "goal-corrected partnership" is formed between the child and the mother (Bowlby, 1969, p. 268). The child begins to understand that the mother has her own set-goals and plans she uses to achieve them. The child is gaining insight into the motives and feelings of the mother. Now the relationship is more complex. The child realizes that in order to meet a set-goal, s/he must plan to get the mother to change her set-goal. This is also true of the mother. In order to obtain her set-goal, she must get the child to have the same set-goal. The partnership involves a constant give and take from both people. It may involve conflict and negotiation.

Bowlby (1969) delineated two classes of attachment behavior. Signaling behavior brings the mother to the child. Examples are crying, babbling, calling, and smiling. They invoke a response from the mother. Crying elicits a specific action from the mother, depending on the type of cry. Babbling and smiling lead to "maternal loving behavior" (Bowlby, 1969, p.246), such as
smiling, stroking, talking, or picking up the baby. A baby's smile in particular has an immediate and long-term effect on the mother by increasing her responsiveness. Attachments become stronger with increased social interaction (Bowlby, 1969).

The second class of attachment behavior is approach behavior. This brings the child to the mother. Included would be clinging, non-nutritive sucking, tracking, grasping, seeking, and any form of locomotion.

The mother's influence on the relationship is also significant and complex. Bowlby (1969) believed that the way a mother will treat her baby is predictable before birth. Her natural tendencies, history of relationships within her family, and her values are some variables that may influence maternal care.

Bowlby (1969) believed that mothering needs to be regulated by the child. The mother must be sensitive and perceptive to what the child needs and respond appropriately. Ideally, the pattern that is most effective for both mother and child is when mother is perceptive of the child's cues and responds in a prompt and appropriate way. Most pathology that occurs with attachment behavior is a result of not enough mothering. Mothers fear that they will spoil the child. Bowlby believed that this is not possible if the mother is sensitive to her child's cues. Less common are problems that result from too much mothering. Usually, this occurs because the mother is taking the initiative and not being sensitive to what the child needs.
Patterns of attachment behavior are influenced by experiences with the attachment figure during early development through adolescence. The way attachment behavior becomes organized within the personality early in life determines the pattern later in life.

Attachment behaviors produce attachments, or affectional bonds, during healthy development. At first the bonds are present between a child and parent, then later between adults. Attachments are active and important throughout the lifetime. Unchallenged preservation of attachment is a foundation of security. Bowlby (1969) proposed that no form of behavior is accompanied by stronger feelings than attachment behavior (Bowlby, 1969).

Ainsworth worked both with Bowlby and independent of him. Her work is agreeable with and complementary to his. She used qualitative data collection and naturalistic observation of the mother-baby dyad in which she observed behavioral patterns and their meaning in context, rather than the frequency of a behavior (Bretherton, 1992).

Ainsworth’s approach to attachment was based on security theory that focuses on infants and young children needing to develop a secure dependence on a parent before moving toward unfamiliar situations. Ainsworth called this a secure base (Ainsworth, Blehar, Waters, & Wall, 1978). She believed that if a child felt secure about the mother’s responsiveness and availability, then the child would explore the environment.
To test this hypothesis Ainsworth implemented an experiment called the strange situation. This involved a baby and the mother in a room with age-appropriate toys. The baby was allowed to explore in the presence of the mother. After a short time, a female stranger would arrive and quietly sit in a chair. She would then speak with the mother before engaging the baby to play. The mother then left the baby with the stranger (first separation), returned (first reunion), and this time left with the stranger so that the baby was alone (second separation). Soon the stranger and then the mother returned to the baby (second reunion).

Ainsworth identified three patterns of infant attachment based on the strange situation. The strongest attachment behaviors were elicited on reunion with the mother. Securely attached babies greeted the mother enthusiastically and sought proximity with her. Avoidantly attached babies avoided proximity with the mother. They mixed their greetings with avoidant behaviors, such as turning away. The third group was classified as anxiously attached. They reacted intensely to separation, showing anger and strong proximity seeking.

Ainsworth (1985) suggested that the securely attached babies had an internal working model of the mother as responsive and available. The avoidantly attached babies had a model of the mother as rejecting. The babies avoided the pain of rejection by avoiding the mother. The anxiously attached babies have a model of their mother as inconsistent. They are angry and fearful
because they are unsure of the mother's availability and what to expect from her.

Ainsworth et al. (1978) found that babies who were securely attached had mothers who were sensitive and responsive to them. They also found that when the mothers were sensitive and responsive early in the first year, the babies cried less at the end of the year. They concluded that the babies had an internal model in which they had come to expect the mother to be sensitive and responsive.

Erikson (1959) formulated a theory of personality development. Erikson's description of trust has many similarities to bonding and attachment, although he did not use these words. His theory was also heavily based on Freudian psychoanalytic concepts. He integrated biological, self-deterministic, and cultural concepts into his theory, so that it could be generalizable to all cultures.

First, Erickson's theory will be described in general principles. Then his concept of trust in relation to attachment and the relationship between trust and ego development and how ego development influences mothering will be explored. Erickson's thoughts on prenatal issues will be briefly addressed.

Erikson defined eight stages of personality development. Each stage is considered a crisis in that growth and awareness ensue and bring an extreme change in perspective. Each stage contains a sense of a positive and a negative attitude; examples are a sense of basic trust versus basic mistrust and a sense of
autonomy versus shame and doubt. These are Erikson's first two stages of personality development (Erikson, 1959; 1968).

Erikson stressed that both the positive and negative attitudes are necessary, but the ratio of the positive must be higher. When the balance is toward the positive in any stage, it helps the person to meet later crises with a better chance of total integrated personality development. In other words, the stages are cumulative. Mastery of the task of the previous stage makes it available for the person (in particular the ego) to use, then the next stage can be initiated safely (Erikson, 1959).

The sense of a basic attitude in any stage may or may not be at a conscious level. While developing during childhood and through integration in adulthood, however, all of Erikson's stages blend together into the total personality (Erikson, 1959; 1968). Erikson also clarified that the positive attitude is not achieved and totally secured for life. New conflicts and changes do occur. The positive attitude may be challenged, but it should be at first strongly developed, then confirmed and reaffirmed during the person's life (Erikson, 1959; Evans, 1967).

When discussing growth of the personality, Erikson (1968) described the growth that occurs in utero, which follows the epigenetic principle. This principle states that anything that grows has a basic plan. From this plan, differentiation of parts occurs, with each part having its critical time for developing. During this critical time, the part is developing and very
vulnerable to possible defect. Differentiation continues until an integrated whole is developed.

Erikson (1968) applied the epigenetic principle to personality development. The personality develops in predetermined stages at times when the person is most ready and receptive for the stages to occur. Each stage has a certain rate of development, is related to the other seven stages, and depends on proper sequencing and proper development. Each stage exists in some early form before its critical time normally arrives. If the negative attitude is dominant during the critical time, then corresponding psychopathologies may occur that would have to be overcome for healthy personality development.

The first stage in personality development is a sense of basic trust versus basic mistrust. Trust in Erikson's theory is defined as the ability to rely on the sameness and continuity of others as well as having a sense of trustworthiness about one's self, so that others will not need to be on guard or to leave (Erikson, 1959; 1968). In essence, basic trust involves mutuality.

Trust and mistrust must be taught by the mother. Erikson most often refers to the mother as the primary caregiver. The mother must teach the baby that the world can be trusted in the form of its mother and that she will take care of feeding and making the baby comfortable and safe. Through trust, the baby learns that there is a relationship between its needs and its world. Mistrust must be taught as sensing danger and
anticipating discomfort in terms of the culture that is lived in. Trust and mistrust are instinctual in animals, but must be learned in humans (Evans, 1967).

Erikson's first six stages mesh well with Freud's psychosexual stages. Basic trust is related to the oral-sensory stage. The mode of behavior is incorporative, which means to take in with the senses, and make this information a part of the self for the ego to integrate and use (Erikson, 1959; Evans, 1967).

Babies are receptive to what is being offered. They incorporate or take in through many ways, for example, through their mouths, their eyes, and tactually. Newborns learn to regulate their methods of receiving with their mothers' methods of giving. The mother allows the baby to coordinate its ways of receiving, as she coordinates and develops her ways of giving. Through this mutuality, the baby learns that in receiving what is given, and learning how to get someone to do things that it wants, the groundwork is being set for the baby to eventually become a giver. The baby will identify with the giver (the mother), incorporate this information into the self, and eventually become a giving person (Erikson, 1959; 1968).

Trust forms the basis for the beginning of a sense of identity. Identity develops through all earlier stages (Evans, 1967). The earliest sense of identity occurs with the encounters between a baby and mother. There is mutual recognition and mutual trustworthiness. The baby recognizes its mother and also
feels recognized by her. The baby begins to feel like a somebody, a separate person (Erikson, 1968; Evans, 1967).

Ego identity is the confidence of having the ability of continuity and inner sameness. It is a sense of who the self is within social reality (Erikson, 1959; 1968). The ego synthesizes and makes a wholeness of all experiences that occur with each stage. It starts and is maintained through trust and mutuality of the mother's need to give and the baby's need to receive (Erikson, 1968).

The mother establishes herself in the motherhood role by identifying herself with people who mothered her well. Her motherhood is reestablished as being a compassionate mother when the baby becomes more and more responsive to her (Erikson, 1977).

Erikson (1959) stated that a basic sense of trust is the first element of healthy personality development. Establishing continuing patterns of balance of basic trust over basic mistrust is the first task for personality development. Through trust, the world can be experienced as interrelated and good (Erikson, 1968). Therefore, promoting a sense of trust in the newborn is the first task for maternal care. She must communicate to the baby that the baby can trust her, itself, and its world. The amount of trust depends on the quality of the maternal relationship. Quality was defined as "sensitive care of the baby's individual needs and a firm sense of personal trustworthiness" (Erikson, 1959, p.63).
Erickson addressed several prenatal issues. When discussing the importance of a crisis as a time for a change in perspective and increased potential and vulnerability, he stated that the most radical change of all is going from intrauterine to extrauterine life (Erikson, 1968). He made it clear that children, even babies, and possibly even an unborn baby, can sensitively perceive emotions from their parents. Children reflect the quality of the environment in which they are growing (Erikson, 1959).

Rubin was one of the first nurse scientists to study the relationship between the mother and her unborn and newborn baby. Rubin (1975) listed four interdependent maternal tasks of pregnancy that are managed equally and concurrently. They are safe passage, acceptance, binding-in, and giving of self. Binding-in has the three interdependent aspects of identification, claiming, and polarization (Rubin, 1977). Information on these three aspects will be included in the binding-in section of maternal tasks.

Rubin (1975) stated that during pregnancy there is an increased sensory awareness of the unborn baby’s presence that causes the pregnant woman to be more introspective. This "centration of attention energies" is a common characteristic of someone who is creatively working (Rubin, 1975, p.143).

The creative work and energies of the pregnant woman are directed toward accomplishing her maternal tasks, which include the areas of behavior, attachments, and values (Rubin, 1975).
She assesses the qualities of relationships and becomes more aware and perceptive of the meaning or intent of behavior. Her cognitive capabilities increase and she is able to recall small details, organize, and analyze information, particularly regarding relationships. These skills of increased attention to detail and analysis of information are essential in child-rearing.

People who are more comfortable with objectivity, such as males, view the pregnant woman as being oversensitive and reading too much into situations. The pregnant woman seeks the companionship of other women who tend to understand and accept her interest in relationships and behavior. Rubin (1975) stated that a lack of female social support indicated a high-risk pregnancy.

The first maternal task is safe passage for her baby and herself (Rubin, 1975). In the first trimester, because the pregnant woman does not yet have the kinesthetic, visual, or tactile awareness of the unborn baby, the pregnant woman is primarily concerned for safety of herself. During the second trimester, she becomes very aware of her unborn baby. She is protective of the baby. She feels that she possesses something that she highly values. Other people are aware of her pregnancy, but not of her baby. In the third trimester, there is concern for her baby and herself. There is no separation between the two. What is a danger to one is a danger to the other.
The second maternal task is acceptance by others. Rubin (1975) viewed this as keystone for a successful pregnancy. This security of acceptance of others is seen as necessary for production of energy for all other tasks.

The pregnant woman must use some energy for working on accommodating the new baby into her social sphere. This means that present relationship ties must be loosened, but not broken. This allows room for the new baby, yet acceptance and social support for the mother. Because each relationship has its own culture, history, expectations, commitments, intimacy, and exclusiveness, there is a healthy, normal resistance to the loosening and realigning of the ties by the pregnant woman and her significant others.

This concern is perceived to be the strongest during the first trimester and early in the third trimester. The pregnant woman must have the acceptance from herself and her significant others. In the first trimester, the pregnant woman needs to have acceptance of herself and the idea of being pregnant. During the second trimester, there needs to be acceptance of the baby. In the third trimester, the woman is in particular need for acceptance and sensitive to rejection. If the baby is rejected, then she also is rejected.

The third maternal task is binding-in. It involves the woman reforming her identity. Binding-in requires incorporation of the baby into the entire self-system. This includes the pregnant woman’s self-image, ideal-image, and body-image (Rubin,
Rubin (1975; 1977) distinguished binding-in as being a relationship process that begins its structure during pregnancy, whereas prenatal attachment or bonding is a state. Rubin described binding-in as progressive, intermittent, accumulative, and active. It lasts about 15 months (Rubin, 1977). It is a precursor of the life-long relationship between a mother and her child (Müller, 1990). Maternal identity is seen as the starting and ending of the process. Binding-in and maternal identity are dependent on each other (Rubin, 1977).

During the first trimester, there is not a binding-in to the child. Before the pregnant woman can bind-in to the child, she needs to bind-in to the idea of being pregnant (Rubin, 1975).

During the second trimester, with quickening, there is a strong love for the baby. It is a possessive love. Through movement, the baby shares the secret of its existence with the mother. The kinesthetic and tactile sensations are intimate, direct, and immediate. Rubin (1984) reported that the "experience of the child in action and in being is an intimately private experience in pregnancy" (p. 64). Rubin expounds on this by stating that love is promoted through the "intimacy of sensory experience, the exclusive communication, and the hidden nature of the child" (p. 64).

The pregnant woman feels unique because she is aware of the baby when nobody else is. Through love, fantasies and dreams are produced and the woman looks for information or news from the
baby. This secrecy and exclusivity make it a kind of romantic love (Muller, 1990; Rubin, 1975; 1984).

During the last trimester, the growth rate of binding-in slows compared to the second trimester. There is a conflict between binding-in to the baby and separating from the pregnancy (Rubin, 1975).

Binding-in consists of three interdependent aspects (Rubin, 1977). The first is identification that begins by fantasizing about the unborn baby. The purpose of identification is to organize maternal behavior and attitudes. The unborn baby needs to be discovered by the mother in order to discover the self and know how to behave in relation to the baby.

It is the perception of fetal movement that transforms the woman's awareness that she is experiencing not just a pregnancy with a theoretical, fantasy child, but a real child. This adds a new dimension to the relationship. There is a psychosocial and biological symbiotic oneness (Rubin, 1977).

The cyclical identification process is complete when the baby is four weeks old or when the mother can empirically know the baby. She knows the baby by sight, smell, or hearing and she knows if the baby is hungry, comfortable, or not well. She becomes sensitively perceptive of the baby's cues.

The second aspect is claiming (Rubin, 1977). During pregnancy, the pregnant woman commits and invests herself heavily to her unborn baby. By the end of the pregnancy she is strongly attached to the unborn baby. Her ego is tied to the baby. She
identifies with the vulnerability of the baby. It is gratifying to have exclusive possession and intimate knowledge of the baby.

After delivery, the exclusivity of ownership of the baby is extended to others that the mother also claims (others who are socially important to her). This is done by identifying characteristics of the baby, such as the baby has hair like the father's hair. This linking by associating the baby with others binds the baby to the others who are important to her. Those others, in turn, also claim the baby. It is difficult for the mother to continue to be committed to the baby without the reciprocal claiming by others (Rubin, 1977).

The last aspect of binding-in is that of polarization. It begins late in pregnancy, usually with labor, and continues until the baby is four to six weeks old. During pregnancy, the unborn baby is incorporated into the self system psychosocially and psychobiologically "so that there is no difference between what is within and the self" (Rubin, 1977, p.70). Polarization means to loosen psychologically and physically from the baby so that the baby is viewed as a separate, constant, and external person after delivery. The mother loosens, but does not sever from the experience of being united with the baby. Then she can experience the baby as an individual.

It is essential for a mother to view herself as a whole and complete person in order to view the baby as a whole and complete person. This does not happen until involution is complete. Until then, the mother continues to identify with the baby. The
baby continues to be an extension of herself. There is still a oneness with the baby (Rubin, 1977).

Externalization of the baby is an important part of polarization. It is meaningful for the mother to feel the weight of the baby on the outside of her body. Holding promotes claiming and identification. Rubin (1977) noted that after the first week there is a decrease in the amount of time the mother spends holding the baby. This continues until the baby’s activities, such as the baby’s smile, can renew her interest in holding and recommitment to love (Rubin, 1977; 1984).

During the third week the mother is ready to be more social and break away from the baby. This is an important time in polarization. The mother has revolted against the lack of identity. It is a form of self renewal. On return to the baby, she feels guilt, that recommits and accelerates her love for the baby. Now, rather than performing the acts of caretaking, she actually mothers the baby. Significant to polarization is that she is able to address the baby as separate from herself.

The fourth maternal task proposed by Rubin (1975) is the giving of self. During the first trimester, when the baby is not yet a reality, an analysis is done. The woman reviews what she has, and what she might lose in terms of issues such as space, functions, body-image, lifestyle, and relationships. In the second trimester, she explores giving and receiving, not necessarily of an object, but of the meaning of giving. She experiences the worth of the essential gifts of someone’s
interest and time.

During the third trimester, there is a renewed awareness of the demands of pregnancy and the dread of labor. The pregnant woman wonders if there is enough to give or if what has been given to her will be taken away. She realizes the worth of other essential gifts, such as companionship, concern, and relief. She needs to be given all of these essential gifts now so that she has stores of them to give to the baby. The gift of relief and companionship, extended to a partnership with the baby, will be given to the baby during times of stress. Her time and interest will be given to the baby in the form of nurturance.

Rubin (1977) compared prenatal to postnatal binding-in. Instead of the oneness of pregnancy, there is identification of the baby as a unique person. Instead of exclusive possession of the baby in pregnancy, there is claiming her baby in her social sphere. Instead of incorporating the baby into her self system in pregnancy, mother and baby are polarized into separate, yet connected beings.

It becomes apparent that there are several different, yet related conceptualizations of attachment. For the purposes of this study, prenatal attachment was conceptually defined as a developmental affectional relationship between a pregnant woman and her unborn baby. Within attachment and prenatal attachment are significant concepts, such as relationship, continuity, oneness, nurturance and mutuality.
The major notion of the conceptual definition is that attachment is a relationship. The relationship involves continuity in that it progresses and develops to life-long attachment. Involved in this intimate relationship is the idea of oneness, with nurturance growing from the oneness. Also involved is mutuality or partnership and connectedness of responding and working together.

Each of the four theorists mentioned noted that the subconcept of sensitivity of the mother to the baby’s cues is an important quality in the development of the attachment relationship. The mother needs to know her baby and herself well enough to know how to be appropriately responsive to the baby. Through knowing her baby and knowing herself as mother she will be able to respond sensitively to the baby. This getting to know the baby and know her new self, as a mother, is a process that begins prenatally.

Another important subconcept is that of sensitive periods. As stated previously, there is general agreement that the early segment of a person’s life is a sensitive period for relationship and personality development. The epigenic principle, that Erikson (1968) referred to and Bowlby (1969) eluded to by discussing sensitive periods, supports the idea of sensitive periods for development. Attachment early in life is crucial for healthy personality development.

Rubin (1975) also supported sensitive periods of development of attachment in describing the four maternal tasks. She
described each task by noting the significant events of each trimester. For example, she noted that during the second trimester binding-in is accelerated.

Klaus & Kennel (1976) noted that during the first minutes and hours after birth, there is a sensitive period when the mother has a heightened sensitivity to her baby. The significance of this sensitive period and its relationship to prenatal and postnatal bonding needs further study. Ongoing research also is needed to clarify the concept of attachment and prenatal attachment and in determining effective ways to measure and enhance the mother-baby prenatal relationship.

Literature Review

There is support in the literature with regard to the relationship between a woman and her child beginning prenatally. The studies involving prenatal attachment, however, have conflicting conclusions and consist primarily of describing the nature of the prenatal relationship or researching the correlation of demographic characteristics to prenatal attachment. Few studies have researched the relationship between implemented nursing interventions and prenatal attachment.

Two intervention studies have examined the relationship between the use of ultrasound with prenatal attachment. Heidrich & Cranley (1989) conducted a study that explored the effects of three variables on prenatal attachment in the second trimester. The three variables were ultrasound examinations, fetal movement, and amniocentesis for the purpose of genetic diagnosis.
The sample consisted of 82 women, who were assigned to one of three groups according to their obstetrical plan of care. Those women who were to have an ultrasound to determine fetal age were assigned to the ultrasound group \((N = 33)\). Women who were to have an amniocentesis for advanced maternal age were in the amniocentesis group \((N = 17)\). Those having neither of those procedures were in the control group \((N = 32)\). The sample was also divided into those women who had felt fetal movement at the time of the pretest \((N = 31)\) and those who had not yet felt fetal movement \((N = 51)\).

Women having the amniocentesis also had ultrasounds as part of the procedure. Those having ultrasounds viewed the screen as the technician indicated the anatomical characteristics of the unborn baby and explained the event. Following the procedure, the mothers were then given a labeled picture of their unborn baby.

Data were collected at approximately 16 weeks (pretest administered before the procedure) and again at 20 weeks (posttest administered after the procedure) gestation. The tools used were the Maternal Featal Attachment Scale (MFAS) (Cranley, 1981) and the Perception of Fetus Scale (POF), a scale developed by the researchers for the study.

The MFAS is a 24 item Likert scale with choices of response ranging from 1 to 5. Higher scores indicate greater attachment. The tool has been tested for validity and reliability. Cronbach’s alpha coefficient of reliable internal consistency is .85. The
POF is a 10 item scale with each item describing the unborn baby’s developmental progress. Responses ranged from 1 to 5 with the higher scores indicating more advanced fetal development. Cronbach’s alpha coefficient of reliable internal consistency was .83.

A repeated measures ANOVA was performed on the MFAS scores and revealed that those who had felt fetal movement had a significantly higher Maternal Fetal Attachment Scale than those who did not feel movement, (F 1, 76 = 5.82, p < .02). The type of procedure did not result in a significant difference between MFAS scores. An a priori contrast was performed to compare the amniocentesis group with the other two groups. At the time of the pretest the amniocentesis group had a significantly lower MFAS score (F 2, 78 = 4.93, p = < .01), compared to the other two groups. At the time of the posttest there was no difference in the scores.

A repeated measures ANOVA was performed on the Perception of Fetus scores. Women tended to rate their unborn baby as more developed than scientifically accurate for gestational age. The POF scores were significantly higher at the posttest than pretest (F 1, 81 = 55.16, p < .001). There were no significant differences between the fetal movement factor nor procedures. The researchers did note, however, that the time factor revealed a significant difference between the pretest and posttest scores. Those who had felt fetal movement had a significantly higher pretest Perception of Fetus score that those who did not feel
movement (F 1, 81 = 4.05, p < .05). There was no significant difference of posttest scores.

A Pearson's correlation showed a significant relationship between the MFAS scores and the POF scores. Pretest MFAS scores were significantly related to posttest MFAS scores, r = .71, p < .000, and also to pretest POF scores, r = .28, p < .01 and posttest POF scores, r = .41, p < .000.

The researchers concluded that feeling fetal movement earlier in pregnancy related positively to prenatal attachment in this study, regardless of type of procedure. In the amniocentesis group, there were lower attachment scores before the results of the amniocentesis were known. All results were normal. The researchers postulated that the women withheld their feelings until there was an optimistic result. This could also help explain why less than half of the pregnant women did not experience fetal movement before the ultrasound. Those women may have withheld their feelings and had not looked for signs of movement until they obtained ultrasound results (Heidrich & Cranley, 1989).

The researchers also noted a significant increase in pretest to posttest MFAS scores in each group. This was attributed to the progression of gestation and was expected (Heidrich & Cranley, 1981). The researchers also found a positive relationship between the MFAS scores and the POF scores. Women perceive their fetus as farther developed as their attachment increased, regardless of their length of gestation. This was
explained that possibly these women pursue information regarding fetal development or may retain information better than less attached women.

Another ultrasound study examined the relationship between prenatal bonding and knowledge of the gender of the unborn baby (Wu & Eichmann, 1988). This study included 57 couples, pregnant women along with their husbands. The sample was selected during the routine 18 week ultrasound scan. The women completed the MFAS (Cranley, 1981) and the husbands completed the Paternal Fetal Attachment Scale (Cranley, 1981b), with a gender-appropriate change in the items where it was necessary. Both tools were tested for adequate reliability and validity. Each subject was also asked their gender preference for their unborn baby.

At 34 weeks another routine ultrasound scan was performed. Those who wanted to know the gender of their unborn baby were informed at that time. At 37 weeks, 3 weeks after the second ultrasound, the parents repeated Cranley's tools and also were interviewed regarding the experience of the ultrasound, the decision of knowing or not knowing the gender of the baby, and the impact of these factors.

A double multivariate ANOVA demonstrated the following two significant effects: the timing of the measurement and the gender of the parent were significant to the scores on fetal attachment, timing (F 1, 55 = 40.94, p < .0001) and parent gender (F 1, 55 = 11.15, p < .002). Women and men both had a
significant increase on the attachment scales, but women had a significantly greater increase than men. The researchers concluded that parental attachment to their unborn baby develops naturally as pregnancy progresses and that attachment was greater for mothers due to their total involvement in the pregnancy.

For both parents, those who chose not to know the gender of their unborn baby had significantly higher fetal attachment scores than those who chose to know the gender ($F_{1, 55} = 4.39, p < .04$). A second multivariate ANOVA analyzed if the scores of the attachment scales were influenced by whether the determined gender of the unborn baby was the preferred gender. There was no significant influence.

Wu & Eichmann (1988) had originally hypothesized that knowledge of the unborn baby’s gender would increase fetal attachment scores, but the data indicated otherwise. The postultrasound interviews clarified this. There were two main reasons for not wanting to know the unborn baby’s gender. One was to preserve the element of surprise at delivery, also expressed as not wanting to interfere with nature. Another reason was that the parents voiced acceptance of the baby no matter what the gender and the primary concern was for the baby’s health. The researchers postulated that those who chose not to know the gender may have had a more acceptance of the inherent progression of pregnancy and possibly wanted a baby for the sake of the baby.
One intervention and attachment study that is cited frequently in the nursing literature is that of Carter-Jessop (1981). The purpose of this study was to determine if attachment could be enhanced through prenatal intervention. The researcher developed a three-part prenatal attachment intervention designed to make women more aware of their unborn babies.

The three-part nursing intervention included: (1) maternal awareness of the unborn baby by use of palpation of the unborn baby's parts and determination of position; (2) maternal awareness of the unborn baby's activity and how the mother can affect the activity; and (3) gentle abdominal massage over the unborn baby performed by the mother, especially during times of increased activity of the unborn baby.

The sample included 10 primiparas, five in the control group and five who were administered the prenatal intervention. All women were married, caucasian, and had uncomplicated pregnancies. The number of attachment behaviors was noted in each mother two to four days postpartum.

The tool used for measurement of attachment behavior was developed by Carter-Jessop and called the Postnatal Attachment Test (1981). The tool consisted of a list of nine categories of attachment behaviors that were identified by Klaus, Kennell, Plumb, & Zuehlke (1970). The nine categories of attachment examined were eye contact, mother talking to baby, en face position, mother touching baby with palms, mother touching baby with fingertips, mother touching baby's extremities, mother
touching baby's trunk, encompassing, and mother smiling. The validity and reliability of the tool were not reported.

Carter-Jessop (1981) found a significant increase in maternal attachment behaviors postnatally after implementing her three-part intervention. The mean of the number of attachment behaviors for the control group was 54 and the experimental group was 106.6. The experimental group had more than twice as many attachment behaviors as the control group. A significant difference was found between the frequency of attachment behaviors in the two groups (t = 3.349, p = .01).

The researcher also differentiated between attachment behaviors and advanced attachment behaviors. Of the nine attachment behaviors listed, four were identified by Klaus et al. (1970) as behaviors that occur more frequently later in the mother's first contacts with the baby. These four advanced attachment behaviors are en face position, mother touching baby with palms, mother touching baby's trunk, and encompassing. Carter-Jessop (1981) made the assumption that these behaviors indicated an advanced stage of attachment.

The mean of the number of advanced attachment behaviors for the control group was 21.4 and the experimental group 49.6. The experimental group had more than twice as many advanced attachment behaviors as the control group. A significant difference was found between the two groups (t = 2.85, p = .025). Carter-Jessop (1981) made two conclusions: the attachment process is present during the third trimester and it can be strengthened
through prenatal intervention during the third trimester.

Modified replications of the Carter-Jessop (1981) study were developed by Carson & Virden (1984) and Davis & Akridge (1987). In both of these studies, however, there was no relationship found between prenatal intervention and postnatal attachment.

Carson & Virden (1984) created a study using a larger sample (N = 69) of low-income pregnant women. There were 29 Caucasians, 30 African Americans, and 10 from other ethnic groups.

This study involved three groups. The experimental group (N = 23) received teaching of palpation. A second experimental group (N = 21) received teaching of relaxation to use during labor. This group was added to discover if prenatal teaching of an issue other than palpation would demonstrate a relationship to postnatal attachment behaviors. Each of the subjects in the experimental groups received two 20 minute teaching sessions during their regular prenatal visits. Teaching was done on an individual basis. The third group was the control group (N = 25) and received no special teaching.

Carson & Virden (1984) used a posttest only design and used the same tool that Carter-Jessop (1981) used. Observations were made during the first two weeks postpartum. Each subject was observed every 10 seconds in a ten minute period.

There were no significant differences between the three groups in the frequency of attachment behaviors (Carson & Virden, 1984). An interesting finding was that Caucasian mothers demonstrated a significantly higher frequency of attachment
behaviors than African Americans \( t = 2.86; \ p = .01 \). The researchers postulated that there may be a different norm for African Americans and suggested that cultural differences of attachment behaviors needed further study.

The Davis & Akridge study (1987) involved 22 pregnant women. There were 12 in the control group and 10 in the experimental group. There were eight Caucasians and two African Americans in the experimental group. There were nine Caucasians and three African Americans in the control group. The experimental group performed the same interventions as the women in Carter-Jessop's experimental group. Cranley's (1981) Maternal-Fetal Attachment Scale (MFAS) was administered as a pretest.

The tool Davis & Akridge (1987) used for postpartum evaluation of maternal attachment was Avant's Maternal Attachment Assessment Scale. This tool is divided into the following four subscales: affectionate behavior, proximity maintaining, caretaking behavior, and mother's attention. Observations were made during a feeding. The attachment score was acquired by observing the mother for 15 minutes. The frequency of each behavior in the four subscales was noted for twenty seconds of every minute. The total of the frequencies was the overall attachment score. Interrater reliability for this study was 95%. Content validity was not established.

Davis & Akridge found no significant difference between the prenatal attachment scores (MFAS) of the experimental and control groups \( t = 0.04; \ p = 0.05 \). There was also no significant
difference between the postnatal attachment scores of the experimental and control groups ($t = 1.09; p = 0.05$).

Another intervention study researched the relationship between counting fetal movements and prenatal attachment (Mikhail, Freda, Merkatz, Polizzotto, Mazloom, & Merkatz, 1991). This study contained a control group of 88 third trimester women and an experimental group of 125 third trimester women who implemented the intervention of counting fetal movement. The experimental group was further divided into two groups, those who used the Sadovsky chart (counting fetal movement three times each day after meals) ($N = 63$) and those who used the Cardiff chart (counting fetal movement daily each morning) ($N = 62$).

After one month of counting fetal movement, Cranley’s (1981) Maternal-Fetal Attachment Scale (MFAS) was administered to the experimental group and the control group. The MFAS scores for the control and experimental groups were compared through univariate analysis. The researchers found statistically significant higher scores in the experimental group compared to the control group ($p < 0.0001$). There was no significant difference in MFAS scores between the women who used either the Sadovsky or the Cardiff charts.

Based on the results, Mikhail et al. (1991) proposed that through movement, the unborn baby entices the mother to perform behaviors that encourage her feelings of attachment and interaction with the unborn baby. The researchers delineated that the process of counting fetal movement, not the method, was
important in enhancing prenatal attachment in their study.

A postnatal intervention study was conducted that explored the effects of infant carrying on attachment (Anisfeld, Casper, Nozyce, & Cunningham, 1990). The hypothesis developed for the study was that increased physical maternal contact would promote increased maternal responsiveness and more securely attached babies.

The sample consisted of 49 women. There were 23 in the experimental group, who received soft infant carriers worn by the mothers and 26 in the control group, who received plastic infant seats. The soft carriers had pedometers sewn inside to get an objective estimation of its use.

At three and one-half months a play session between mother and baby was videotaped to evaluate the amount of time the baby looked at the mother and the amount of time mother and baby spent vocalizing. Another analysis was done on vocalization to determine if the mothers responded contingently to their babies' vocalizations, indicating responsivity. At 13 months the Ainsworth Strange Situation (Ainsworth, et al., 1978) was administered.

Analysis of the three and one-half month play session showed babies in the experimental group looked at mother more often than babies in the control group, Chi square (1, N = 49) = 4.65, $p < .05$. These babies also vocalized alone significantly less often than the babies in the control group (experimental mean = 4.75%, control mean = 9.73%, t(47) = 2.95, $p < .01$).
Mothers in the experimental group initiated vocalizations after periods of quiet and responded to the baby’s vocalizations by joining in with the baby more often than mothers in the control group.

An ANCOVA was used for analyzing maternal responsivity of vocalizations. The experimental group mean (.61) was significantly higher than the control group mean (.44, F (1,31) = 6.57, p < .02). Mothers in the experimental group responded more often within 2 seconds of infant vocalizations than control group mothers. In the control group, mothers who were more vocally responsive at three and one-half months had babies that were more securely attached at 13 months.

The application of the Chi-square test was used to compare security of attachment. Significantly more experimental group babies (83%) were securely attached at 13 months than control group babies (38%). Logistic regression analysis showed the regression coefficient to be significantly different from zero (Beta = 1.93, SE = .82, Z = 2.35, p = .019). Within the experimental group, 15 of the 16 who had high use of the soft carrier had infants who were securely attached. Of the seven who were low/moderate users of the carrier, four were securely attached (Chi-square 1, N = 23 = 2.35, N.S.). The number of avoidantly attached babies in the experimental group (13%) was less than in the control group (35.8%).

A second logistic analysis regression was performed in which maternal responsivity was added to determine if the differences
in attachment between the two groups was due only to differences in maternal responsivity. The regression coefficient was still significantly different from zero (Beta = 2.02, SE = 1.01, Z = 2.00, p = .045). This result indicated that the soft carrier had an effect on attachment, beyond what could be attributed to maternal responsivity.

Mothers in the experimental group reported that their baby started social smiling later (mean, 4.86 weeks) than those in the control group (mean, 3.68), t(47) = 2.31, p < .05. In addition, 21% of the babies in the experimental group had a period of daily crying on a regular basis, compared to 52% of the control group babies (Chi square 1, N = 49 of 5.23, p < .05).

Anisfeld et al. (1990) concluded that the increase in physical contact by using the soft carrier caused mothers to be more responsive to their babies and promoted secure attachment between mothers and their 13 month old babies in this sample (Anisfeld et al., 1990). Mothers in the experimental group were more responsive contingently to their infants’ vocalizations than the mothers in the control group. Because other possible contributing factors were controlled for during analysis, the researchers concluded that the use of the soft carriers promoted the responsivity.

The researchers explained the less frequent looking behavior in the control group by stating that those mothers were less responsive. They noted an alternative reason may be because the carried babies had less en face opportunities and were now
seeking that kind of interaction.

In the control group, the higher number of avoidantly attached babies was possibly due to lack of attention to the babies' wants and needs and lack of proper stimulation for the baby (Anisfeld et al., 1990). No data were noted to support this statement except reporting that another study showed that lack of attachment was associated with neglectful care (Spieker & Booth, 1988). Anisfeld et al. (1990) reported that there were no cases of neglect or abuse in their sample, who was being closely followed by a pediatric practice. The researchers seemed to differentiate between neglect and lack of attention to the babies' needs.

Ainsworth et al. (1978) was cited in stating that mothers of avoidantly attached babies frequently have an aversion toward physical contact and concluded that the process of using the soft carrier may have helped some mothers overcome their initial aversion to physical contact and allowed nurturing behavior to develop (Anisfeld et al., 1990).

The theoretical framework used by Anisfeld et al. (1990) was Bowlby's attachment theory. The attachment behaviors that the researchers noted, i.e. vocalizing, social smiling and crying, are also attachment behaviors that Bowlby listed as a baby's innate way to maintain proximity to the mother. As mentioned, the carried babies vocalized less, cried less, and smiled later than the babies in the control group. According to Bowlby's theoretical framework, a baby's attachment behaviors are used
only when needed, that is only when the baby needs proximity to the mother. The carried babies needed to have their attachment behaviors activated less often than the control babies because they had mothers close to them (Anisfeld et al., 1990).

The behaviors of both the mothers and the babies in the experimental group were affected by increased physical contact through the use of the soft carrier. The mothers were more contingently responsive to their babies and the babies were more securely attached, beyond what was attributed to the increased responsivity.

Summary

The literature revealed insufficient information on prenatal attachment. There are few current studies of prenatal intervention that enhance attachment. Studies of prenatal attachment, particularly intervention studies, demonstrate conflicting results.

Carter-Jessop's (1981) three-part intervention study had dramatic results with increasing postnatal attachment through prenatal intervention. Modified replicate studies by Carson & Virden (1984) and Davis & Akridge (1987), however, did not demonstrate similar results.

Wu & Eichmann's (1988) study demonstrated that those parents who chose not to know the gender of their unborn baby had higher prenatal attachment scores that those who chose to know. This was contrary to what the researchers had originally hypothesized.

Logically, they proposed that if the parents had more
knowledge of their unborn baby that they would increase their attachment score. Since the data showed otherwise, however, the researchers proposed that those parents who chose not to know the gender were more accepting of the baby for the sake of the baby or had more acceptance of the inherent progression of pregnancy. This indicates that there must be other elements involved in prenatal attachment that do not involve knowledge or increased awareness of the unborn baby.

An intervention study that demonstrated an increase in prenatal attachment scores was that of Mikhail et al. (1991). By implementing one of two different methods of counting fetal movements, the MFAS scores were significantly higher than in the control group who did not count fetal movement. The researchers proposed that through the process, not method, of counting fetal movement, the baby encourages the mother's feelings of attachment.

Heidrich & Cranley (1989) confirmed Rubin's (1975; 1977) proposition that prenatal attachment increases after the mother feels movement of her unborn baby. This increase in prenatal attachment occurred in each group in the study, regardless of type of procedure the mother experienced, i.e. ultrasound, amniocentesis, or neither.

The postnatal intervention study by Anisfeld et al. (1990) demonstrated that increased physical contact by using soft infant carriers was associated with increased maternal responsivity, more securely attached babies, and fewer attachment behaviors
from the baby, i.e. vocalizing, social smiling, and crying.

Because a baby’s attachment behaviors are used only when needed, that is, only when the baby needs to be close to the mother, the carried babies needed to use their attachment behaviors less often than the control babies. The carried babies already had their mothers close to them. The significance of physical contact needs further support.

Quality attachment between a baby and mother or another primary care giver has been found to be a significant determinant in the healthy development of a person. A developmental framework can be used by nurses in examining and understanding prenatal attachment and its importance in maternal-child care.
CHAPTER THREE

METHODOLOGY

The purpose of this study was to examine if implementation of the intervention of massage would increase prenatal attachment of pregnant women to their unborn babies. This chapter presents the methodology used for the study and consists of the following five sections: research design, sample and sampling plan, data collection tools, data collection procedures, and protection of human subjects. A brief summary concludes this chapter.

Research Design

To examine the relationship between massage and prenatal attachment, a quasi-experimental research design was used for the study. A quasi-experimental design is similar to a true experimental design in that both designs enable the researcher to manipulate the independent variable. Although randomization was not possible, a control group was used and there was active manipulation of the independent variable (massage). The quasi-experimental research design was selected because this design allowed for stronger inferences of the causal relationship between variables and assisted in examining more specifically the effects of massage on prenatal attachment.

Sample and Sampling Plan

A convenience sampling plan was employed. Childbirth education classes offered by a medical center, located in the Midwest, were selected as either an experimental or control group. The classes selected began in May, June, and July due to
convenience of the researcher. Classes were attended once a week for two hours for a six-week series. A total of six classes were approached to be included in the study. The control group consisted of two classes and the experimental consisted of four classes.

The majority of the women in the sample were first time mothers. The content of the classes was geared toward first time mothers and their partners. Content included basic anatomy and physiology of pregnancy, labor, and birthing. Supportive and comfort measures also were discussed, such as breathing techniques, positioning, relaxation, and massage, as well as available analgesia and anesthesia. Teaching strategies used for the classes included lecture, enhanced with class discussions, small group activities, videos, demonstrations, and practice time.

Included in the study were pregnant women who consented, had physician consent, were 18 years old or older, and could speak, read, and write English. No exclusions were made based on parity, marital status, or income level. Excluded from the study were those women who were under 18 years old or did not speak, read, and write English. Also excluded were those who had a history of any medical or obstetrical complications and those who did not have written consent from their physician.

Six classes, with a total of 164 women, were approached for the study. The control group consisted of two classes, with 65 pregnant women approached for the control group. The first class
had 31 subjects with 27 consenting to participate, 17 of which completed the study. The second class had 34 subjects with 27 consenting to participate, 16 of which completed the study. A total of 33 control subjects completed the study.

Four prenatal classes with 99 pregnant women were approached for the experimental group. The first class had 35 pregnant women, with 23 consenting to participate, 16 of which received physician consent and 3 of those completing the study. The second class had 19 subjects with 15 consenting to participate, 13 of which received physician consent and 4 of those completing the study. The third class had 18 subjects with 12 consenting to participate, 10 of which received physician consent and 5 of those completing the study. The fourth class had 27 subjects with 14 consenting to participate, 9 of which received physician consent and 4 of those completing the study. A total of 16 experimental subjects completed the study.

Sixteen experimental subjects were excluded from the study due to lack of physician consent. One subject had a history of preterm labor with this pregnancy. Two subjects were carrying twins. They were all excluded.

The reason identified for control group subjects not completing the posttest questionnaire was that they had not attended the last class session. Reasons identified for experimental group subjects not completing the posttest questionnaires were that some subjects delivered before the completion of the class, one believed that the protocol was too
"mechanical", one was uncomfortable performing the effleurage because the baby moved, several stated that finding time to perform the effleurage was a factor, some had difficulty in remembering to do it, and some did not attend the last class session for unknown reasons.

Data Collection Tools

Two data collection tools were used to collect data for the study. The first was a Demographic Information tool (Appendix A). The tool included the subject's name, physician's name, her due date, age, marital status, level of education, perceived amount of social support, number of other living children, and race/ethnicity.

The second tool, the Prenatal Attachment Inventory (PAI) (Appendix B), was used to measure prenatal attachment. The PAI is a 21-item tool developed by Mary Muller in 1989 that consists of 21 statements of thoughts, feelings, and situations that women might experience during pregnancy. A few examples of statements are: I plan the things I will do with my baby; I imagine what part of the baby I'm touching; and I feel love for the baby.

The tool incorporates a Likert scale in which subjects can rate each statement according to their experiences in the past month as almost always (4 points), often (3 points), sometimes (2 points), and almost never (1 point). A single prenatal attachment score is obtained. Scores can range from 21 (indicating low prenatal attachment) to 84 (indicating high prenatal attachment). Permission was obtained from Mary Muller
to use the tool. To provide additional qualitative data the following open-ended question was added to the instrument: "Please share any other ways that you have developed a relationship with your unborn baby. Any information would be greatly appreciated. Thank you."

The attachment model was used as a basis for testing the PAI. "The attachment model postulated that initial attachment experiences lead to the development of internal representations, which in turn influence subsequent attachments formed by the person" (Muller, 1993, p. 201). Attachments include previous attachment experiences and interrelationships with partners, the unborn baby, and pregnancy adaptation. Muller (1990) defined attachment as "the unique, affectionate relationship that develops between a woman and her fetus" (p. 11). Along with this definition, attachment and pregnancy adaptation literature provided the basis for the items included in the PAI.

Validity and reliability were determined for the PAI. PAI scores were correlated with scores of other instruments that measured constructs in the attachment model, specifically, pregnancy adaptation and marital satisfaction. This was done to determine construct validity. There was a negative correlation ($r = -.25$) between the PAI and the pregnancy adaptation scores, which were measured by the Maternal Adjustment and Maternal Adaptation Scale (MAMA) (Kumar, Robson, & Smith, 1984). This indicated an overall positive adaptation to pregnancy. There was no correlation ($r = .05$) between the PAI and the marital
satisfaction scores as measured by the Kansas Marital Satisfaction Scale (KMSS) (Schumm, Paff-Bergen, Hatch, Obiorah, Copeland, Meens, & Bugaighis, 1986) and the MAMA Marital Relations subscale.

PAI scores also were correlated with an established instrument, the Maternal-Fetal Attachment Scale (MFAS) (Cranley, 1981). The MFAS has been a frequently cited instrument in prenatal attachment literature. This was used to assess concurrent validity. PAI and MFAS were strongly correlated (r = .72).

To determine reliability, Cronbach's alpha coefficient of reliable internal consistency was .81. Muller (1993) also calculated the alpha for Whites (.80) and non-Whites (.82) to determined PAI stability across the sample.

Data Collection Procedures

During the months of May to July, 1996, a total of six childbirth education classes were approached to participate in the study. Each childbirth class was designated as either an experimental group or a control group to avoid confusion. A verbal explanation of the study was provided as part of the registration process during the first class. Individual pregnant women or small groups of two or three pregnant women, along with their partners, were approached. A brief written explanation in the form a cover letter (Appendix C for the experimental group and Appendix D for the control group) along with a consent form (Appendix E for the experimental group and Appendix F for the
control group) were provided to each pregnant woman. Included with the cover letter and consent form were the PAI (Appendix B) and the demographic questionnaire (Appendix A). The experimental group also received the protocol for performing effleurage (Appendix G).

The pregnant women in the experimental group were informed that they would be asked to perform effleurage for five minutes, twice a day, fill out a log, and on the last day of the childbirth education class they would be asked to complete the PAI again. The pregnant women in the control group were informed that on the last day of the childbirth education class they would be asked to complete the PAI again.

The pregnant women were asked to fill out the information during registration or break time, not during class time. The consent forms and questionnaires were then collected during a later break. Those in the experimental group were informed that written consent also would be obtained from their physician indicating that they were low-risk, carrying singleton babies, and were medically allowed to perform effleurage.

Prior to developing the protocol, three physicians were contacted for their opinion and support. Each gave verbal approval for the participation of low risk pregnant women in performing light, gentle effleurage as depicted in the protocol.

During the following week, physicians’ office personnel were contacted either by phone or in person. A brief explanation of the study was given along with written information in the form of
the Physician's Cover Letter (Appendix H), Physician's Consent Form (Appendix I), and all the written information that the pregnant women received. The physicians' office personnel then faxed or handed the signed consents to the researcher.

The individuals in the control group did not need physician consent. They were not taught the intervention of effleurage.

After physician consent, during the second class session, the intervention of effleurage was taught to the experimental group during the second childbirth class. Those subjects who did not receive consent from their physician were informed that they were excluded from the study. A demonstration of effleurage was provided. A written protocol was developed to ensure consistency of implementation.

The protocol consisted of the following steps:
1. The subject should assume a comfortable, relaxing position.
2. The subject may lubricate her skin with lotion, vegetable or mineral oil to facilitate smooth strokes.
3. The subject should place the palms of both hands just above the pubic bone.
3. She should move her hands gently and lightly out to her sides and around to the top of her uterus.
4. She should bring her hands to the middle of her uterus and progress downward toward the pubic bone.
5. The subject should do this in about 4 seconds, or about 15 times each minute.
6. She should continue this stroke for five minutes, two times
per day.
7. She should record the dates and times that she performed the effleurage.
8. She was instructed to discontinue the stroking if she felt any discomfort.

The experimental group was instructed to perform the massage protocol for five minutes, two times per day. The massage stroke was reinforced during the next three classes through instruction and demonstration, as in the second class. Support was given by asking if there were any questions or concerns. Encouragement was given by expressing gratitude for participation. A log was provided during the second class to record each time effleurage was performed. During the last class, the PAI was given for the second time to both the control and experimental groups. The researcher invited participants and others who were interested in the results of the study to write their names and addresses on a list on the last day of class so that a copy of the summary could be mailed to them.

Protection of Human Subjects

Special consideration was given to the protection of the human subjects included in the study. Permission to conduct the study was first obtained from the Human Subjects Research Review Committee at Drake University. Next, permission from the Human Subjects Committee at the medical center was obtained.

Participation in the study was entirely voluntary. A cover letter for the pregnant women in the experimental group (Appendix
C) and the control group (Appendix D) was provided explaining the purpose of the study, procedures, the risks and benefits of participation, subjects' rights, and how a summary of the results could be obtained. After reviewing the cover letter, the experimental subjects were asked to sign and date the consent form (Appendix E). The control subjects also were asked to sign a consent form (Appendix F).

Written consent from the physician of each subject also was obtained (Appendix I). A cover letter (Appendix H) was provided to the physicians that explained the purpose of the study, the procedure, information that the patient received, and method of obtaining results of the study. It was requested that the cover letter and a copy of the consent be placed on the subject’s chart. In case of a change in the subject’s condition, the physician could request that the subject discontinue participation in this study. The cover letter provided the phone number and address of the researcher.

The subject’s rights included the right to privacy, the right to informed consent, and the right to freedom from harm. Confidentiality was guaranteed. Names were only used when obtaining consent from the physician and to cross reference pre- and posttest scores. The subjects were informed that participation was voluntary and that the subject or her physician could terminate the subject’s participation at anytime without penalty. The subjects were informed of risks and benefits of participation. Results of the study were provided to the
Birthing Center, the Childbirth Education Department, and to any subjects or other persons who designated interest in receiving the results of the study.

Summary

To investigate the effects of effleurage on prenatal attachment, a quasi-experimental research design was used. The study included 33 control subjects and 16 experimental subjects who attended childbirth education classes and completed the questionnaires. The total number of subjects completing the study was 49. Two data collection tools, the Demographic Information tool and the PAI, were administered during the first class as a pretest to both the control and experimental groups. After obtaining physician consent, the experimental group was taught the intervention of massage during the second class and was asked to perform it twice a day. The PAI was administered to both groups as a posttest during the last day of class. Chapter Four analyzes the data obtained from the study.
CHAPTER FOUR

ANALYSIS OF DATA

The purpose of this study was to examine the effects of effleurage on prenatal attachment. This chapter is divided into three sections. The first section describes the demographic characteristics of the sample. The second section analyzes the data in relationship to the research hypotheses. The final section summarizes the chapter.

Description of the Sample

The total number of subjects who participated in the study was 49. As illustrated in Table 1, the experimental group consisted of 16 pregnant women who attended childbirth education classes at a medical center located in the Midwest during May, June, and July, 1996. The ages of the women in the experimental group ranged from 23 to 32, with a mean of 27.7. The gestational ages of the women ranged from 21.14 weeks to 33.86 weeks, with a mean of 29.66 weeks. Fifteen (94%) of the subjects in the experimental group were married and one (6%) was cohabitating. One subject (6%) had attained a high school diploma as the highest educational level, two (13%) had some college education, 12 (75%) had received their baccalaureate degree, and one (6%) had earned a doctoral degree.

Thirteen (81%) of the subjects in the experimental group reported very adequate social support, with three (19%) reporting adequate social support. Not one subject reported inadequate social support. All experimental group subjects were first time
mothers and Caucasian.

As illustrated in Table 1, the control group consisted of 33 subjects who attended the childbirth education classes during May and June. The ages of the women in the control group ranged from 19 to 39, with a mean of 27.5. The gestational ages of the women ranged from 17.43 weeks to 33.57 weeks with a mean of 30.2. Twenty-nine (88%) of the control group subjects were married, with two (6%) reporting cohabitating, and two (6%) engaged. The highest educational level attained ranged from two (6%) who had some high school, five (15%) who had graduated from high school, ten (30%) with some college, thirteen (39%) with baccalaureate degrees, two (6%) with master's degrees, and one (3%) subject had a doctoral degree.

Perceived social support was reported as very adequate for 25 (76%) of the control group subjects and adequate for eight (24%). Not one subject reported inadequate social support. Twenty six (79%) subjects in the control group were Caucasian, three (9%) were Native American, two (6%) were Hispanic American, one (3%) was Asian American, and one (3%) reported a mixture of Caucasian and African American. Twenty-seven (82%) of the control group subjects were first time mothers with six (18%) reporting having one other child.
### Table 1

**Demographic Characteristics of the Sample**

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Demographic Characteristics of the Sample (con’t)

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<td>RACE/ETHNICITY</td>
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<tr>
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<td>100</td>
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<tr>
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<td>0</td>
<td>2</td>
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<tr>
<td>Native Amer</td>
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<td>0</td>
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<tr>
<td>Asian Amer</td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Mix</td>
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<td>0</td>
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</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>100</td>
<td>33</td>
</tr>
</tbody>
</table>

Research Hypotheses

Research Hypothesis 1

Three research hypotheses were tested in this study. The first hypothesis was: Pregnant women in the experimental group who use the intervention of massage will demonstrate a significantly greater increase between pretest/posttest Prenatal Attachment Inventory (PAI) (Appendix B) scores than pregnant women in the control group.

To test this hypothesis, the PAI scores were obtained for the experimental and control groups. The PAI is a 21-item tool
that consists of statements of thoughts, feelings, and situations that women experience during pregnancy. Possible scores range from 21 (indicating low prenatal attachment) to 84 (indicating high prenatal attachment).

As illustrated in Table 2, experimental group pretest PAI scores ranged from 48 to 79, with a mean of 62.88. The experimental group PAI posttest scores ranged from 48 to 81, with a mean of 69.56. A dependent t-test, with an alpha level set at .05, as illustrated in Table 3, demonstrated that there was a significant increase between the PAI pretest and posttest scores of the experimental group (p = 0.0009). This indicates that there was a significant increase between the pretest and posttest attachment scores following implementation of the intervention of massage in the experimental group.

As illustrated in Table 2, the control group PAI pretest scores ranged from 43 to 79, with a mean of 63.58. The control group PAI posttest scores ranged from 52 to 83, with a mean of 66.64. A dependent t-test with an alpha level set at .05, as illustrated in Table 3, demonstrated that there was a significant difference between the pretest and posttest PAI scores of the control group (p = 0.0144). This indicates that there was a significant increase between the pretest and posttest attachment scores of the control group, with no implemented intervention.
Table 2

Pretest and Posttest PAI Score Ranges and Means for the Experimental and Control Groups

<table>
<thead>
<tr>
<th></th>
<th>PAI SCORES</th>
<th>RANGE</th>
<th>MEAN</th>
<th>STANDARD DEVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERIMENTAL</td>
<td>PRETEST</td>
<td>48-79</td>
<td>62.88</td>
<td>8.69</td>
</tr>
<tr>
<td></td>
<td>POSTTEST</td>
<td>48-81</td>
<td>69.56</td>
<td>8.90</td>
</tr>
<tr>
<td>CONTROL</td>
<td>PRETEST</td>
<td>43-79</td>
<td>63.58</td>
<td>9.39</td>
</tr>
<tr>
<td></td>
<td>POSTTEST</td>
<td>52-83</td>
<td>66.64</td>
<td>8.51</td>
</tr>
</tbody>
</table>

Table 3

Dependent T-Test Analysis of Pretest/Posttest Differences for the Experimental and Control Groups

<table>
<thead>
<tr>
<th>alpha=.05</th>
<th>N</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERIMENTAL</td>
<td>16</td>
<td>-3.77</td>
<td>15</td>
<td>0.0009</td>
</tr>
<tr>
<td>CONTROL</td>
<td>33</td>
<td>-2.29</td>
<td>32</td>
<td>0.0144</td>
</tr>
</tbody>
</table>

Although there was a significant increase in the PAI scores of the experimental group (p = 0.009), there was also a significant increase in the control group scores (p = 0.0144). To determine if the increase between the experimental group’s PAI pretest and posttest scores was significantly greater than control group’s scores, an independent t-test of the mean differences between the pretest and posttest scores was applied.
With an alpha set at .05, no significant difference was found \((t = 1.63, p = 0.0560)\). As illustrated in Table 4, the research hypothesis that pregnant women in the experimental group who used the intervention of massage will demonstrate a more significantly higher increase between pretest/posttest PAI scores than the control group was not supported.

Table 4

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>MEAN</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERIMENTAL</td>
<td>16</td>
<td>6.688</td>
<td>1.634</td>
<td>32</td>
<td>0.056</td>
</tr>
<tr>
<td>CONTROL</td>
<td>33</td>
<td>3.061</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Research Hypothesis 2

The second hypothesis was: Pregnant women in the experimental group who use the intervention of massage will have significantly higher posttest PAI scores than the pregnant women in the control group. To test this hypothesis, the alpha was set at .05 and an independent t-test was applied to the posttest PAI scores of the experimental and control groups. The experimental group PAI posttest scores ranged from 48 to 81, with a mean of 69.56. The control group PAI posttest scores ranged from 52 to 83, with a mean of 66.64. As illustrated in Table 5, there was
no significant difference between the posttest PAI scores of the experimental and control groups \((p = 0.14)\).

The pretest PAI experimental and control group scores also were compared by using an independent t-test with an alpha level set at 0.05. Again, there was no significant difference between the pretest scores \((p = 0.40)\).

Table 5

**Independent T-Test Analysis of Pretest and Posttest Differences Between the Experimental and Control Groups**

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>(df)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRETEST EXP / PRETEST CON</td>
<td>-0.25</td>
<td>47</td>
<td>0.40</td>
</tr>
<tr>
<td>POSTTEST EXP / POSTTEST CON</td>
<td>1.11</td>
<td>47</td>
<td>0.14</td>
</tr>
</tbody>
</table>

The research hypothesis that pregnant women in the experimental group who use the intervention of massage will have significantly higher posttest PAI scores than the pregnant women in the control group was not supported. There was no significant difference between the posttest PAI scores of the experimental and control groups.

**Research Hypothesis 3**

The third hypothesis was: There is no relationship among the demographic variables of maternal age, marital status, education level, perceived social support, number of other living children, and race/ethnicity and PAI scores. A Pearson r was applied to
compare all PAI posttest scores with each of the demographic variables mentioned above.

PAI posttest scores demonstrated a very weak inverse relationship with maternal age ($r = -0.105$) and number of children ($r = -0.113$). There was no statistically significant relationship between PAI posttest scores and marital status ($r = -0.001$), educational level ($r = -0.015$), or race/ethnicity ($-0.008$). Social support showed a moderate positive relationship ($r = 0.311$).

A Pearson $r$ was also applied to gestational age. There was no significant relationship between PAI scores and gestational age ($r = 0.028$).

Thus, the hypothesis of no statistically significant relationship between PAI scores and the demographic variables was supported for marital status, educational level, maternal age, number of children, and race/ethnicity. There was essentially no relationship found between PAI scores and these variables. The hypothesis of no significant relationship was not supported for the demographic variable of perceived social support because a moderate positive correlation was found. There was also no significant relationship between PAI scores and gestational age.

Additional Findings

Qualitative information was obtained by including additional comments: Please share any other ways that you have developed a relationship with your unborn baby. There were three subjects who responded in the experimental group. There were eleven
subjects who responded in the control group.

One subject in the experimental group reported that the baby responded to the massage and seemed to reach out to the mother. Several subjects reported singing, talking, or reading to their baby. Other subjects invited family members to participate in a relationship with the unborn baby. There were several examples of this. Some pregnant women included the sibling when reading to the unborn baby. One subject reported that the unborn baby responded by kicking when the father was near. Another allowed the father to play a "poking game" with the unborn baby, where the father would poke the baby in a rhythmic way, and the baby would respond by poking back in the same way.

Summary

To examine the effects of effleurage on prenatal attachment, three hypotheses were tested with an experimental group of 16 pregnant women and a control group of 33 pregnant women. Both the experimental and control groups demonstrated significant improvement between the pretest and posttest PAI scores. The mean differences between the pretest and posttest scores of the experimental and control groups were compared to determine if the increased level of improvement of the experimental group was significantly higher than the control group. The level of significance, however, was not significant.

Correlational relationships were determined between PAI scores and demographic variables. The only moderate correlation noted was between PAI scores and perceived social support. There
was no statistically significant relationship between PAI scores and the demographic variables of marital status, educational level, race/ethnicity, maternal age, number of children, or gestational age.

Two themes emerged in the qualitative data. Several subjects verbally communicated with their unborn babies. Husbands and siblings were allowed to communicate and interact with the baby.
CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS, AND IMPLICATIONS

The purpose of this study was to examine the effects of effleurage on prenatal attachment. A quasi-experimental research design was used for the study. A group of 49 pregnant women who attended childbirth education classes at a medical center in the Midwest participated in the study. The experimental group consisted of 16 pregnant women who were taught the intervention of effleurage. The control consisted of 33 pregnant women who were not taught the intervention.

Three research hypotheses were posed for the study. The first research hypothesis was: Pregnant women in the experimental group who use the intervention of massage will demonstrate a significantly greater increase between pretest/posttest PAI scores than pregnant women in the control group. With an alpha level set at .05, an independent t-test of the mean differences between the pretest/posttest scores for the experimental and control groups revealed \( t = 1.634, p = 0.560 \). This hypothesis was not supported.

The second research hypothesis was: Pregnant women in the experimental group who use the intervention of massage will have significantly higher posttest scores than women in the control group. There was no significant difference between the posttest PAI scores of the experimental and control groups \( (t = 1.11, p = 0.14) \).

The third hypothesis was: There is no relationship among the
demographic variables of maternal age, marital status, education level, perceived social support, number of other living children, and race/ethnicity and PAI scores. Social support was the only moderate correlation noted (r = 0.311). Maternal age (r = -0.105) and number of children (r = -0.113) demonstrated a weak inverse relationship. There was no statistically significant relationship between PAI scores and the demographic variables of marital status (r = -0.006), educational level (r = -0.015), race/ethnicity (r = -0.008), or gestational age (r = 0.028).

Discussion

This study examined the effects of effleurage on prenatal attachment. The findings of the first hypothesis, that stated that the experimental group would demonstrate a greater increase in PAI scores than the control group, approached significance (p = 0.0560). This borderline result confirms the importance of continued research on interventions that promote prenatal attachment. Possibly a combination of communication and interaction interventions may be necessary to promote prenatal attachment, as was performed in the Carter-Jessop study (1981).

In this study, there was a moderate correlation (r = 0.311) between prenatal attachment and social support. This supports a consistent finding found in the literature. Cranley (1981) reported a strong positive correlation (r = .51) involving social support and prenatal attachment. Similarly, Mercer, Ferketich, May, DeJoseph, & Sollid (1988) reported a moderate positive
correlation \((r = .23)\) that applied to low risk women only.

Because this has been a fairly consistent result, it is important to explore the relationship between prenatal attachment and social support further. If the positive relationship continues to be consistent, suggested studies might explore how nurses can contribute to "mothering the mother" at all stages of her pregnancy as well as during the postnatal period. Bowlby (1951) noted that "if a community values its children it must cherish their parents" (p. 84).

The lack of relationship between prenatal attachment and gestational age \((r = 0.028)\) is inconsistent with previous studies that have examined the relationship between prenatal attachment and gestational age. This may be because in this study, probably all of the pregnant women had experienced fetal movement at some time before the pretest. In some studies, the pretest was performed before quickening, and the posttest after quickening (Cranley, 1984; Grace, 1989; Heidrich & Cranley, 1989).

Cranley (1984) found that attachment scores, as measured by the MPAS, were higher in women who were beyond 20 weeks gestation than for women under 20 weeks gestation. A study involving a sample who completed the MFAS five times, at four week intervals, demonstrated that MPAS scores increased as gestation increased (Grace, 1989). The least amount of stability in scores occurred during early second trimester. This was attributed to some of the sample experiencing fetal movement, and others not. Heidrich & Cranley (1989) found that women who had experienced fetal
movement had a higher MFAS score that those who did not.

The literature review contained few nursing intervention studies that promote prenatal attachment. This current study examined the effects of a prenatal intervention (effleurage) on prenatal attachment and found no significant effects. Other studies that examined the effect of prenatal intervention on postnatal attachment also produced inconsistent results.

In the study by Carter-Jessop (1981), the pregnant women in the experimental group performed a three-part intervention. The control group did not perform the intervention. The intervention was abdominal massage along with checking the position of the unborn baby and becoming more aware of the baby's activities and how her interactions affect the baby. The total sample size was small (N = 10). Postnatal attachment was evaluated comparing the experimental group with the control group. The tool had not been tested for reliability or validity, but items in the tool were substantiated by the literature (Klaus et al., 1970). The experimental group demonstrated significantly more attachment behaviors postnatally than the control group. A pretest was not administered.

Carson & Virden (1984) and Davis & Akridge (1987) attempted a modified replication of this study. In both of these studies, however, no relationship was found between prenatal intervention and postnatal attachment. Cranley's (1981) Maternal Fetal Attachment Scale (MFAS) was administered as a pretest in the Davis & Akridge (1987) study. As found in this study, there was
no significant difference between the prenatal attachment scores of the experimental and control groups in that study. There also was no significant difference between the postnatal attachment scores in either study.

**Limitations of the Study**

There are several major limitations of this study. The sample size was small (total \( N = 49 \)), particularly the experimental group (\( N = 16 \)). The control group had approximately twice as many subjects (\( N = 33 \)) as the experimental group. In addition, the sample was homogenous. Most of the subjects were low risk, white, married, well educated, and had at least an adequate support system. Due to the small size and the lack of diversity of the sample, the ability to generalize the results is limited. With a much larger and diverse sample, the results may be more pertinent to the body of nursing knowledge.

The Hawthorn effect was likely. The subjects were aware that they were participating in a study and this may have been sufficient to cause them to alter their answers on the questionnaire. Even though the questionnaire stated that there were no right answers, it might have been apparent to the subjects as to what the more desirable answers were.

The sensitization of the testing effect also might have occurred. The pretest may have offered suggestions that changed the subjects' attitudes for the posttest.

In addition to the major limitations, other limitations may be due to measurement capabilities. Prenatal attachment can be
described, but measuring something that is a process, never-ending, and always developing, can be very difficult to quantify. Measuring prenatal attachment is particularly difficult because of the subjective, private nature of the experience. Tools that have been developed to measure postnatal attachment focus on attachment behaviors. Common attachment behaviors that are measured are eye contact, touching, and vocalizations (Brazelton, 1992; Denehy, 1992; Klaus & Kennel, 1976). There are fewer observable behaviors with prenatal attachment.

Another limitation of the study may be the lack of knowledge of how closely these attachment behaviors reflect the feelings of attachment. Bowlby (1969) stated that attachment behaviors produce attachments. Koniak-Griffith (1993) differed by stating that feelings are not always related to behavior. Neither author offered research to support their claims.

The conceptual definition of prenatal attachment for this study defined it as an affectional relationship. The focus was on the affective, rather than behavioral or cognitive aspects, of attachment. The conceptual basis for the development of the PAI (Muller, 1993), the tool chosen for this study, was consistent with the emphasis on the affective domain. The tool, however, does contain many elements of the behavioral and cognitive domains, specifically, prenatal tasks of maternal role attainment. Can the cognitive, behavioral, and affective aspects of attachment be separated and tested separately? Does the strength of one aspect of attachment reflect the strength of the
others? Is it more accurate to test all three aspects of attachment at the same time? These tool-related questions are not answered in the literature.

Although Muller (1993) stated that her tool reflected affiliation rather than behaviors, she also stated that there was a strong correlation between her tool and Cranley's, the MFAS (1981) \( r = .72 \). Cranley (1981) stated that prenatal attachment depended on accomplishing developmental tasks of pregnancy. Grace (1989) agreed, reporting that Cranley's tool measures prenatal behaviors, specifically, prenatal maternal tasks of role attainment, rather than prenatal affiliation. The high positive correlation between the tools suggests that both tools are measuring the same concept and the claim that the PAI is affiliative and the MFAS is behavioral is questionable. Muller (1993) proposed that more than one tool may be needed to adequately measure prenatal attachment.

Rubin (1984) stated that attachment and maternal identity are "coordinates of the same process" (p. 51). It is unclear if measuring one is a reflection of the measurement of the other. Fuller (1990) noted some limitations of measuring attachment. She stated that many studies attempted to measure prenatal attachment within the framework of pregnancy adaptation yet others noted the need to differentiate between adaptation to the pregnancy and attitudes toward the unborn baby. Are these concepts the same, separate, or interrelated? Clarity of these issues is needed.
Recommendations for Future Studies

A modified replication of this study is recommended. A larger, more diverse, random sample would be suggested. The body of knowledge could be increased by using a higher risk sample and a different method of intervention, such as talking or singing to the unborn baby. Using a combination of interventions to promote prenatal attachment also may be beneficial. Because there has been inconsistent results in correlating prenatal and postnatal attachment, structuring the study so that correlation of the results with postnatal attachment would increase the usefulness and validity of the knowledge of prenatal attachment.

Another modification would be to explore prenatal attachment between the unborn baby and significant others, such as fathers, siblings, and grandparents. With the prevalence of the family focus, studies involving the family’s level of attachment to the unborn baby and the mother’s perceived social support could provide valuable information.

Verny & Kelly (1981) and Brazelton (1992) have suggested that a pregnant woman’s thoughts and feelings could have a significant impact on the emotional development of the child. Correlational studies that add to or dispute this statement need to be conducted. A research question to consider may be: Does significant and persistent prenatal maternal ambivalence (or stress) affect the development of the child?

Perhaps qualitative studies or a combination of quantitative-qualitative studies could be useful. An open-ended
question such as "Which interventions make you feel closer to, more positive toward, or good about the baby?" could be explored. That could be a starting point for the types of prenatal interventions that could be researched.

Cultural differences in prenatal and postnatal bonding also need to be explored. Grace (1984) suggested that there is a wide range of individual differences in the way mothers display postnatal attachment behaviors. Exploring these differences and disseminating that knowledge will assist nurses in promoting attachment in ways that are natural for the individual within her culture.

With the increased use of fertility drugs and procedures, there are studies needed on prenatal and postnatal attachment of mothers of multiple births. One approach could be to investigate the attachment and grief of a mother when one of the babies is critically ill or dies while the other(s) are healthy. Does a mother attach and grieve at the same time? What can nurses do to assist the process of grieving while attaching? How can these two concepts be measured in this situation?

Knowledge of babies who are adopted out was not examined in this study. It is assumed that prenatal attachment should not be promoted in these circumstances. It also is assumed that even though prenatal attachment is not promoted for adopted babies, healthy personality development would still occur within a loving adoptive family. The parental pattern of being sensitive and responsive to the baby as an individual may be promoted within
the new family. Issues related to adoption, such as how the nurse can facilitate the process for all involved, should be sensitively explored.

As eluded to earlier, tool refinement is needed. Before this can happen, there is an essential need for expanded theorization of prenatal attachment, conceptual development, and differentiation of closely related concepts. This would include the development of propositions that relate the closely related concepts to each other. When this knowledge is available and widespread, then construct validity will be more accurate, and tool revisions can occur.

Implications for Advanced Nursing Practice

Although the relationship between postnatal massage and postnatal attachment is highly supported (Ainsworth, 1982; Bowlby, 1969; Brazelton, 1982; Klaus & Kennell, 1982; Rubin, 1977; Verny & Kelly, 1988), few studies have specifically examined the relationship between prenatal massage and prenatal attachment. When considering the postnatal benefits of increased attachment with infant massage, it would seem that there are potential benefits that may result from the prenatal implementation of massage. With tool refinement and prenatal massage, coupled with other forms of communication and interaction, a relationship between prenatal massage and prenatal attachment may be found.

The findings of this study were nonsignificant. This study, however, still provides meaningful knowledge for the nursing
profession. Through the review of the literature and the results of this study, it is confirmed that more studies are needed that test a variety of nursing interventions that promote prenatal attachment. Conceptual clarification is needed, which would enhance both tool refinement and theory development. The opportunities for the nurse researcher to actively study prenatal attachment have been discussed throughout this chapter. Keeping current with the literature, attending seminars, and networking with other nurses also are ways to gain knowledge through research.

The moderate positive correlation of social support and prenatal attachment that was found in this study also is supported in the literature. This may be a very important intervention that nurses could use to promote attachment. The nurse could assess the pregnant woman’s support system. The advanced practice maternal-child nurse, nurse practitioner, or nurse midwife could be part of the support system and also assist the pregnant woman in finding ways to strengthen her current support system.

As new literature reveals effective methods of promoting prenatal attachment, the nurse administrator could incorporate prenatal attachment promotion into childbirth education classes. Nurse administrators in an office or clinic setting could arrange prenatal visits so that time is allowed periodically for teaching prenatal and postnatal attachment interventions. The nurse administrator would need to budget for teaching materials that
could be dispensed during teaching periods and reviewed at a later visit. The materials would need to be appropriate to the mother's educational and cultural background.

The nurse educator could instruct nursing students, novice nurses, and experienced nurses on emerging attachment interventions. The theoretical framework along with current techniques of attachment promotion could be introduced. Encouraging students, novices, and experienced nurses to read current prenatal attachment literature, to research their own ideas, and disseminate their information also could be a part of the nurse educator's role. The importance of social support during the pregnancy and after delivery also could be included.

As nurse leaders, advance practice nurses may be the person to suggest and initiate changes relevant to prenatal attachment in settings that need updating. Initiating a positive change in their setting by presenting current researched information on prenatal attachment and a feasible plan for change could be beneficial to the maternal-child population.

Supportive care during pregnancy and beyond is best accomplished with the help of an advanced practice maternal-child nurse. With a focus on the developing attachments throughout pregnancy, the nurse can "mother the mother" throughout her pregnancy. This will add to her social support and promote attachment and the health of the family. The pattern of sensitive, responsive interaction between a mother and her child can be developed and established prenatally, so that it can
continue for years to come.

The quality of society depends on the strength of the family. The strength of the family depends on healthy attachments within the family. These attachments can be acknowledged and supported both prenatally and postnatally. With nurses promoting attachment and "mothering the mother," significant contributions can be made to the health of society.
REFERENCES


APPENDIX A

Demographic Information
DEMOGRAPHIC INFORMATION

1. Name: ________________________________

2. Doctor’s name ________________________

3. Due date _____________________________

4. Age: _____ years

5. Marital status:
   _____ Married         _____ Cohabitating
   _____ Single          _____ Separated
   _____ Divorced        _____ Engaged
   _____ Other (Please explain)

6. Highest level of education
   _____ Some high school  _____ Bachelors degree
   _____ Graduated from high school  _____ Masters degree
   _____ Some college      _____ Doctoral degree

7. Amount of social support from friends or family
   _____ inadequate
   _____ adequate
   _____ very adequate

8. Number of other living children _____

9. Race/Ethnicity
   _____ Caucasian          _____ African American
   _____ Hispanic American  _____ Asian American
   _____ Native American    _____ Other (Please specify)

You have completed the questionnaire. Thank you very much.
APPENDIX B

Prenatal Attachment Inventory
The Prenatal Attachment Inventory

The following sentences describe thoughts, feelings, and situations women may experience during pregnancy. I am interested in your experiences during the past month. Please circle the letter under the word that applies to you. There are no right or wrong answers, just your answers. I am interested in your thoughts and feelings.

<table>
<thead>
<tr>
<th></th>
<th>Almost</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I wonder what the baby looks like now . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>2. I imagine calling the baby by name . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>3. I enjoy feeling the baby move . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>4. I think that my baby already has a personality . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>5. A lot of other people put their hands on my tummy to feel the baby move . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>6. I know things I do make a difference to the baby</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>7. I plan the things I will do with my baby . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>8. I tell others what the baby does inside me . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>9. I imagine what part of the baby I’m touching .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>10. I know when the baby is asleep . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>11. I can make my baby move</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Almost Always</td>
<td>Often</td>
<td>Sometimes</td>
<td>Almost Never</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------</td>
<td>-------</td>
<td>-----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>I buy/make things for the baby . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>13.</td>
<td>I feel love for the baby</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>14.</td>
<td>I try to imagine what the baby is doing in there . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>15.</td>
<td>I like to sit with my arms around my tummy . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>16.</td>
<td>I dream about the baby .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>17.</td>
<td>I know why the baby is moving . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>18.</td>
<td>I stroke the baby through my tummy . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>19.</td>
<td>I share secrets with the baby . . . . . . . . . . . .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>20.</td>
<td>I know the baby hears me</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>21.</td>
<td>I get very excited when I think about the baby .</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

Additional comments: Please share any other ways that you have developed a relationship with your unborn baby. Any information would be greatly appreciated. Thank you.

You have completed the questionnaire. Thank you very much.

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APPENDIX C

Experimental Subjects' Cover Letter
Dear Expectant Mother,

As a registered nurse enrolled in the graduate nursing program at Drake University, Des Moines, Iowa, I am concerned about ways in which nurses can promote bonding between mothers and their babies. I am conducting a research study for the purpose of studying if massage can enhance mother-baby bonding. The major benefit of participation in this study is to increase nurses' knowledge of actions that can enhance the bonding of mothers and their babies. There are no known risks in participation of this study beyond the ten minutes used for completing the questionnaires, and ten minutes per day needed to perform the effleurage.

Your participation will entail completing one questionnaire at the beginning of the prenatal childbirth education course and one at the end of the course. In addition, you will be performing a form of massage called effleurage. Beginning the second week of the childbirth course, you will be asked to perform a gentle, light, long, rhythmic, self-stroking massage of your abdomen. A written protocol explaining the procedure will be provided to you as well as a demonstration at each class. A log also will be furnished so you can record when you perform the effleurage.

Your participation in this study is strictly voluntary. You may withdraw your participation at anytime without affecting any aspect of the care you will receive. All information will be held in the strictest of confidence. Nothing identifying you will be included in the study. Your answers will be anonymous. If you would like a summary of this study, you may notify me at the address below.

You will be asked to sign a consent stating your willingness to participate. I also will be contacting your doctor in order to get his/her consent for your participation.

This study is being conducted in connection with my Master's of Science in Nursing degree at Drake University, Des Moines, Iowa, under the supervision of Sandra Sellers, Ph.D., R.N., Drake University, phone 515-271-2754.

Please keep this letter. If you have any comments or questions I can be contacted at 254-1907 (home) or 247-3207 (work, on Wednesdays and Thursdays). Please call anytime.

Thank you for your valuable contribution.

Sincerely,

Dale Brown, RN
7124 Townsend
Urbandale, Iowa
50322
APPENDIX D

Control Subjects' Cover Letter
Dear Expectant Mother,

As a registered nurse enrolled in the graduate nursing program at Drake University, Des Moines, Iowa, I am concerned about the ways in which nurses can promote the bonding between mothers and their babies.

Your participation will entail completing one questionnaire at the beginning of the prenatal childbirth education course and one at the end of the course. The major benefit of your participation is to increase nurses' knowledge of actions that can enhance the bonding between mothers and their babies.

There are no risks beyond the ten minutes needed for completing the questionnaires. You will be asked to sign a consent stating your willingness to participate.

Your participation in this study is strictly voluntary. You may withdraw your participation at anytime without affecting any aspect of the care you will receive. All information will be held in the strictest of confidence. Nothing identifying you will be included in the study. Your answers will be anonymous. If you would like a summary of this study, you may notify me at the address below.

This study is being conducted in connection with my Master's of Science in Nursing degree at Drake University, Des Moines, Iowa, under the supervision of Sandra Sellers, Ph.D., R.N., Drake University, phone 515-271-2754.

Please keep this letter. If you have any comments or questions I can be contacted at 254-1907 (home) or 247-3207 (work, on Wednesdays and Thursdays). Please call anytime.

Thank you for your valuable contribution.

Sincerely,

Dale Brown, RN
7124 Townsend
Urbandale, Iowa
50322
APPENDIX E

Experimental Subjects' Consent Form
EXPECTANT MOTHER'S CONSENT FORM

I have read and understand the cover letter and this consent. I agree to participate in this study. I understand that my participation is voluntary. If I choose not to participate I understand that the care that I receive will not be affected in any way. I understand that I will be given two questionnaires at the beginning of the childbirth course and one questionnaire at the end of the course. Beginning after the second childbirth class I will be asked to perform effleurage for five minutes, two times per day. Each time I perform the effleurage, I will record the date and time on a log provided to me. I know that the effleurage should be stopped if I experience any discomfort. I also agree to have my doctor contacted, on my behalf, for his/her consent of my participation. I have received a cover letter explaining the procedure. I understand that I am welcome to contact the researcher at anytime and have been provided with names and phone numbers.

No commitment is made to provide free medical care or compensation for any adverse results, due to participation in this study. Medical services for treatment of adverse results will be offered at the usual charge. Further information concerning policies in this regard, or information about the conduct of this study or the rights of research subjects, may be obtained from the researcher.

(Expectant Mother's signature)

date

(Witness)

date
APPENDIX F

Control Subjects' Consent Form
EXPECTANT MOTHER'S CONSENT FORM

I have read and understand the cover letter and this consent. I agree to participate in this study. I understand that my participation is voluntary. If I choose not to participate I understand that the care that I receive will not be affected in any way. I understand that I will be given two questionnaires at the beginning of the childbirth course and one questionnaire at the end of the course. I understand that I am welcome to contact the researcher at anytime and have been provided with names and phone numbers.

No commitment is made to provide free medical care or compensation for any adverse results, due to participation in this study. Medical services for treatment of adverse results will be offered at the usual charge. Further information concerning policies in this regard, or information about the conduct of this study or the rights of research subjects, may be obtained from the researcher.

(Expectant Mother's signature)

(date)

(Witness)

(date)
APPENDIX G

Protocol for Performing Effleurage
PROTOCOL FOR PERFORMING EFFLEURAGE

Beginning next week, please perform the following protocol:

1. Begin by assuming a comfortable, relaxing position.
2. You may lubricate your skin with lotion, vegetable or mineral oil to facilitate smooth strokes.
3. Place the palms of both hands just above the pubic bone.
4. Move your hands gently and lightly out to your sides and around to the top of your uterus.
5. Bring your hands to the middle of your uterus and progress downward toward the pubic bone.
6. Try to do this in about 4 seconds, or about 15 times each minute.
7. Continue this stroke for five minutes, two times each day.
8. Please record the dates and times that you perform the effleurage.
9. Please discontinue the stroking if you feel any discomfort.
APPENDIX H

Physicians’ Cover Letter
Dear Physician,

As a registered nurse enrolled in the graduate nursing program at Drake University, Des Moines, Iowa, I am conducting a research study in which a patient of yours may be participating. The purpose of the study is to examine the effects of effleurage on prenatal attachment. Your patient has consented to participate and has been informed that participation is voluntary and that she may discontinue her participation at anytime.

Your patient will be asked to complete questionnaires and perform a gentle, light, abdominal effleurage for five minutes, two times per day. A protocol of how to perform the effleurage is attached, as well as all other information provided to your patient. She will be instructed to stop if she feels any discomfort. Your patient will receive the printed instructions along with name and phone numbers of myself and my thesis advisor.

I am including a consent form for you to sign indicating that your patient is low risk and that your permission is granted, if she chooses to participate. Please indicate to me any unusual restrictions or conditions, if necessary. All personal information will be held strictly confidential. Your name will only be used for consent purposes only.

Please include this letter on your patient’s chart. If her condition changes in such a way that you deem it unadvisable for her to participate in this study, then please call me at anytime and instruct her to stop the effleurage.

This study is being conducted under the supervision of Sandra Sellers, Ph.D., R.N., Drake University, phone 515-271-2754. If you have any comments or questions you can contact Dr. Sellers or me at 254-1907 (home) or 247-3207 (work, on Wednesdays and Thursdays).

Thank you so much for your consideration. Results of the study may be obtained by contacting me at the address below. I’m happy to be working with you in the study examining interventions to enhance the health of obstetric patients.

Sincerely,

Dale Brown, RN
7124 Townsend
Urbandale, Iowa
50322
APPENDIX I

Physicians' Consent Form
PHYSICIAN'S CONSENT FORM

This patient, ________________________, is under my care. She is considered to have a low risk, singleton pregnancy. She is able to participate in this research study, if she chooses. I understand that I may request that the patient terminate her participation in this study at anytime.

(Physician’s signature)

(date)