THE RELATIONSHIP BETWEEN MOTHERS' PERCEPTIONS ABOUT THE INFLUENCES OF INFANT CAREGIVING PRACTICES ON INFANT PRESENT AND FUTURE WELL-BEING AND THE INFANT'S COGNITIVE DEVELOPMENTAL LEVEL

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ABSTRACT

THE RELATIONSHIP BETWEEN MOTHERS' PERCEPTIONS ABOUT THE INFLUENCES OF INFANT CAREGIVING PRACTICES ON INFANT PRESENT AND FUTURE WELL-BEING AND THE INFANT'S COGNITIVE DEVELOPMENTAL LEVEL

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A descriptive-correlational study was conducted to identify the relationship between mothers' perceptions about the influences of infant caregiving practices on the infant's well-being and cognitive developmental level. The population studied were premature infants seen at a developmental assessment clinic. Mothers of infants who attended the clinic and met the preestablished criteria completed the Infant Caregiving Inventory (ICI). The Bayley Mental Development Index (MDI) measured the infants' cognitive developmental level.

Data were analyzed using Pearson product-moment correlations and descriptive statistics. No significant relationship was found between the two major variables. The demographic variables were correlated with the ICI and the MDI. The ICI was also evaluated for reliability

Nurses should recognize the potential alterations in the development of attachment between mothers and premature infants. By improving the assessment of mothers' caregiving practices, the nurse can identify alterations and help mothers develop caregiving practices to promote infant well-being.

CHAPTER I

THE PROBLEM

Introduction

The recent advances in health care technology and perinatal health care have successfully decreased the infant mortality rate. But by increasing the number of premature infants who survive, the health care system has increased the number of infants with potential developmental problems. Health care professionals are now becoming concerned not only with the survival of the infant, but with the quality of the premature infant's long-term development. The advances made in perinatal health care may have inadvertently altered the initiation of the mother-infant relationship, "straining that relationship beyond its limits of adaptability" (Lozoff, Brittenham, Trause, Kennell, & Klaus, 1977, p. 1).

The prematurity of the birth process impacts the infant's development and the development of the mother-infant attachment process. "The parents of these babies have not completed the developmental tasks of pregnancy when, suddenly, they are thrust into a situation in which their fantasies of a 'perfect' normal child and a fulfilling childbirth are shattered" (Harrison, 1983, p. ix). The premature infant is often very sick; the parents not only have to fear for its life, but also deal with their inability to care and nurture

the infant. The parents also have to deal with guilt over not having a "normal" child and grief for the loss of that normal child (Klaus & Kennell, 1982). The guilt and grief the parents feel will have an effect on the way they respond to and form a bond with their child.

The development of the mother-infant relationship has a profound effect on the infant's long-term well-being. Disruption or distortion in the mother-infant relationship is believed to underlie many later disturbances in human functioning both emotionally and intellectually (Klein & Durfel, 1979). Klaus and Kennell (1976) have researched the effects of separating the infant from its mother and the importance of early bonding. These studies have led to changes within the hospitals to allow the mother and infant early contact. The mother of a premature infant is often not allowed this opportunity because of the seriousness of her infant's condition and the need for immediate health care. The fear has been that because of this inability to bond at the first few moments of life the attachment process will be permanently affected. Studies by Ainsworth and Bell (1970) indicate that the attachment patterns are influenced by caregiver-infant interaction over a period of time, not just the first few moments of life.

The mother-infant relationship is a reciprocal feedback system in which the infant is an active participant. Infants are not passive recipients of care; they take an active role in the interactional process between mother and infant (Brazelton, 1981). Brazelton (1979) looked at the reciprocal feedback system in which the mother and infant participate in a mutually rewarding process. This process may be

blurred for the mothers of premature infants because of the infant's inability to give clear feedback signals. The immaturity of the nervous system of the premature infant does not allow the infant to respond to its mother in the way a term infant would; for the infant to look into its mother's eyes directly may provide too much stimulation or not be even possible because of the immature development of the optic nerves. This inability to respond to the mother has an effect on how the mother relates to the infant (Harrison, 1983).

Health care professionals in neonatal intensive care units need to assist the mothers to see ways in which they can care for and influence their infants; otherwise the feelings of helplessness and the anxiety they are experiencing can have long-term effects on the establishment of the mother-infant relationship. Once the baby is sent home, the mother is often overwhelmed by feelings of incompetence. The feelings of incompetence and insecurity can create a high level of anxiety for the mothers. "The amount of anxiety that a new parent experiences may parallel how much he or she cares about doing well by the baby" (Brazelton, 1981, p. 1).

Learning to respond to a new infant is a trying process for all mothers. The mothers of premature infants have never had the experience of having their babies alone without health care professionals and the security of the hospital setting. Premature infants have a low tolerance for stimulation (Harrison, 1983). This intolerance for stimulation may be exhibited in irritable, fussy behavior. New mothers need to learn to respond to their infants in appropriate ways, and not

be turned off by the hypersensitive reactions of the infants (Brazelton, 1983). "Guiding the development of a young child from helpless infant to mature adult is a complex and unrelenting task, and the pleasures of having children can be overshadowed by feelings of inadequacy and insecurity concerning child rearing methods" (Boger, 1983, p. 2). The health care system needs to develop new ways to evaluate the maternal-infant dyad and help to establish a healthy environment for the child's development.

The mother's beliefs about child rearing are reflected in her interactions with her child (Mercer, 1981). These beliefs are influenced by the mother's knowledge of child care, her educational level, and prior experience with child care. Smeriglio and Parks (1983) have conducted research on the importance of the mother's perceived ability to influence the child's well-being through caregiving practices. One of the links between acquiring the knowledge of the child-rearing methods and implementing them is the mother's ability to perceive accurately her influence on the child's well-being and to have accurate expectations of the infant's developmental potentials. Because health care providers have the opportunity to reach large numbers of infants and mothers, it is important to take advantage of this opportunity to provide mothers with knowledge of infant development and what influence they can have on the child's development.

Well-baby visits can be used to enhance the mother-infant relationship. By helping the mother acquire a better understanding of child development and caregiving techniques and by allowing her to

express her concerns about her infant's development, the health care professional has the potential to impact the home environment. Mothers often have unrealistic expectations and perceptions of their children (Broussard, 1970). Many mothers are not prepared for the difficulties of having and raising a child. When this lack of preparation is combined with a potentially inadequate social support system (many of these mothers are young, unemployed, and single) and the increased stress of caring for a premature infant, the result can be a population of mothers who have the potential for developing problems with attachment. Subsequently, problems with attachment can lead to difficulties in dealing with day-to-day stresses of caring for an infant. "Neglectful, inadequate and abusive behavior can result from the inability of parents to cope with day-to-day needs of their infants" (Boger, 1983, p. 2). Members of the health care system need to look for ways to meet the special needs of mothers of premature infants by increasing their knowledge of infant development and helping them understand their infant better.

Purpose

The importance of early experiences on the long-term development of a child has been documented by many researchers (Ainsworth & Bell, 1970; Brazelton, 1976; White, 1959). The health care system now needs to look at how to influence the home environment. One area in which health care professionals can potentially exert influence is in the parents' level of knowledge and awareness of infant development. Researchers have done studies documenting the positive effect of

teaching on the quality of the mother-infant relationship (Casey, 1982; Hall, 1980). The need now is to identify what specific aspects of the mother-infant relationship are related to the infant's development and how the health care professional can influence these variables. "The extent to which the parent has the ability to control the infant in some absolute sense is less important than the parent's perception of being able to control infant behavior" (Goldberg, 1977, p. 166). By analyzing the relationship between the mother's perception of how her caregiving practices affect the infant's well-being and the infant's cognitive development, we can begin to explore how to impact the mother's perceptions and potentially help her to see how she influences the well-being of her child.

Problem Statement

What is the relationship between the mother's perceptions about the influence of infant caregiving practices on the infant's present and future well-being, and the actual cognitive developmental level of the premature infant at 12 to 18 months?

Definitions

Perception, for the purpose of this study, is best defined by King: Perception is each person's representation of reality. It is what we believe to be true. In this study it is the mother's beliefs about how her caregiving practices influence the infant's present and future well-being.

Caregiving practices are those activities the mother participates in on a daily basis for the care of her child. These activities may be direct interactions with the child in feeding, talking, and providing play materials, or indirect activities such as choosing a child day-care facility or the quality and quantity of health care.

Cognitive developmental level is the measurement of the set of behaviors which display the infant's ability to perform in areas of memory, learning, problem-solving skills, vocalization, and verbal communication. For the purpose of this study, cognitive development will be measured by the Bayley Scales of Infant Development (BSID) Mental Development Index (MDI). The BSID are used to compare an infant's cognitive developmental level with other infants the same age, looking for any early developmental delays which would benefit from intervention from the health care system. Some of the behaviors used to measure cognitive development in the Bayley MDI include the way an infant looks at and handles objects, how the infant responds to people, and the amount and type of vocalization an infant displays.

Premature infant for the purpose of this study is one who is born less than 36 weeks gestation, has been hospitalized for at least 2 weeks, has no congenital anomalies, weighed less than 2,500 grams and more than 1,000 grams at birth, and is still living with its biological mother at 12 to 18 months of age.

Present and future well-being refers to the mother's perception of the infant's physical growth and health, intelligence, personality, and feelings of happiness or unhappiness (Smeriglio & Parks, 1983).

Hypothesis

The mothers who believe their caregiving practices have an influence on the infant's present and future well-being will have infants who score higher on the cognitive developmental measures than mothers who do not perceive their care influences the infant's present and future well-being.

Assumptions

1. The maternal-infant relationship is a reciprocal interaction process.

2. Caregiving practices have an impact on the infant's development.

3. Mothers are able to relate their specific actions to the child's developmental level.

4. Respondents to the questionnaire will complete it as honestly and completely as possible.

5. The questionnaire will be sensitive enough to pick up the relationship between the mother's perceptions and her caregiving practices.

6. The Bayley Scales of Infant Development are reliable and valid measures of the infant's developmental level in relationship to the infant's peers.

7. The impact of prematurity will still be felt at 12 to 18 months in relationship to the infant's cognitive developmental level.

8. It is assumed these infants have a genetic endowment of average, normally distributed intellectual capacity.

Limitations

1. The study will only be dealing with the perceptions of the mothers about caregiving practices and developmental outcomes, not their awareness of actual caregiving techniques or developmental milestones.

2. The study will only be dealing with mothers of premature infants who are 36 weeks gestation or less, have been hospitalized at least 2 weeks, have no congenital anomalies, weighed less than 2,500 grams and more than 1,000 grams, and are still living with their biological mothers.

3. The respondents may not answer the questionnaire honestly, but instead in a way they feel the health care professionals would want them to because of the questionnaire being given out at the developmental clinic.

4. The study will not deal with other factors that might influence the development of the child, such as home environment, mother's education, or socioeconomic level.

5. The study will only include mothers, but we have no way of knowing what influence other family members have on her responses.

Overview

This research study is presented in six chapters. In Chapter I the researcher has presented an introduction to the problem, a statement of the problem, the hypothesis, definition of the major concepts, assumptions, and limitations of the study.

In Chapter II the concepts of the research problem are delineated, the relationship between the variables in the study is explored, and the concepts are related to King's nursing theory.

In Chapter III literature that is pertinent to the research is reviewed. The literature is presented and critiqued to support the research problem and hypothesis.

The research design, methodology, and procedures used in this study are described in Chapter IV. In Chapter V the description of the data and the data analysis are given and discussed. The summary interpreting the research findings, conclusions, recommendations, and the nursing implications of this study are presented in Chapter VI.

CHAPTER II

CONCEPTUAL FRAMEWORK

Overview

In Chapter II the concepts of perception, cognitive development, and prematurity are defined and related to the role of Clinical Nurse Specialist (CNS) in King's theory of nursing. The CNS has a role in helping to improve the accuracy of a mother's perception in relationship to how the mother's caregiving practices affect a premature infant's cognitive development.

Introduction

Theories of child development have viewed the mother-infant relationship in a variety of ways over the years. The early theorists treated the child as a slab of clay to be molded by its caregiver into an intelligent, productive human being. Recent research has stressed the idea that the infant is a competent interacting partner in the maternal-child relationship (Brazelton, 1981). The reciprocal relationship between infant and mother is one factor in determining the long-term development of the child. This is especially true of the preterm infant, who with sensitive and concerned parents can be helped to develop far beyond the expectations of the medical experts (Brazelton, 1981; Harrison, 1983). The environment the mother provides

for the infant and her sensitivity to the child's needs have long-term effects on the child's developmental level (Bell & Ainsworth, 1970).

The mother's beliefs about child rearing are reflected in the environment she provides and the interactions she will initiate with her child. These beliefs are influenced by the mother's knowledge of child care, her educational level, and prior experience with child care (Broussard, 1979). Parental knowledge can be further divided into (a) awareness of developmental milestones, (b) awareness of specific caregiving techniques, and (c) perception of relationships between caregiving practices and developmental outcomes (Smeriglio & Parks, 1983). The importance of the perceived ability to influence the child's well-being through caregiving practices will be one link between acquiring the knowledge and implementation of that knowledge by the mother, as seen in her behavior to the infant. The health care provider who has contact with the mothers of premature infants needs to emphasize the importance of the mother's role in the infant's care and long-term development. During the time the premature infant is in the hospital, the mother often feels she has very little influence on her infant's care. It is important for the mother of the premature infant to perceive that her actions do have an influence on the child's well-being so that she will be able to assist the child in developing to his/her fullest potential. The mother's expectations of her infant and her perceptions have a significant effect on the infant's development to the extent that what mothers believe about their children can become a self-fulfilling prophecy (Broussard, 1971).

Concepts

Perception for the purpose of this study is best defined by King: Perception is each person's representation of reality. One's perception is related to past experiences, to concept of self, to biological inheritance, to educational background, and to socioeconomic groups (King, 1981). These are important factors to consider when looking at how a mother perceives her caregiving activities will affect her infant. The mothers of premature infants are influenced by the kinds of experiences they have had with infants in the past and the kind of care they received as a child.

A mother's concept of self goes through various changes because of pregnancy and the birthing process. The mothers of premature infants also have to deal with the facts of having a fragile, sick child who may need special care for a long time. When the mother takes the infant home, she may have trouble looking at her infant as a normal child (Henig & Fletcher, 1983). A mother's perception of her infant is often determined by factors other than the actual physical condition of the infant (Broussard, 1971).

The mother's personal assessment and interpretation of observations about the behavior of her infant can be affected by the infant's personality, her expectations, and the attachment relationship that has formed between them (Hall, 1980). This is an important consideration with the mothers of premature infants because of the stress of long-term hospitalization and difficulty some mothers have in forming attachments with their infants. The helplessness and uncertainty that

the mother felt while her infant was in the premature nursery will affect how she perceives her care will influence her child (Harrison, 1983). The mother needs early support in being allowed to care for her infant on a basic level in the nursery so that she can feel she does have an influence on her child's recovery and development.

The caregiver is the person responsible for giving care to an infant (Lewis & Rosenblum, 1974). Caregiving practices are influenced by many variables: the mother's educational level, her prior experience with child care, her self-concept, sociocultural factors, her support systems, and the infant itself (Crnic, Greenberg, Ragozin, Robinson, & Bashan, 1983). Caregiving practices include not only the activities the mother performs for the infant on a daily basis such as feeding, talking to the infant, responding to the infant's cry, selecting toys, and providing rules and guidelines, but also the indirect practices such as the type of daycare she chooses and the type and quantity of medical care the infant receives (Smeriglio & Parks, 1983).

That caregiving practices can influence the development of the infant is evidenced by studies examining the role of the parent on the infant's later developmental level. Bell and Ainsworth (1970) did a study that related the infant's developmental level with the sensitivity of the mother to the infant's needs. Beckwith (1976) found that infants who scored higher on IQ tests at 9 months had received more general attentiveness from caretakers at 1 and 3 months of age. Caldwell and Bradley (1976) linked the quality of attachment and caregiving with quality of play and problem-solving experience at 2 years of age.

The type of environment a caregiver provides an infant can be linked to the level of development achieved by children. Caregiving practices cover a broad range of direct and indirect activities which can be influenced by the mother and the infant.

Development in this study refers to how the infant matures on a cognitive level. The interactional process between the infant and mother affects the potential results of the developmental process (Bell & Ainsworth, 1970). Development is a process of increasing complexity and integration of ideas, behaviors, and thoughts (Nelms & Mullins, 1982). Development as measured by parents and health care providers is often in terms of developmental milestones or tasks. If a child does not develop in a similar time schedule as his peers, the parents may become anxious and concerned. This anxiety can affect the mother's behavior toward the infant. "Many parents fear that the physical, intellectual or emotional development of their premature baby will be different from that of a term baby" (DuHamel, Lin, Skelton, & Hantke, 1974, p. 1054).

A child's development and his/her developmental level are related to the maturational process. The nervous system must be developed to a certain level for an infant to accomplish any particular developmental task. The ages set for accomplishment of developmental milestones are in terms of an infant's birth being at 40 weeks gestation. To have realistic expectations for the premature infant, the concept of corrected ages needs to be examined. Corrected ages are based on the date the infant was expected to be born. The reason an infant's age is

corrected to 40 weeks gestation is that the nervous system has had time to develop to the same level as a term infant (Henig & Fletcher, 1983). When assessing a premature infant's developmental level, it is important to correct for the actual gestational age of birth. If an infant was born 2 months premature, when the infant reaches 12 months old the corrected age would be 10 months. The infant should be compared with other infants who are 10 months old. The mothers need to be aware of this adjustment in order to have realistic expectations of the abilities of their infants.

Developmental tasks are the milestones one uses to compare an infant's development with other babies. Although one cannot designate the normal development of a child, one can specify what the average progression will be (Illingsworth, 1980). The developmental tasks can serve as guidelines for health care providers in indicating a need for intervention to help stimulate normal development. Developmental tasks are used in the Bayley Scales of Infant Development to give a numerical level of infant development to use in comparing premature infants to other infants in the same age range in regard to cognitive development.

The cognitive development of an infant as measured by the BSID Mental Scales involves the acquisition of object constance and memory, learning and problem-solving ability, vocalization and beginnings of verbal communication, and the ability to form generalizations and classifications which are the basis of abstract thinking (Bayley, 1969). The cognitive development of a child is influenced by his environment and the type of stimulation the infant receives.

The Bayley Mental Scales use behaviors to measure cognitive development. Some of the behaviors assessed are the way an infant looks at and handles objects, how the infant responds to people, and the amount and type of vocalization. Examples of some of the measures are an infant's ability to scribble, handle a toy, listen to the evaluator, speak, respond to verbal commands, or look at pictures in a book. All of the behaviors are assessed by a trained observer. The infant is compared with what an average infant can accomplish at his/her age range. The premature infant's age is its corrected age for prematurity when compared on the cognitive developmental measures.

The caregiver's reaction to an infant's attempts at cognitive behaviors is one of the factors in the child's acquisition of appropriate cognitive behaviors. The infant's actions are part of a reciprocal feedback system between the mother and infant, both individuals influencing each other (Brazelton & Als, 1979). The infant and caregiver both learn from each other. The infant is fueled by responses he/she receives from people responding to them. This sets up a cycle of receiving, registering, being upset by a signal, and then achieving a new balance. Thus the stimuli he/she receives from his/her mother help him/her to learn control over the environment and that it is all right to try new things because he/she can learn to adapt to them. One concern with the premature infant that Brazelton addressed is that the signals a premature infant sends out may not be clear to the mother, and hence it is hard to set up the reciprocal feedback system. The health care provider needs to help the mother identify the

infant's responses and assist them in setting up a form of communication. Rewarding communication between a baby and mother is critical to the development of the child (Brazelton, 1983).

The premature infant for the purpose of this study is one who is born less than 36 weeks gestation and weighed less than 2,500 grams and more than 1,000 grams. Very low birth weight infants have a prolonged hospitalization and greater likelihood of physical and developmental disabilities (Cooper & Schraeder, 1982). The infant must be living with its biological mother at the time of the assessment. Premature infants can be considered candidates for abnormal maternal-infant attachment (DuHamel et al., 1974). The problems with attachment may develop because of a delay in the onset of parenting activities, feelings of guilt, and fear of the infant's death (Harrison, 1983). Another reason the premature infant and its mother have difficulty forming an attachment is that the infant often does not give clear feedback signals. As a newborn, the premature infant is still struggling with the maintenance of his/her physical environment (temperature regulation, breathing, etc.), and thus the infant may not be able to give positive feedback to the mother when she tries to touch and hold him/her. Thee factors can affect the mother by increasing her level of anxiety and making her feel like a failure as a mother (Klaus & Kennell, 1982). When one combines the lack of positive feedback with a high level of anxiety, the combination could lead to a poor maternal-infant attachment and subsequent lack of development of the maternal-infant relationship. This pattern of unpredictable, unreadable,

unresponsive behavior has the potential for trapping an initially responsive parent in cycles of ineffective interaction with parental feelings of failure and helplessness (Goldberg, 1977). The feelings of failure can be potentiated if the parent is not assisted to see what effect he/she can have on the infant's development.

The infant's present and future well-being are reflected in the outcomes as identified by Smeriglio and Parks (1983). The outcomes include the infant's physical growth, physical health, intelligence when older, personality when older, and the child's feelings of happiness or unhappiness. The authors related each item of infant functioning to specific caregiving practices and then evaluated how the mother felt each caregiving practice influences the outcome functioning of the infant.

The caregiving practices that a mother believes in have an influence on the early experiences an infant will receive. The premature infant has a potential for developing at a different pace than a term infant and with possible disabilities. The environment in which the premature infant grows will have an impact on the outcome of his/her developmental process. The mother needs to perceive that she can influence the child's outcome in order to have her implement the caregiving practices which can stimulate her child to the its optimal level of development. The health care professional can play a role in helping to change the perceptions of the mother. Mothers of premature infants often feel helpless and insecure with their infants; they need encouragement and support from health care providers to care for what

often is a difficult infant. With the help of sensitive health care providers, the mother can learn to communicate with her infant and become aware of the positive cues the infant will give to her.

The CNS can play an important role in increasing a mother's knowledge of child development and thus the accuracy of her perceptions of the influence caregiving practices have on a premature infant's well-being. As a health care provider, the CNS needs to have a solid theoretical framework on which to base the practice. King has developed a theory of nursing that involves the interaction of client and nurse; King emphasizes the influence of perceptions on the ultimate transaction that takes place between nurse and client. In the following section, King's theory of nursing is explained in regard to the CNS role for the maternal-infant dyad.

Nursing Theory and Relationship to the Problem

According to King (1981), "nurses teach, guide and counsel individuals and groups to help them maintain health" (p. 8). The nurse functions to assist the patient to his/her optimum potential. King sees individuals as personal systems who create groups or interpersonal systems. One interpersonal system would be that of the mother and child. Perception plays a large part in King's theory. "It is through perception that an individual comes to know self, to know other persons, and to know objects in the environment" (King, 1981, p. 19). In the process of human interactions, individuals (such as mother and infant) react in terms of their perceptions, expectations, and needs.

King identifies the concepts of growth and development which are important in understanding the nurse's role in the parent-child interaction. "The manner in which a person grows and develops is influenced positively and negatively by other people and objects in the environment" (King, 1981, p. 31). King identifies the need for nurses to have a knowledge of growth and development to help parents to understand what to expect from children at various stages, especially when there is a disturbance in the normal process. "Growth and development are a function of genetic endowment, meaningful and satisfying experiences and an environment conducive to helping individuals move toward maturity" (King, 1981, p. 31).

Within an interpersonal system the accuracy of perception increases effectiveness of one's actions. The mother must have an accurate perception of how her caregiving practices influence the infant's well-being in order to implement appropriate caregiving practices which will help her premature infant to develop to his/her optimum potential.

The model presented (see Figure 2.1) relies on King's concepts of interaction, reaction, and transaction. When two individuals meet in a situation then mentally act and react to each other; these mental actions are influenced by perceptions, which in turn are influenced by past experiences, knowledge, and values. Interaction follows the meeting of two people and involves the exchange of ideas and feelings in which the individuals are having an effect on each other. Transactions occur when both individuals (in this case, nurse and client) are

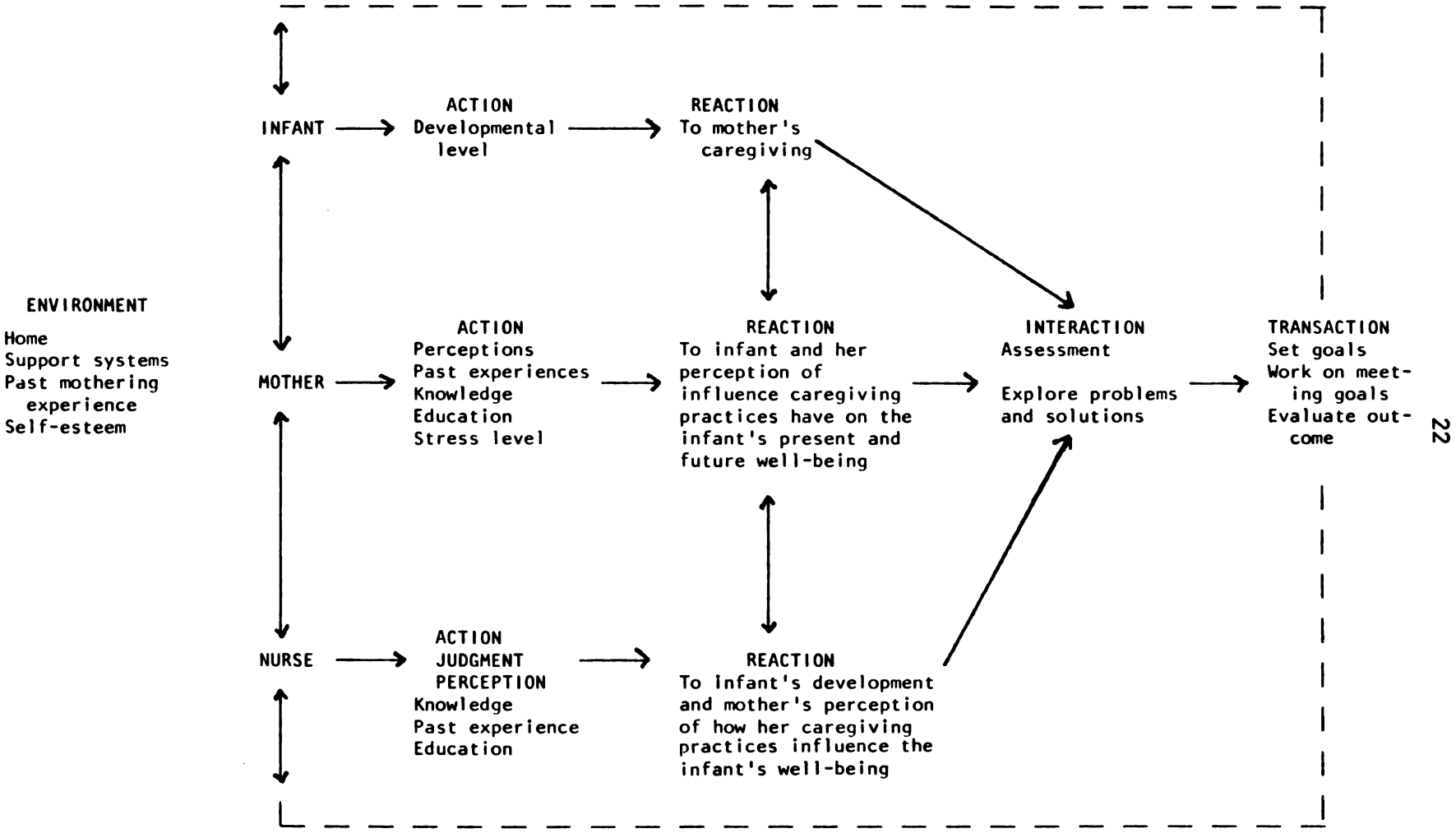

Figure 2: Conceptual model.

directly working toward some mutually identified goals. The goal of this nursing model is to obtain an optimal level of health for both mother and infant.

The client will be both the mother and the premature infant. The way in which nursing will affect this change in perception will be through communication of information to the mother and assessing where the mother stands in relation to other stressors in her environment. These stressors may be having an effect on her caregiving behavior and her expectations of the infant. The environment plays a big part in the mother's perception and in the infant's development. There are many environmental factors which affect the mother's perception of how her caregiving practices influence infant well-being. The most important ones are her educational background, her support systems at home, and her past mothering experience (Oehler, 1981).

Environment will also play a part in the infant's development. "The level and type of stimulation available within the home was the most outstanding correlate to development of premature infants" (Hayes, 1980, p. 36). These factors could be confounding variables to be studied in further evaluation of this subject.

The interaction between mother, infant, and CNS involves teaching the mother in the hospital and at home about the infant and its special needs. In the NICU the mother should be encouraged to interact with her infant by having the nurse explain the infant's progress and set-backs. The nurse also needs to encourage the mother to have direct caregiver contact (diapering, bathing, holding, and feeding), evaluate

the frequency of visits, and note the kind of attention the mother gives the infant. The frequency of visits and type of attention given to the infant can be an indication of the type of relationship the mother will have on a long-term basis with the baby (Klaus & Kennell, 1981). The CNS needs to talk with the mother about development and corrected ages. The CNS also needs to explore possible problems that may occur with transportation for visits to the infant and encourage the mother to express her concerns and fears about taking the infant home. Before discharge, the primary health care provider should be contacted and goals for the mother and infant set up mutually with the provider and client. The CNS needs to keep in close contact with the mother-infant dyad after discharge, for this is a critical time in the adjustment of the mother and infant to the home environment and can affect the infant's progress. The post-discharge period involves a lot of readjustments for the mother, infant, and other family members; they will have new roles to learn, as well as new time schedules and changes in their interpersonal relationships. The CNS should be able to interact with the mother and infant to help make this transition period progress as smoothly as possible. The CNS can be a resource person to help answer questions, assist the mother in working through some anxieties about the infant's development, and assess how the family is adjusting to the new infant.

As the infant grows and develops, the CNS will continue to evaluate the infant's progress. The CNS can potentially help to identify any developmental delays that might be amenable to specific health care

interventions. The mother's status needs to be assessed to evaluate how she is coping with the infant and how the family feels concerning the infant. The home environment is an important variable in the infant's development, and if the nurse feels it is warranted, it might be helpful to go into the home situation and assess the mother-infant relationship in the natural setting.

King's concepts of interaction and goal setting which proceed to transactions help the CNS to guide her/his actions in the relationship with the mother and premature infant. King stresses the importance of perception and how perception is influenced by the environment and will have an effect on a person's reactions to another individual. The importance of perception in King's model indicates the need for assessing the mother's perception of how her care influences the present and future well-being of the premature infant. Assessing the mother's perceptions will help the CNS identify possible problems in the relationship. In following King's model, the CNS will assess the situation by evaluating not only the mother's actions but her perceptions of how care influences the infant's present and future well-being. Then the CNS can interact with the mother and infant to set goals that satisfy both the CNS and the mother-infant relationship. The CNS then proceeds with the transaction process with both the client and CNS working to facilitate the normal development of the premature infant. This is an ongoing process, and the CNS and client need to evaluate whether the goals are being met on a periodic basis, then setting new goals if necessary.

Summary

In Chapter II the conceptual model has been presented. The concepts of perception, cognitive development, and prematurity were defined and related to the conceptual framework. The relationship of King's theory of nursing was presented, and the role of the CNS working with premature infants and their mothers was explored within King's theoretical framework.

The literature pertaining to this study is presented in Chapter III. The literature is reviewed as it relates to premature infants, maternal perceptions, and the importance of caregiving practices to the infant's present and future well-being.

CHAPTER III

LITERATURE REVIEW

Introduction

The literature review is designed to document recent research studies that relate the concepts of prematurity, parental perception, and effects of caregiver behaviors on infant development. The literature review is organized in the following manner: (a) the effects of prematurity on infant development, (b) the effects of prematurity on the mother's perceptions of the infant, (c) the relationship between infant development and the mother's perceptions of how the caregiving practices affect the infant's well-being, and (d) studies relating the caregiving practices identified in the ICI to infant cognitive development.

Overview

The recent research done concerning human development has focused on the interaction of the infant and environment. The type of caregiving received has also emerged as a factor in infant development. The argument is no longer between proponents of the "nature" or "nurture" doctrines, but instead focuses on how the relationship of the infant to his/her environment affects the infant's development. Once the relationship is established, health care providers need to assess how to

impact the relationship to facilitate an optimal environment for the infant to grow and develop. There are a multitude of risk factors which can affect the premature infant's development. Some of the variables are the birth experience, the early neonatal period, and the mother-infant relationship as a result of these factors. The premature infant is at special risk for problems of infant development.

Prematurity and Infant Development

With the advent of modern technology, the infant survival rate has increased. The earlier age of viability for infants has tended to increase the number of infants who have the potential for developmental problems (Cohen, Seaman, Parmelee, & Beckwith, 1982). The premature infant is at an increased risk for medical illness, physical handicaps, and developmental delays. Researchers over the past few years have been closely evaluating the growth and development of premature infants to identify risk factors and developmental trends.

Siegle (1982) looked at the relationship between early reproductive and perinatal insults and the subsequent development of the premature infant. The study was conducted in Ontario with 86 infants, 44 full term and 42 preterm. These infants were matched at birth for sex, parity, age of mother, and socioeconomic status of parents. Siegle tested the infants eight times over a 5-year period to determine the developmental levels of the infants. The developmental levels were measured with the McCarthy Scales of Children's Ability (MSCA). The perinatal histories of the infants were recorded to determine the infant risk factors.

The mean scores on the MSCA were compared with a *t*-test for means and found to be significantly higher for the term infants than for the preterm infants ($p < .05$). A linear stepwise multiple regression analysis was conducted on the infant risk factors to determine those factors which related to the developmental scores. The perinatal and reproductive factors correlated with the developmental scores for the preterm and term infants at 5 years of age. Siegle concluded from these data that preterm infants' early risk factors often influence the infants' later developmental level. Siegle went on to conclude that developmental delays and developmental level could be predicted from a combination of perinatal, reproductive, and demographic variables. This statement can be questioned because development is a complex variable and has not been found to be consistently predictable.

A longitudinal study of low birth weight (LBW) infants was done by Smith, Somner, and Tetzchner (1982). The researchers studied a group of children who had birth weights below 2,000 grams and had received care in the NICU at Oslo University Hospital in Norway. The children were evaluated at 3, 6, 9, 12, and 18 months of age, using various intelligence tests appropriate for age. The home environment was assessed at 6 months of age and again at 3 years. An Optimality Index was scored relative to the pregnancy, delivery, early postnatal period, and complications of each child.

After the data had been collected, a multiple regression analysis was used to relate the variables. The Stanford-Binet intelligence test administered at 3 years of age was related to birth weight,

socioeconomic status, and pregnancy complications. The 6-month home environment score related positively to the Stanford-Binet at the $p < .05$ level of significance. The authors went on to look at the difference in development that related to the Optimality Index. The findings indicated that infants with a high optimality score (indicating fewer complications with pregnancy, delivery, and postnatal period) scored in the average to high range of the intelligence scale. However, a low optimality score did not correlate with the level of performance on the intelligence test (Smith et al., 1982). The significant factor appeared to be the home environment. The multiple regression analysis indicated some significant differences between the infants who scored low on the Optimality Index and low on the IQ measure and the infants who scored low on the Optimality Index and high on IQ measures. The differences were in parents' SES, the amount of vocalization given to the baby, and contingent response to distress. These items were significant at the $p < .01$ level.

The authors concluded from these data that the child's perinatal and prenatal history correlates with the infant's later development but that the home environment also has an effect on the development level achieved by the infants. The study had some interesting findings, but the sample size was small (48 infants). Also, the study was conducted in a country that has socialized medicine, and all the families received the same medical care. These factors limit the ability to generalize the results to the entire neonatal population.

Cohen, Sigman, Parmelee, and Beckwith (1982) also studied how perinatal risk factors relate to the premature infant's developmental outcome. Cohen et al. were specifically interested in looking at why infants with similar biological insults in the neonatal period have different developmental outcomes.

The population Cohen et al. studied consisted of 62 premature infants born at UCLA Hospital in California. These infants and their families were followed for 5 years. The medical histories of the infants were evaluated by the Obstetric Complications Scale, the Postnatal Complication Scale, and a Pediatric Complication Scale. The researchers made assessments of the infant-caregiver interactions at 1, 8, and 24 months. The infants were assessed developmentally with the Gesell Developmental Scales at 4, 9, and 12 months and by the Stanford-Binet at 5 years.

The data were analyzed using a correlation coefficient. No significant relationship was found between any of the complications scores and later developmental scores. Caregiver interactions were found to correlate positively with the infant developmental scores at 1, 2, and 5 years at the $p < .05$ significance level.

Cohen et al. also explored the predictability of later infant development using the perinatal risk factors. A multivariate test was performed to compare low-performance infants (less than a score of 90 on the Stanford-Binet) with those infants who performed in the normal range. The results indicated that infants who had lower Stanford-Binet scores had had more postnatal complications ($p < .05$ level). The data

also indicated that infants with the lowest Stanford-Binet scores had caregivers who scored lower on the caregiver interaction assessments ($p < .05$).

Cohen et al. concluded from these data that preterm infants who have prenatal complications are at greater risk for developmental problems. A significant factor in the preterm infant's development is the responsiveness of the caregiver. The authors stressed the importance of evaluating the caregiver-infant interaction and implementing appropriate interventions to enhance the responsiveness of the caregiver to the premature infant.

Hunt, Tooley, and Harvin (1982) were interested in identifying learning disabilities and long-term developmental delays of the premature infant. The research was designed to examine the intellectual outcome of very low birth weight (VLBW) infants. The study was a longitudinal follow-up done of the survivors of the neonatal unit at the University of California in San Francisco. Hunt et al. felt that the identification of normal development in infancy does not guarantee that the infants will continue to have a normal intellectual functioning in later childhood. Most of the studies of preterm infants have looked at infants' developmental levels (the first 2 to 3 years of life). Hunt et al. chose to look at preterm infants who had reached school age.

The children were evaluated at ages 8 to 11 using the Wechsler Intelligence Scale for Children (WISC). Hunt et al. found that 20% of the infants' scores on the WISC were borderline intellectual

functioning or lower (IQ of 84 or less). The authors also looked at siblings of the VLBW infants and found an average difference of 14.6 points between the premature infants and their siblings on the WISC scores. Hunt et al. concluded from these data that VLBW infants are at greater risk for developmental problems than term infants and that the effects of premature birth and low birth weight can be long lasting. One of the major problems with the research on the VLBW infants is that treatment of these infants is very different today than it was 8 years ago. The differences in treatment make it difficult to compare the infants who are 10 years old with those being born today. Hunt et al.'s research emphasized the importance of long-term follow-up of the preterm infant in helping to detect and treat any developmental problems that might occur to the infant.

Noble-Jamieson, Lukeman, Silverman, and Davies (1982) did a similar study in London looking retrospectively at VLBW infants to identify any neurological or psychological abnormalities that might go unnoticed on a general screening for infant development. Noble-Jamieson et al. assessed 20 VLBW children who were school age. These children were considered normal by their parents and teachers. The 20 VLBW children were matched with term children of the same sex, age, and social class. The two groups of children were evaluated at 9 years of age using three evaluation tools: the WISC, a neurological exam (with emphasis on minor neurological dysfunction), and the Children's Behavior Questionnaire.

The Children's Behavior Questionnaire and the neurological exam were analyzed using a chi-square. The VLBW children showed a significantly greater incidence of neurological dysfunction ($p < .01$). The WISC scores were analyzed using the paired t-test. The VLBW infants scored lower than the term infants on four out of five of the WISC subtests ($p < .01$).

Noble-Jamieson et al. concluded from these data that VLBW infants showed an unusual number of soft (minor) neurological signs. The assumption the authors made was that even though the VLBW children attended school and were considered normal, they may remain slightly below the average term child. Thus, these infants may need ongoing developmental assessment and thorough evaluation of neurological function to detect any abnormalities.

The study conducted by Noble-Jamieson et al. had some limitations. The infants had parents from a higher socioeconomic level than the majority of premature infants, which limits the ability to generalize to other populations. The small sample size would also influence the results of the study. Despite these limitations, the data indicated a need for continued surveillance through school age of the VLBW infants and their families.

Hack, Caron, Rivers, and Tanaroff (1983) examined the problem of morbidity in VLBW infants. Hack et al.'s research assessed the VLBW infants' short- and long-term growth; visual, auditory, and neurological abnormalities; and need for rehospitalization. The population

consisted of 505 infants born at Rainbow Babies Children's Hospital in Cleveland.

The infants were followed by Hack et al. for 3 years. The findings were given in descriptive form only: (a) 22% of the VLBW infants were found to be underweight at 3 years of age, (b) 40% of the children exhibited transient abnormalities of muscle tone in the first and second year of life, (c) 19% were considered to be handicapped (as defined by neurological abnormalities and/or subnormal IQ--less than 80), and (d) 33% of the infants were rehospitalized at least once during the first 3 years of life.

Hack et al. concluded that VLBW infants for at least the first 3 years of life are at risk for increased morbidity. Thus the VLBW infant needs special consideration and treatment by the health care team. The major limitation of the study is that no comparison data were given for the general population on morbidity statistics to qualify the importance of the figures found on the VLBW infant.

Premature infants, because of their immature neurological systems, often react differently in the postnatal period to stimulation than the term infant. The abnormal response to stimulation presents a potential problem for the primary caregiver in developing a relationship with the infant. Cooper and Schraeder designed their research to assess special characteristics of the premature infant in the postnatal period. The study population consisted of 26 infants from the Philadelphia area. The purpose of the study was to gather information about the premature infant. Cooper and Schraeder tested the infants at 10 months of age

with the Denver Developmental Screening Test (DDST) and the Infant Temperament Questionnaire (ITQ). The infants' home environments were assessed by the Home Observation for Measurement of Environment (HOME).

The data from the DDST identified 42% of the infants to be at risk for developmental delay (using corrected gestational ages). A correlation coefficient was used to compare the HOME and the DDST scores; no significant relationship was found between the two variables. A chi-square analysis of the ITQ scores for the premature infants and a normal population showed a significant difference in temperament between the two groups of infants at the $p < .001$ level. The premature infants were found to be more difficult than the term infants, as defined by the ITQ.

Cooper and Schraeder concluded that premature infants are often more irritable and difficult to care for than term infants. The possible consequences of these findings are that the infant's behavior can "turn off" caregivers. Thus a cycle may develop that begins or continues as the infant's temperament influences the response style of the caregiver and then the caregiver's response affects the infant. The implications for health care providers are that parents of premature infants may need help in identifying infant behavior patterns. The health care provider needs to assist and support parents in dealing with these infants' behavior patterns to increase the "goodness of fit."

Developmental studies, especially those concerning the premature infant, have certain unique problems and limitations. The major

problems and limitations in developmental research include a limited knowledge of the relationship between environmental and genetic variables which affect normal human development, difficulties of analyzing data, and problems with infant behavior. The limited knowledge of the relationship between environmental and genetic variables which affect normal human development makes it difficult to identify specific variables which influence abnormal behaviors. Human development is discontinuous, meaning developmental levels recorded in infancy may not be predictive of later achievements. The multitude of factors influencing human development are difficult to separate and analyze, forcing researchers to deal with trends rather than causal relationships. Infants present a unique problem in recording consistent behavior patterns. The infant may be restless, uncooperative, or have attentional differences depending on the time of day or setting.

Preterm infants present some unique problems for researchers. Medical treatment and care of the preterm infant has changed drastically over the last few years. The different type of medical care received by infants 5 to 10 years ago may have affected the developmental level they were able to achieve. The preterm infants' prognosis today may be very different from that of infants who have presented in most of the available research studies. Most of the research studies have dealt with the specialized group of VLBW infants who may not reflect accurately the general population of preterm infants. Despite these limitations, the reader can ascertain some general trends for the preterm infant, such as being at risk for

developmental delays. The most significant positive effect on the infants' developmental levels appears to be the home environment and the amount of stimulation provided to the preterm infants. The effect of a positive home environment on the preterm infant supports the need for health care providers to adequately assess the premature infant and the home environment. Parents of premature infants need to be encouraged to provide an appropriately stimulating environment for the growth and development of their children.

The premature infant is at risk for developmental delay because of medical factors surrounding the infant's birth, and there might be alterations in the maternal-infant relationship secondary to the unique experiences surrounding the infant's birth and neonatal period. The preterm infant does not look like the term infant they had hoped and planned for. The infant and mother may be separated for an extended period following the infant's birth. As a result of the multitude of factors surrounding the infant's birth and the stressors put on the mothers of preterm infants, the mothers may develop an altered perception of the infant.

Mothers' Perceptions of the Preterm Infant

The mothers of premature infants have to deal with a complex array of stressors. Some of the maternal stressors include not being emotionally prepared for the birth of the baby, not being able to be with the baby after birth, feeling guilty about the early delivery, and having to deal with the emotional crisis related to the infant's hospitalization. The infant stressors include the infant's immature

nervous system, the need for specialized medical care, and the unique appearance of the infant. The birth of a preterm infant is not at all what the mother was prepared for; "few mothers and fathers ever face a more distressing situation than the one that confronts them as the parents of a tiny high-risk baby" (Harrison, 1983, p. 1).

Kaplan and Mason (1960) identified the maternal reaction to the birth of a premature infant as a potential acute emotional disorder. The differences in the preterm and term maternal-infant relationship start at the delivery or before. When the infant is delivered, the mother sees the infant only briefly, and her recollections may be of the baby's small size, its unusual color, and unattractive appearance. The first few days are ones of uncertainty, when the mother has to deal with the possibility that the infant is in danger and might die. After the premature infant goes home, there is another period of anxiety for the mothers. The mothers are concerned because of the complete responsibility they assume for a tiny, fragile infant.

Kaplan and Mason identified four tasks that mothers of premature infants must accomplish for the maternal-infant relationship to progress in a normal manner. The first task occurs at the time of delivery when the mother must go through a period of anticipatory grief for the potential loss of her child. The second task is that of acknowledging the maternal failure to deliver a normal full-term infant. The third task is for the mother to resume the process of relating to the baby; at this point the mother begins to believe that the baby will survive. The fourth task is for the mother to understand

how a preterm infant differs from a normal baby in terms of its special needs and growth patterns (Kaplan & Mason, 1960). All of these tasks must be successfully accomplished by the mother to promote an optimal maternal-infant relationship and an accurate perception of the infant.

Klaus and Kennell (1982) have explored the idea of critical periods for bonding. Klaus and Kennell feel that the separation of mother and infant at birth can precipitate an altered mother-child relationship. Although there has been much controversy over whether there is a "critical period" for human bonding (Harman, Blicken, & Good, 1982), most child care professionals will agree that the prolonged separation can have an influence on the mother-infant attachment process. The combination of early separation of mother and infant, the unique appearance and qualities of the premature infant, and the emotional crisis of the mother can potentially lead to an altered maternal perception of the preterm infant. The altered maternal perception of the premature infant can subsequently lead to inappropriate maternal behavior.

Stern (1973) has done research with preterm and term infants who were abused and found that there was an increased incidence of child abuse in premature infants. Stern studied 51 abused children retrospectively and found that 23.5% were preterm infants. Stern feels that prematurity may be a factor in child-abuse incidence because of the early strain it puts on the relationship between mother and infant. Stern cites the infant's increased irritability, its high-pitched cry, and the unique appearance of the infant as potential factors in the

altered relationship between mother and infant. The infant's risk factors combined with possible maternal risk factors of young age, limited income, and limited social support create the potential for abuse among the premature infant population. Stern admits that no causal relationship can be drawn concerning child abuse because of the multifactoral process involved, but the observations made have stimulated other research studies on parental perception of the premature infant.

Bidder, Crowe, and Gray (1974) looked at mothers' attitudes toward the preterm infant. The researchers evaluated whether mothers of preterm infants were more concerned about their preterm infants and whether these mothers perceived the preterm child differently than a term or ideal child.

The assumptions made by Bidder et al. were that because of the uniqueness of the premature infant the mother may perceive the infant in a different way than a full-term infant. "The infant may appear physically unattractive, fragile, wasted and be inattentive toward the mother" (Bidder et al., 1974, p. 766). The population consisted of 20 mothers who had at least two children (one term infant and one preterm infant). The mothers were interviewed in the home environment and asked to compare their preterm, term, and concept of ideal child on various measures. The measures included a questionnaire to evaluate the children on temperament using the Semantic-Differential technique and a comparison of the three infants' behavior.

The results of the data were analyzed for significance using the sign test (a statistically significant difference between groups). Mothers saw their preterm children as weaker than the term infants ($p < 0.05$). The mothers stated that they were significantly more anxious with their preterm infants than with term infants ($p < 0.05$). No significant differences were found between the rates of preterm and term infant development in the mothers' opinions. In comparing the idea child to both the preterm and term infants, the mothers stated the ideal child was more relaxed, quieter, calmer, and more satisfied than either of their infants.

Bidder et al. concluded from these data that mothers did view their preterm infants differently than their term infants. The mothers saw preterm infants as weaker and more vulnerable than the term infant. Although the sample size was small and no objective analysis of the infants was given, Bidder et al. suggested the mothers of preterm infants do perceive their infants differently than term infants.

Jeffocate, Humphrey, and Lloyd (1979) did a retrospective study to investigate early bonding difficulties in parents of preterm infants and parental attitudes toward the preterm child. The population was chosen from infants born at St. George's Hospital, London, over a 1-year time period. There were 17 families with preterm infants and 17 term infants used as controls. The parents were interviewed in their own homes using a semi-structured interview schedule. An adapted version of the Neonatal Perception Inventory (NPI) was used to assess

the parents' perceptions of their own baby in comparison to an average baby.

The data from the study were presented in descriptive and analytical form. Eight of 17 mothers of preterm infants stated that it took almost 2 months after the infants' birth to develop real affection for their children. Mothers of preterm infants stated that while the child was in the care of the hospital the mothers did not feel the infant was theirs. The parents' scores on the NPI showed significantly lower scores in the parents of preterm infants than in the term infants' parents. The data were analyzed using a pooled t-test for means with a significance level of $p < 0.01$.

Sixty percent of the preterm groups of mothers expressed extreme anxiety and fear following the birth of their infant and up to the time of discharge from the hospital. No control-group parents expressed more than "some" anxiety about leaving their infants, while one-quarter of the preterm infants' parents even at 12 to 15 months after birth stated they were "very" anxious about leaving their infants. The researchers also noted two documented cases of child abuse in the preterm group, with no abuse in the term infants.

Jeffocate et al. concluded that parents of preterm infants may have continued anxiety about their preterm infants even after the infants leave the hospital. The parents of preterm infants may also perceive their child as vulnerable or in some way different from the normal child. The study by Jeffocate et al. was a small sample group in a specific area and has the limitation of not being able to draw

many conclusions from the data, which are given mostly in descriptive form. But these research findings add support to the conclusions about the altered perceptions of mothers of preterm infants.

Collingwood and Aberman (1979) chose to look at how separation at birth affects the mother-infant relationship. Collingwood and Aberman's major concern was the increased prevalence of low-birth-weight children with documented cases of child abuse and neglect. The study population consisted of 32 premature infants born over a period of a year in Greater London. For each index case a control was matched for sex, month of birth, and residence since birth. The mothers were then interviewed when the children had reached school age (5 to 6 years old). The maternal-child relationship was evaluated using a focused interview which was designed to allow mothers to express their feelings and concerns about the infants. The mothers were also asked to fill out a questionnaire on their perceptions of their children and to evaluate the infants' temperament.

Most of the data were presented in descriptive form. In the interview, Collingwood and Aberman found that none of the control mothers expressed a dislike of or hostile feeling toward their children. In contrast, six of the preterm mothers were assessed as having rejected their children. The difference was statistically significant using the Fischer Exact Test ($p = 0.02$). The scores of the Semantic Differential Technique Questionnaire were evaluated using the Wilcoxon's two-sample rank test. The results showed that a significantly higher proportion of preterm than term children were rated by

their mothers as destructive and whining. The mothers who were classified as rejecting their children were less satisfied with their lifestyle at the $p = 0.005$ level of significance. A higher proportion of mothers of preterm infants were under 20 years of age when the infant was born ($p = 0.02$).

The conclusions drawn from these data by Collingwood and Aberman were that the rejection of a child by its mother occurred more commonly in mothers of preterm infants who were under 20 years of age, had been separated from their child for at least 14 days, and were less satisfied with their own lifestyle. Those mothers who rejected their children also perceived their children as being difficult or unlikeable. There are definite limitations of this study. One was the small sample size, which limits the ability to generalize. It is also difficult to relate the maternal-child relationship directly to the premature birth of the infant and early separation of mother and child. The pattern of circumstances which affects a maternal-child relationship is complex. But it appears that prematurity and early separation can put added stress on the development of attachment between the mother and infant and the mother's acceptance of the infant.

McCormick, Shapiro, and Starfield (1982) looked at factors which are associated with maternal opinions of infant development as they relate to the perception of a vulnerable child. The researchers looked at mother-infant dyads from across the United States, including New York, Los Angeles, Dallas, Cleveland, and regions in Arizona. There were a total of 4,000 families interviewed; 82% were low-birth-weight

infants (LBW) and 3% were normal birth weight (NBW). The infants were evaluated in their homes when the infant was 1 year of age. Trained lay interviewers administered a survey instrument consisting of an interview with mother, sociodemographic data, the mother's evaluation of the infant's development, and a developmental assessment of the infant by the observer.

The data were analyzed using a bivariate analysis with a chi-square analysis for significance. Eighty-eight percent of the infants observed were considered to be developing normally by the trained observer. In contrast, 72% of the infants considered normal by trained observers were considered to be developing slowly by their mothers. A strong relationship was found between the mother's perception of the child's development and the variables of infant birth weight and length of hospitalization.

McCormick et al. concluded that mothers of preterm infants often assess their infants' developmental level inappropriately. This conclusion indicates a need for routine systematic developmental assessment of preterm infants by trained professionals to help the mothers have a more realistic expectation of their infants' developmental abilities.

Leavitt, Conovan, Neff, and Sherry (1978) did a study to evaluate how parents respond differently to the faces and cries of premature infants. The study was designed to evaluate whether the cry of a premature infant was perceived as more aversive and if the infant cues were influenced by the parents' perception of the child's temperament.

The population consisted of 32 middle-class couples who had 5-month-old infants. The couples were divided into two groups. The groups each watched two tapes of the infants; during the tapes the infants were shown quiet and playing, then crying, followed by a period when the infants were quiet again. Half of the parents viewed a tape of a normal full-term infant, and half of the group viewed a tape of a premature infant. The tapes were dubbed with the cries so that half of the normal and half of the premature infants emitted the cry of a normal infant while the other half emitted the cry of a premature infant. The couples were assessed for physiological response during the tapings with the Beckman type R. M. Dynography recorder, which recorded heart rate, skin conduction, and blood pressure. The parents were asked immediately after the viewing to fill out an adjective checklist concerning how they felt while viewing the different tapes.

The data were analyzed using an analysis of variance. The results indicated that the premature infant cry elicited a significantly greater autonomic arousal than did the normal infant cry at the $p = 0.05$ level of significance. The mood adjective checklist that the parents subjectively filled out indicated that the parents felt significantly more irritated and annoyed while hearing the premature baby's cry than while hearing the normal baby's cry (at the $p = 0.01$ level of significance). The parents also reported that they found the normal baby more pleasant to look at than the premature infant (at the $p = 0.01$ level of significance).

The limitations of the study included the small sample size and the use of only middle-class parents when the majority of premature infants are born to lower-class mothers. The conclusions Leavitt et al. made from the data were that the cry and appearance of the premature infant were perceived as more aversive than those of a full-term infant. Also, parents reported they were less eager to interact with the preterm infant, which could ultimately affect the long-term maternal perception and attachment of the mother-infant dyad.

Hildebrandt and Fitzgerald (1983) have done research on how the infant's physical attractiveness affects bonding and attachment. The theory base of the research lies in the ethologic assumptions that the appearance and behavior of infants act to release or elicit approach behaviors by adults. Hildebrandt and Fitzgerald made the assumption that the infant's physical appearance acts as a cue which influences the adult-infant relationship. According to their research, identification of "cuteness" is related to the infant's age, sex, facial features, facial expression, and birth order. This research was conducted using photographs of infants and having adults rate the infants on a 5-point scale as to perceived cuteness. The pictures of the infants were rated by adult and student populations.

Hildebrandt and Fitzgerald found that parents looked longer at infants whom they perceived as "cuter." Hildebrandt and Fitzgerald have postulated that there is a two-component response to the infant's physical appearance. The initial response is to the general appearance of the infant. The second process, the cognitive preference

evaluation of the infant's attractiveness, leads to longer gazing by the adult. The sustained attention to a particular infant is related to the adult's qualitative judgment of the degree of infant attractiveness.

The data from Hildebrandt and Fitzgerald's research is particularly important to the concept of parents' perception of the premature infant. "The physical appearance of the premature infant lacks the 'babyish' quality of a full term neonate and thus the infant may be perceived as less attractive, which may decrease the amount of 'looking' the infant receives" (Hildebrandt & Fitzgerald, 1983). The maternal perception of the infant as being less attractive could potentially affect the attachment process by altering the mother's perception of the preterm infant.

There are many obstacles to the development of maternal-infant attachment in the premature infant. Some of these obstacles include the guilt over having caused the premature delivery, the fear for the infant's life, and the inability to do anything specific to help the infant. The fear and anxiety which accompany a premature birth are not easily forgotten (Harrison, 1983). These factors of fear and anxiety may alter the mother's perception of the child. Early detection of alterations in the mother-infant relationship is essential for the health care system to have an effect on the outcome of this relationship. The potential for altered attachment and inaccurate perceptions of mothers toward their premature infants indicates a need for support and encouragement from the health care system toward the mothers of

premature infants. The mothers need to be encouraged to treat their infants as normal children.

It has been documented that mothers of premature infants can develop altered perceptions of their infants. The altered perceptions can influence their behaviors toward the infant and subsequently influence the infant's future and present well-being. The research which explores the relationship between the mother's perceptions and the infant's present and future well-being is discussed in the next section.

Caregiver Perception of Infant Well-Being

A significant part of the infant's environment involves its parents and the type of caregiving the infant receives. The caregivers' knowledge level concerning infant development and their perception of the influence their caregiving has on infant well-being may influence the caregivers' behaviors toward the infant.

Broussard and Hartner in 1963 developed a tool to assess mothers' perception of their infants in comparison to an average infant. The idea behind the Neonatal Perception Inventory (NPI) was that mothers who perceive their infants are more fussy, irritable, or difficult than the average infant would have infants who were at an increased risk for emotional and developmental deviations. Broussard and Hartner (1969) chose a sample of 120 nulliparious women to be part of their study. The women filled out the NPI at 1 day post-delivery and at 1 month after birth of infant. The questionnaires were scored and the infants were then either categorized from the mothers' responses as high or low

risk for potential developmental or emotional problems. Eighty-four percent of the infants were rated as low risk from the results of the NPI, and 25% rated as high risk for potential developmental problems. This same sample of infants was evaluated at age 4-1/2 by psychiatrists who were blind to the original results of the NPI. The risk categories of the NPI and the psychiatrist evaluation were compared using the chi-square. A significant relationship was found between the NPI risk categories and the psychiatric evaluation.

Broussard (1969) postulated from these results that a mother's expectations can influence her child's behavior to the extent that mothers' expectations can become a self-fulfilling prophecy. Broussard continued to follow these children, and at 10 years of age the children were again evaluated by a psychiatrist. The data indicated a significant relationship between the predictive risk rating of the NPI and the developmental levels of the children at 10 years of age ($p = .05$). Broussard remained convinced that the mother's perception of her infant affects her behavior toward the infant and thus affects the infant's development. The question that comes to mind is how the other factors which may be influencing the infant's development can be separated (from the mother's perceptions and subsequent behaviors) and evaluated for significance.

Brazelton (1973) did cross-cultural research studies concerning maternal expectations and the influence these expectations had on infant responses. Brazelton's theory is that both the mother and the infant affect each other in a reciprocal feedback system. The

expectations of an infant's mother are influential in the infant's development, and the infant's development affects the mother. Brazelton examined the mother-infant dyad in Africa, Mexico, and the United States. The data showed that even when the infant was severely malnourished in utero the infant was able to respond to the mother's expectations. The mother's expectations influenced the amount the infant moved around, smiled, and responded to the mother. The mothers who expected more from their infants had infants who responded accordingly. Brazelton concluded that the mother's expectations will influence the child's responses to the environment. The preterm infant may be perceived as vulnerable, thus not expected to perform in the way a term infant would be expected to perform.

Perry (1982) studied a group of 57 couples to determine if parents' perceptions related to infant behaviors. The basis behind the research was a concern that parents did not accurately perceive their infants' behaviors, thus not responding to them appropriately. Perry designed the study to evaluate if structured interactions with the parents and nurse could affect their perceptions of their infant. The participants were divided into four groups: the mother-intervention group, the father-intervention group, the parent-intervention group, and a control which received no intervention.

The infant's behavior was measured at birth and 1 week. The mother's and father's perception of their infant was measured using the NPI at birth, 1 week, and 1 month. No relationship was found between the infant's behavior (as measured by the Brazelton Scales) and the

parents' perception of the infant's behavior as measured by the NPI. A multivariate analysis of variance was used to analyze the remaining data. Perry found that there was a relationship between parents' perceptions of their infants and structured interaction between the nurse and parent ($p = .05$). Perry concluded from these data that (a) parents' perceptions of their infant's behavior are not always accurate and (b) the question of whether intervention can influence parent perception cannot be definitively decided from these data, which implies a need for further study of parental perceptions. The finding that parents did not perceive their infants' behavior accurately indicates a need for health professionals to find ways to assess parental perceptions. Once the parental perceptions are measured, the health care professional can help parents to perceive their infants' behavior appropriately.

Snyder, Eyres, and Barnard (1979) attempted to evaluate how mothers' expectations related to infant development. The basic assumptions of the study were that mothers often miss opportunities to enhance the child's development because of a lack of knowledge about infants' capabilities and parenting. The study was conducted at the University of Washington and involved 193 families.

The mothers were asked about antepartal experiences and concerns they had about the infants' development. The mothers also filled out a questionnaire which asked about their expectations of their infants' development. An interview was conducted in the home at 1, 4, 8, and 12 months, when the HOME scale was completed by the interviewer. The

infants were tested at 12 and 24 months of age with the BSID. The infants' developmental scores and the mothers' expectation scores were correlated using the Pearson product-moment correlation. One of the significant findings was that only 13% of the mothers felt their infants would be aware of their surroundings at or shortly after birth. There was a significant correlation between the mothers' expectations and the BSID (no significance level was given). Snyder et al. concluded from these data that mothers' expectations are related to the quality of the early environment that they provide and to the way in which their children develop.

Parks and Smeriglio (1983) have taken the assumption that caregivers' expectations affect infant development. The researchers have attempted to evaluate one specific aspect of caregiver expectations, that of how the caregiver's actions affect an infant's present and future well-being. Their assumption was that parenting knowledge, which they defined as the awareness that caregiving practices influence the infant's present and future well-being, will be an important variable in determining the parents' behavior toward their infant. Parks and Smeriglio developed the Infant Caregiving Inventory to measure the parents' perceptions of the influence their caregiving has on infants' present and future well-being. By measuring parental perception, the health care provider can identify individuals with inaccurate perceptions and help to clarify with the parent the importance of caregiving to an infant's present and future well-being.

Parks and Smeriglio studied 45 primiparous adolescents in Baltimore to evaluate the parenting knowledge and perceptions of this group of mothers using the ICI. The participants in the study were involved in three interview sessions. Each session consisted of filling out questionnaires and observation of mother-infant interactions. The mothers were asked to complete the NPI (Broussard's tool to measure mothers' perceptions of their infants in comparison to the average infant), the ICI (Parks & Smeriglio), and a General Health Questionnaire to assess the adolescent mothers' mental status. During each session the mother's behavior and contact with her infant were observed and recorded by trained observers through a one-way mirror.

The mothers who were in the NPI high-risk category were less frequently observed in physical contact with their infants than mothers in the NPI low-risk group. The Mann-Whitney U test was used with p = .05 significance level. Smiling and *en face* position were more frequent in mothers with high ICI scores (at p = .02 level). Parks and Smeriglio concluded from these data that the mothers' perceptions as documented in the ICI scores were related to more contact with infant, smiling, and *en face* behaviors with their infants.

The limitations of the study relate to the special sample of mothers, who were young, single mothers who volunteered to participate in the study. The results indicate there is a correlation between the mother's perception, the mother's cognitive and attitudinal states, and the mother's observed behavior with her infant.

Parks and Smeriglio (1983) compared the results of the group of single, young adolescent mothers with a group of 35 adult mothers (average age 21.6 years). The adult mothers were sampled from a clinic for healthy babies. The mothers at the clinic were asked to respond to the ICI. The data were analyzed using a Z-test for proportions (p = .01). There was no significant difference between the two groups of mothers in parenting knowledge and perception of caregiving influence on present and future well-being as measured by the ICI. Parks and Smeriglio attributed this lack of significant difference to two facts: (a) that the adolescent mothers had received special sessions for parenting and (b) that the mothers had chosen to be part of the study, which indicated at least some interest in increasing parenting knowledge.

The ICI is made up of items which measure caregiving practices and an aspect of infant functioning that is influenced by these practices. Recent literature, expert opinion, and child development theories have been cited by Parks and Smeriglio to support the caregiving practices used in the questionnaire. The aspects of caregiving that are covered in the ICI are home environment, medical care, day care, and nutrition. Each of these areas will be reviewed and studies identified to support the concepts as they relate to infant development.

Caregiving Practices in Relation to Infant Development

Home Environment

The importance of the home environment to infant development has been examined by several researchers in recent years. Bradley and

Caldwell (1976) did a longitudinal study of 77 normal infants and their families as part of an intervention study at the Center for Early Development and Education in Little Rock, Arkansas. The sample studied was predominantly black, low-income families. Bradley and Caldwell looked at the changes in mental test performance of the infants over time. They then evaluated how the environment might contribute to the changes observed in mental performance.

The children were evaluated by the BSID at 6 months of age and the Stanford-Binet Intelligence Test at 3 years of age. The home environment was evaluated at 6 months by the researchers, who went into the homes and administered the HOME inventory which Bradley and Caldwell (1976) had designed to assess parental support of early cognitive and social-emotional development (van Doorninck, Caldwell, Wright, & Frankenburg, 1981). The data were analyzed using a cross-lagged panel analysis correlation. Caldwell and Bradley found a significant relationship between the HOME scores and an increase in the infant mental index (p = .001). The researchers concluded that the home environment can affect infant development.

Bradley, Caldwell, and Elardo (1979) went on to study the same population at 3 years of age. The intelligence scores were used to divide the group of infants into three categories: (a) those infants who improved in mental status, (b) those who remained stable, and (c) those who declined in test performance. A multiple discriminant analysis was used to differentiate the groups on the basis of the home environment scores. The significance level was p = .001, with a

univariate effect for Maternal Involvement with the Child and Provision of Appropriate Play Material subscales of the HOME inventory on infant intelligence.

Caldwell, Bradley, and Elardo concluded from these data that the level of home stimulation, especially the maternal involvement and appropriate play materials, are related to infants' developmental level. The generalizability of this sample is questionable because of its special characteristics, but the indications are that home environment did affect infant development.

Yarrow, Rubenstein, Pedersen, and Jankowske (1974) studied a population of 41 black infants from middle- to low-income families. The data were collected on two home visits, during which time-sampling observations were done. These observations were then coded into environmental variables which were later correlated with infants' scores on the BSID. Yarrow et al. found a significant correlation between the BSID and two of the subscales of home environment (caregiver responsiveness and variety of stimulation) at the $p = .05$ significance level.

Yarrow et al. concluded that there are significant correlations between environmental variables and infant characteristics. The researchers also felt that it is not appropriate to conclude that any single variable of an infant's environment is responsible for a particular infant function. The relationship between infant characteristics and environment is a reciprocal interaction (Yarrow, 1974). A limitation of this study is the use of correlational analysis rather

than a multivariate analysis, which could identify various factors and their specific relationship to the study variable. The importance is the correlation identified between the child's developmental level and the human as well as inanimate aspects of the infant's environment.

van Doorninck et al. (1981) also looked at the question of whether the home environment of a young child relates to the child's later development. The data were collected from 71 middle- and low-income families. The researchers examined the infants' school achievement and home environment. The data from the schools were presented in centiles. The centiles were developed to facilitate analysis of the data by converting quantitative achievement data from school performance into uniform measures. The school performance measures were from the infants' elementary school achievement (ages 5 to 7). The school centiles were correlated with HOME scores which were obtained when the children were 12 months of age. The HOME scores were found to correlate with the low-income children's school achievement at the $p = .05$ level. There was insufficient variability among the HOME scores of the middle-income group to allow any predictions to be made for this group concerning the influence of home environment on infant development.

van Doorninck et al. concluded that despite the limitations of a small sample size and the questionable validity of the school centiles (because of nonuniform school achievement data), the home environment can be used to predict school achievement among low-income families. The validity of this statement can be questioned because of the

multitude of factors which influence infant development and the use of a correlational analysis. The data do support the assumption that home environment relates to infant development and school achievement.

Beckwith, Cohen, Kopp, Parmelee, and Marcy (1976) studied how the premature infant's cognitive development related to caregiver-infant interaction. Fifty-one premature infants and their families were studied. The infant-caregiver interactions were time sampled in the home environment at the ages of 1, 3, and 8 months. The Gesell developmental schedules were administered to the premature infants at the infants' ninth month of age.

The data were analyzed using a stepwise regression analysis. The variables examined were the caregiver-infant interactions and the infant Gesell IQ at 9 months of age. The caregiver-infant interactions of vocalization, amount of smiling, and the amount of floor freedom allowed the infant, related to the Gesell scores of the infants (p = .05).

The study has several limitations. There were several observers of behavior, which allows for some variability in the results although the interrater reliability was stated to be .80 to .92. The population was of infants born only at UCLA Hospital, excluding all non-English-speaking families, which limits the generalizability. Despite these limitations, Beckwith et al. concluded that preterm infants who scored higher on intelligence testing had different patterns of social interaction with their caregivers than infants who had lower intelligence scores.

The studies presented here support the concept that home environment, which involves the amount of stimulation, vocalization, and appropriate play materials provided to the infant, relates to the infant's developmental level.

Day Care

One of the other areas addressed by the ICI is the relationships between day care and the infant's developmental level, as well as the development of the mother-infant bond. Many mothers have to go back to work shortly after the birth of their children and are concerned about how this will affect the child. Hock (1980) looked at how day care within a home setting affects infant development. The sample consisted of mothers and infants from two hospitals in a metropolitan area. One group of mothers planned to go back to work within 3 months, and the other group planned to stay home with their infants. The mothers were matched on race, socioeconomic level, education, and the sex of the infant. One of the limitations of the study was that the sample was mostly white, middle-class mothers. Another limitation was the inability of the researchers to use the matched pairs of subjects because of changes in the mothers' employment status.

The researchers interviewed the mothers at the infants' birth and when the infants were 3 and 8 months old. The interview was designed to look at the mothers' attitudes about work and child rearing. The mother-infant dyads were observed for interactive behaviors, and the

infants were tested for developmental level using the BSID at 8 months of age.

The data were analyzed using two-factor analysis. There were no significant differences found between the group of infants who had working versus nonworking mothers on BSID scores or on the maternal-infant interaction measures. The only significant relationship found was that the infants of working mothers had less resistance to strangers at the $p = .05$ level. Hock concluded from these data that there were no detrimental effects on this population of infants from being placed in day care.

Farran and Ramey (1977) looked at attachment behaviors of infants who attended day care. The study population was 23 black, low-income infants between 9 and 13 months of age. The children were observed in a room interacting with mother, the day care teacher, and a stranger. The sessions were video taped, and the observers were instructed to look at frequency and duration of play, physical contact with adults, and sharing of toys. The interrater reliability of the observers was .85.

The results of the study were analyzed using a multivariate analysis of variance. The data revealed that all the children spent significantly more time with their mothers than with strangers (at the $p = .003$ level) and that the infants went to their mothers more often for help. Farran and Ramey concluded that day care did not have any notable detrimental effect on the maternal-infant attachment in these infants. The limitations of this study were the small sample size and

the specific low-income black population. The results support other research done on the effects of day care on infant development and maternal-infant attachment.

Doyle (1975) studied how infant development related to attachment behaviors of infants who had spent at least 7 months in a day care center. The researcher matched 24 infants who attended day care with 24 infants who remained in the home with their mothers. The infants were matched on sex, age, parent educational level, father's occupation, and parent age. The maternal-infant attachment behavior was measured by Ainsworth and Bell's "Stranger Situation." The intellectual development of the infants was measured by Cattell's Infant Intelligence Scale.

The mean IQ of the day care center children was found to be higher than that of children at home ($p = .05$). A three-way analysis of variance was used to analyze the remaining data for relationships. Only one difference between day care and home care was found to reach significance level: Home children looked more at strangers ($p = .05$). Doyle concluded from these data that there was no significant difference between the day care infants and the home care infants on attachment. Doyle also stated that there might be an increase in intelligence of day care versus home care infants. The thought that comes to mind about intelligence is that the day care centers are designed to expose the infant to learning measured by many of our intelligence tests. The difference in IQ scores could be a measure of what is

taught to the infant rather than actual differences in the infants' cognitive abilities.

The recent research on day care appears to support the idea that day care itself has no detrimental effects on infants and, in fact, may help the children to be more prepared for school.

Health Care

The ICI also identifies a relationship between health care and the infant's present and future well-being. The importance of health care in improving the health status of children through immunizations and early detection of developmental delays has been widely accepted and supported by the American Academy of Pediatrics and other health care groups. Now an effort is being made to explore how well-child visits can influence child development by supplying support and education to parents. Several researchers have examined how the well-child visit actually affects the mother-infant relationship and subsequent infant development.

Whitt and Casey (1982) explored the effects of pediatric-based intervention on cognitive development, maternal-infant behaviors, and the interactional quality of the mother-infant relationship at 6 months of age. Forty-seven maternal-infant pairs were selected to be in the study. The maternal-infant pairs were then randomly assigned to either an intervention group or the control group. The control group received routine well-baby care by the pediatrician. The intervention mothers received these same services plus discussions which were designed to (a) increase mothers' awareness of infant development and encourage

responsiveness to infant cues, (b) improve maternal understanding of development, and (c) enhance maternal confidence.

The data were collected at a 6-month well-baby visit. The assessment included an observation of the maternal-infant interactions and an evaluation of the infants' developmental level (BSID). The data were analyzed using a Pearson product-moment correlation. No significant group differences were obtained between the two groups of infants on the BSID. A one-tailed *t*-test was used to determine the differences between the means of the two groups. The intervention group had higher scores on positive affective relationship variables than the mothers without intervention ($p = .02$). The intervention group also smiled more at their infants than the nonintervention group of mothers.

Whitt and Casey concluded from these data that pediatric well-child visits are a potentially effective modality for enhancing the affective quality of the parent-infant relationship. The study results are limited by a small sample size and a homogeneous middle-class sample, but the data suggest that pediatric interventions can influence maternal attitudes which, in turn, can affect infant development.

Chamberlin, Szumowski, and Zastowny (1979) designed a study to evaluate whether visits to pediatric offices made a difference in a child's development. The variables examined were parental support, parental guidance, and an infant developmental screening. The researchers used 35 different private practice fee-for-service pediatric offices in the Rochester, New York, area to obtain participants for the study. Approximately 500 mothers who went to

these pediatric offices chose to be involved in the study. The pediatricians were given a questionnaire to evaluate whether they used high or low levels of teaching during routine office visits with the parents of small children. On the basis of this questionnaire, the pediatricians were divided into two groups: those with high levels of teaching of parents and those with low levels of teaching to parents of small children. The mothers were sent questionnaires to assess their level of knowledge of child development, attitudes toward their children, and their child-rearing styles. The mothers also filled out a questionnaire that assessed their perception of their infants' development (the Minnesota Child Development Inventory).

The data were analyzed using a Pearson product-moment correlation. No significant relationships were found between parental variables and the type of pediatric intervention received by the mothers. The mothers who went to pediatricians who were high-level teachers reported more use of positive contact with their infants and a feeling of being helped in the child-rearing role (the differences did not reach statistical significance). The lack of statistically significant findings could be attributed to several factors: The data were collected through self-report only, the pediatricians were labeled for teaching styles through self-report, and no direct observation of physician-client interaction was made. Despite these limitations, Chamberlin et al. felt that the data indicated a potential relationship which should be explored further through research between the positive parenting behaviors and pediatric intervention.

Chamberlin and Szumowski (1980) felt that part of the reason that they had found no significant relationships in their previous study was that the time span between the physician interactions and the evaluation of infant development was not long enough. The authors went on to do a follow-up study of the same sample of mothers and infants when the infants were 2-1/2 years of age. At this time, 44% of the original sample were available for study. The mothers were again sent questionnaires to assess their knowledge of child development, attitudes, child-rearing styles, and child developmental status.

The data were analyzed using a correlational analysis. A significant relationship was found between mother's reported positive contact with infant and having pediatricians with high teaching scores. The importance of this finding is that mothers who have more positive contact with their infants could, in turn, affect the infants' development through positive interactions. The knowledge level of mothers attending pediatric practices with high teaching scores increased over the 3-year time period. The opposite relationship occurred with the mothers who went to pediatricians with low teaching styles (these results did not reach statistical significance).

Chamberlin and Szumowski went on to do a content analysis of a small sample of the office visits. The findings revealed that the high-level teaching physicians taught about stage-related infant behaviors and common management problems. Neither group, however, spent much time teaching the importance of providing stimulating interactions between parent and child to promote optimal development in the infant.

Chamberlin and Szumowski concluded from this that more focused teaching in the areas of cognitive stimulation and importance of an affectionate relationship might lead to better child development outcomes.

Gutelies, Kirsch, MacDonald, Brooks, and McErlean (1977) studied the effects of controlled child health supervision on a group of low-income black unmarried young mothers. The study involved 95 mother-infant pairs, 47 in the experimental group and 48 in the control group. The experimental group received information and medical care from their seventh month of pregnancy on through their infant's third year of life. The experimental mothers received complete well-baby care through home visits from one pediatrician and nurse for the entire 3 years. The home visits lasted at least an hour and involved teaching and counseling about baby care, feeding, and concerns the young mothers might have about their own lives. The controls received their medical care from well-baby clinics in the area.

The children were evaluated yearly by a psychologist who was blind to the study groups. At the yearly visit the mothers were asked to answer questions about the child's health, eating habits, behavior, and any medical problems the infants might have had. The mothers were observed through a one-way mirror and rated on variables which reflect adequate maternal-infant interaction.

The data were analyzed using the chi-square on 2 x 2 contingency tables. The differences were reported as significant at the 5% level of confidence or better. The results of the developmental and intelligence tests showed increasingly significant differences between the

experimental and control children through 3 years of age, with decreasing differences in the following years (after intervention stopped). The study did not find many significant differences in maternal-infant interaction between the two groups when observed through the one-way mirror. The only items that proved significant were the greater amount of conversation between the mother and child at 2 years and more appropriate maternal handling of fussiness at 3 years of age.

Gutelius et al. concluded from these data that a causal relationship existed between the intervention and some of the favorable findings, although the authors felt that the more important finding was that the trends all pointed in the positive directions for the experimental group. This indicates that intervention can make a difference in the mother-infant relationship if the intervention is done properly and focused on the right aspects of child development.

The study by Gutelius et al. does have some obvious limitations. By way of selection of population and design of the study, the researchers almost guaranteed themselves some positive results. The generalizability of the results is questionable because of the population and the amount of time spent with the intervention subjects. The assumption of a causal relationship can be questioned, especially because the only analysis of the data was a chi-square analysis. Despite these limitations, the data do show a trend that health care professionals can impact the mother's relationship with her infant and thus possibly affect the infant's development.

Nutrition

The importance of nutrition to development has long been acknowledged by many. "You are what you eat" is a widely used expression whose scientific validity is increasingly being recognized by the world's nutritionists and health professionals (NICHD, 1976). Malnutrition is mankind's most pervasive health problem. Even in the United States, 400 million people are starving or seriously malnourished. Thus, mothers need to perceive the importance of providing their children with adequate nutrition.

Freeman, Klein, Townsend, and Lechtig (1980) did a long-term longitudinal investigation concerning the relationship of nutrition to infant mental development. The researchers' hypothesis was that both nutritional and social domains are related to infant cognitive development, but the relative importance depends on the particular situation and cognitive dimensions selected as criterion variables. The data were collected from approximately 1,000 children ages 3 to 7 years old who resided in four small Spanish-speaking Guatemalan villages.

The investigation was set up as a quasi-experimental design which involved four villages. In two of the villages, pregnant and lactating mothers and their children were given protein caloric supplements two times a day. The other two villages received a supplement with no protein. The supplements were received and drunk under supervision, but on a voluntary basis so that the subjects received various amounts of supplements. The children were evaluated at the end of the 4-year

period on cognitive measures, nutritional status, and socioenvironmental measures.

The data were analyzed using a correlation and a multiple regression analysis. The infants' nutritional status and the socioenvironmental factors were found to be significantly correlated with the infants' cognitive competence at 4 years of age ($p = .05$). The multiple regression analysis indicated that the infants' cognitive competence was related more to the infants' nutritional status than to socioeconomic status ($p = .01$).

Limitations of the study include the questionable validity and reliability of the measures used and the variation in amount of supplementation the participants received, which could influence the results of the study. The study was conducted in a foreign country, which limits the ability to generalize the findings to other populations. Despite these limitations, Freeman et al. concluded that even when controlling for socioenvironmental variables, the infants' nutritional status does affect cognitive development. These data do not represent a causal link or rule out the home environment as a significant variable, but they do validate the importance of nutritional status of infants on cognitive development. The study also showed that infant development could be influenced by supplemental food programs used to improve the infants' nutritional status.

Hertzig, Birch, Richardson, and Tizard (1973) studied the relationship of intellectual functioning of school-age boys to the nutritional status of these boys as infants. The population consisted of a

group of 74 boys who had been hospitalized within the first 2 years of life for severe clinical malnutrition. Two comparison groups of infants were used by the researchers to control for home environment and genetic predisposition. The first comparison group were siblings of the malnourished infant. The second group were unrelated classmates or neighbors who were the same age as the severely malnourished infants.

The assumption of the researchers was that the index group, having suffered acute malnutrition, would be most severely impaired intellectually; the siblings, some of whom had chronic submalnutrition, would be intermediately impaired; and the comparison group would be the least impaired intellectually. The intellectual levels of the study population were evaluated by means of the WISC scales. The results of the WISC were used as a comparison between groups rather than as a measure of intelligence because of the questionable validity of the scores in a different culture than the one in which the test was originally standardized.

The data were analyzed using a *t*-test for comparison of means. For the Full Scale, Verbal, and Performance IQ measures (the WISC scores), the index cases had the lowest mean scores, the siblings intermediate scores, and the comparison group the highest scores. The differences were found to be statistically significant at the 0.001 level of confidence.

The conclusion was that children who have experienced severe malnutrition in the first 2 years of life have lower levels of

intelligence at school age. This study was designed to control as much as possible within the range of human research for home environment. There are admittedly many other variables which could have affected the intellectual development of the children; even so, there is a relationship indicated between the nutritional status of children and the children's later intellectual level.

Hicks, Langham, and Takemaka (1982) examined the effect of nutritional supplementation on infant development within the United States. The purpose was to look at the possible impact of a supplemental food program (WIC) provided during the perinatal period upon cognitive functioning. The population studied included infants within a region of rural Louisiana who met the risk criteria for nutritional deprivation. The subjects were predominantly low-income black rural families. Families were chosen who had at least two infants on WIC. One of the siblings received the WIC supplementation after the infant's first birthday (the late supplement group) and another sibling who had been supplemented through the mother from the third trimester of pregnancy through the first year of life (the early supplement group). A total of 21 pairs of siblings and their families agreed to participate.

The infants were evaluated for behavior, sociocultural status, and intelligence. The intellectual level was evaluated at school age by the WISC-R, and then an Estimated Learning Potential (ELP) was obtained using the WISC-R and the Sociocultural Scales developed by Mercer. The children's GPA at school was also collected as a measure of school achievement. The data were analyzed using an analysis of variance with

a significance level of $p = 0.01$. The variables were compared using a correlation coefficient. On the cognitive measures and the GPA of the infants in the first year of school, the late supplement group was found to be significantly more impaired in function than the early supplement group. A significant relationship was found between the two groups' nutritional status, the cognitive developmental measures, and the Behavioral Problem Checklist.

Hicks et al. concluded that supplemental nutritional services to infants and pregnant women can impact later infant intellectual functioning and the infants' behavioral adjustment. The use of sibling pairs decreases the amount of variance that can be attributed to the infants' home environment but introduces the variables of age and parity. The population in this study were predominantly black and rural, which decreases the ability to generalize the findings to other populations. Despite these limitations, the data indicate that the level of nutrition in the infant's first few months of life can influence the growth and development of the child. The mothers need to perceive the importance of proper nutrition in their infants' intellectual growth and development. Health care professionals need to facilitate the mothers' ability to provide adequate nutrition for their children. The health care provider can provide information, support, and help in locating appropriate agencies within the community to assist the mother in providing adequate nutrition for her infant.

Summary

In summary, the literature supports the idea that premature infants are at increased risk for developmental delay, not only in the first few years of life but potentially on into school age. The risk factors for developmental delay in the premature infant include both infant and maternal factors. The infant factors include an immature nervous system which affects how the infant relates to the environment, any medical problems which occur in the neonatal period, and the unique health care needs of the infant into childhood. The maternal factors involve the way the mother deals with the emotional crisis surrounding the birth, the accuracy of her perceptions of her infant, and the amount of social support the mother has at home. The multitude of risk factors that can influence the maternal-infant relationship identifies the premature infant and the infant's mother as needful of special care and follow-up from the health care providers.

The relationship between the mother's knowledge and caregiving practices and the infant's development has been documented by research studies. The need now is to identify what aspects of the mother's knowledge can be measured and potentially affected by health care professionals' interventions. Parks and Smeriglio have developed a tool, the ICI, to assess the mother's knowledge and perception of the influence her caregiving practices have on the infant's present and future well-being. The caregiving practices identified in the ICI as influencing the infant's well-being are the type of home environment provided (including the amount and type of stimulation, and play

material provided), the type of day care, health care, and nutritional practices of the mother. These caregiving practices' relationship to infant well-being are well documented by research, expert opinion, and child theories.

The mother's perception of the influence of her caregiving practices can have on the infant's present and future well-being can potentially be transferred to more appropriate caregiving behaviors. These improved caregiving behaviors are especially important for the premature infant who is at risk for developmental delays. Premature infants need an optimal environment in which to grow and develop to their maximum potential.

In Chapter III the literature pertinent to the research has been reviewed. In Chapter IV the methodology and data-collection procedures along with the operational definitions, discussion of the instruments, and statistical analysis are presented.

CHAPTER IV

METHODOLOGY AND PROCEDURES

Overview

The premature infant is at an increased risk for developmental delay. There have been numerous research studies that relate the home environment to the infant's developmental level. The problem for researchers is to identify which aspects of the infant's environment directly relate to the cognitive developmental level of the infant. This study was designed to evaluate the relationship between the mother's perceptions of how her caregiving practices affect the infant's present and future well-being and the infant's cognitive developmental level.

The design of this study was descriptive-correlational. The two variables being studied were the mother's perceptions of how her caregiving practices affect the infant's present and future well-being and the premature infant's cognitive developmental level. The problem examined was: What is the relationship between the mother's perceptions about the influence of her infant caregiving practices on the infant's present and future well-being and the actual cognitive developmental level of the premature infant at 12 to 18 months of age?

Operational Definitions

Perceptions of caregiving practices was defined as the mother's perceptions about the influences of infant caregiving practices on the infant's present and future well-being as measured by the Infant Caregiving Inventory (ICI). The ICI was designed by V. Smeriglio and P. Parks (1983) at the University of Maryland. The ICI was developed to provide a systematic means to assess mothers' perceptions about the influence of infant caregiving practices on the infant's present and future well-being. Parks and Smeriglio felt that the performance of an appropriate caregiving practice may depend on the knowledge that a particular parenting behavior influences the present and future well-being of the infant. The ICI was designed to measure this aspect of parenting knowledge.

The instrument has 34 items; each item specifies a caregiving practice and an aspect of infant or maternal functioning that is influenced by the practice. Examples of the caregiving practices which are included in the ICI are the amount of stimulation given to an infant (through talking, playing, the types of toys, and the variety of people the infant is exposed to), the type and consistency of medical care, the type of day care, and the type of nutrition the infant receives (see Appendix A).

Cognitive developmental level. The infant's mental developmental level was measured by the Bayley Scales of Infant Development (BSID) Mental Development Index. The BSID was designed to provide a measure of the developmental progress of infants. The mental scale was

designed "to assess sensory perceptual acuities, discriminations, and the ability to respond to these; the early acquisition of object constance and memory, learning, and problem-solving ability; vocalizations and the beginnings of verbal communication; and early evidence of the ability to form generalizations and classifications, which is the basis of abstract thinking" (Bayley, 1969). The BSID is divided into three parts: the Mental Scale, the Motor Scale, and the Infant Behavior Record. The Mental and Motor Scales yield two indexes, the Mental Development Index (MDI) and the Psychomotor Development Index (PDI). The MDI of the infants in this study was obtained at the Developmental Assessment Clinic (DAC) by a psychologist specially trained to administer the BSID. The data were presented in raw scores and then converted into the MDI. The raw score is the number of items passed of those items appropriate for the infant's age. The raw score is then converted into the MDI, which is the standard score and allows for comparison between infants. The scores on the MDI were standardized to have a mean of 100 and a standard deviation of 16. The range of scores was from 50 to 150, which includes three standard deviations from the mean either way (see Appendix B).

The sociodemographic variables that were examined were the infant's age, sex, the gestational age at birth, the birth weight, length of hospitalization, type of oxygen support received, and the mother's age and marital status. When analyzing the data in Chapter V, these variables were examined to see if they influenced the child's developmental level (the MDI). The sociodemographic information was

obtained from the infants' charts at the DAC by the researcher. The researcher completed a form with the demographic variables for each study participant (see Appendix C).

Hypothesis

Null hypothesis: There will be no relationship between the mother's perception about the influence her caregiving practices have on the infant's present and future well-being and the infant's cognitive developmental level.

Instruments

Bayley Mental Development Index

The BSID was designed to provide a tripartite basis for the evaluation of a child's developmental status in the first 2-1/2 years of life (Bayley, 1969). The BSID was developed using research by Gessell and Bayley. The population of infants used in the testing and standardization of the instrument is the most representative of any sample of infants used for developmental testing in our present culture (Scheiner & Abroms, 1980). The BSID provides an assessment of an infant's mental status, motor status, and behavior in relationship to his/her peers. The standardization of the mental and motor scales is as good as or better than any other individual test used to measure infant development (Buros, 1978).

The MDI scale was chosen for use in this research study because of the relationship found in several research studies between the MDI scores and the home environment as it relates to infant stimulation

(Bayley & Schafer, 1964; Poresky & Henderson, 1982). The BSID is a highly standardized instrument. In 1960 a nationwide stratified-sample design study with a sample size of 1,262 infants was used to standardize the BSID. The sample was controlled for sex, color, residence (urban-rural), and education of the head of the household. The infants ranged in age from 2 to 30 months, with only "normal" children living at home included in the sample. Even though the original sample were "normal" children, the BSID has been used for 30 years on various sample populations of infants. The early identification of developmentally disabled infants requires comprehensive developmental evaluation with tools such as the BSID (Scheiner & Abroms, 1980).

The mental index consists of a total of 163 items to evaluate problem-solving skills, fine-motor skills, language, and social skills. The items administered to a given infant are determined by the infant's age according to test protocol. The scores are evaluated on a pass-fail basis as assessed by a trained observer. The raw scores on the mental scales are converted into the MDI, which is an index or normalized standard score (Bayley, 1969). The item's title is descriptive and serves as the primary identifier (see Appendix B). The items are listed with the item number, approximate age placement, and item title. An example: Item 1, Placement: 0.1, Title: Responds to sound of bell. The examiner then responds with a P for pass, F for fail, or Other. The other options include: O (omit), R (refused), or RPT (reported by mother). Only those items noted as passed (P) are scored, but indications given in the "Other" column may be useful in

reviewing the adequacy of the test as a measure of the child's performance (Bayley, 1969).

The BSID are administered only by specially trained individuals who are familiar with the BSID and infant development theory. "Both the administration and interpretation of the test demands a great deal of the examiner" (Buros, 1978, p. 207). The BSID are not predictive of later IQ but are indicators of the infant's current developmental status in relationship to the infant's peers (Bayley, 1969). The final scores are presented as a developmental index, which is a score ranging from 50 to 150.

A disadvantage of the BSID, as in all infant development tests, is that there has been no consistent relationship found to later infant developmental levels. This fact limits the use of the data for longitudinal generalizations. The interpretation of the scores may differ greatly, depending on the present medical status of the infant (Buros, 1978). Despite the fact that the interpretation of the BSID has some inconsistencies, the scales are considered the most well-standardized infant test currently available for infants 2 to 30 months of age (Scheiner & Abroms, 1980). The high standardization and the wide use of the BSID plus the fact that the DAC had a trained psychologist to administer the test made the BSID the acceptable choice for use in this study as the measurement of the infant's cognitive development.

The data for the reliability and validity of the BSID were collected between 1958 and 1960. The sample included 1,262 children from 2 months to 30 months of age. To compute coefficients of

reliability for the Mental Scales, they were divided into two approximately equal halves. The split-half reliability coefficients for the Mental Scale ranged from .81 to .93, with median value of .88.

Another sample of 350 California children ages 18 to 30 months were administered the Bayley Mental Development Index (MDI) at the Stanford-Binet Intelligence Scale. The correlation for the infants at 24 months was r = .53. This indicates a substantial degree of agreement between the two scales and helps establish the validity of the BSID (Bayley, 1969).

Infant Caregiver Inventory

The ICI is an instrument that measures the parents' perceptions about the influence of infant caregiving practices on the infants' present and future well-being (Parks & Smeriglio, 1983). The rationale given by Parks and Smeriglio for measuring perceived effectiveness is that appropriate and responsive behavior which parents are capable of may not be performed unless they recognize that it will affect their infant's well-being.

The ICI is an instrument intended primarily for parents. The ICI can provide data which can help guide planning for programs for parents and can be used to individualize parenting education and counseling based on the findings of the ICI. The ICI was developed by P. Parks of the University of Maryland Center for Research and V. Smeriglio, Department of Maternal and Child Health, Johns Hopkins University. The ICI has been used on a variety of populations and in a variety of situations (LeResche, Strobino, Parks, Fischer, & Smeriglio, 1983;

Parks & Smeriglio, 1983). Parks and Smeriglio have published several research papers using the ICI and are presently working on the results of a study conducted with 126 mothers of 6 month olds from three socioeconomic groups using the revised version of the ICI. The preliminary results indicate that there is a relationship between ICI scores and socioeconomic level, and between ICI scores and the home environment (see Appendix D).

The ICI was used to measure how the mothers of premature infants perceive they can influence the infants' present and future well-being. The ICI scores evaluate the mothers' knowledge and perceived influence of caregiving practices on infants' present and future well-being, which were correlated with the infants' development level as measured by the BSID. The ICI is a 34-item questionnaire which the mothers completed; the total scores were obtained from the answers the mothers gave to the questions (see Appendix A). The total scores for awareness were used in the data analysis to represent mothers' perception of caregiving practices' influence on infants' well-being.

The developmental outcomes measured by the ICI are divided into five categories. The items reflect both current and future areas of functioning of the infant. The developmental outcomes include the infant's personality at school age (Items 1-6), the infant's physical growth (Items 7-10), the infant's intelligence at school age (Items 11-21), the baby's happiness or unhappiness (Items 22-28), and the infant's health (Items 29-34). The emphasis is on the infant developmental outcomes present and future. The ICI also includes one maternal

outcome measure, the mother's happiness or unhappiness (Items 35-38). The subcategory concerning the mother's happiness was excluded from this study because the relationship between the mother's happiness and infant functioning has not been consistently supported by research studies (LeResche et al., 1983).

The format of the items in the ICI follows a consistent pattern with the caregiving practice listed first, then a four-point scale, followed by the aspect of infant functioning it influences. An example of the items follows:

> I think that the way babies are talked to has
> no ____ slight ____ moderate ____ strong ____
> influence on their personality when they reach school age.

The Infant Caregiving Inventory was recently revised by its authors, V. Smeriglio and P. Parks. The revised form of the ICI changed the order of items, modified the wording slightly, added some items, and deleted some fillers. Items with the same developmental outcome appear together to facilitate the ease with which mothers complete the questionnaire. The final data on the reliability and validity of this revised version of the ICI have not been published as of this date. Parks was able to provide the following preliminary data. (See Appendix D.)

Parks and Smeriglio have conducted a study with 126 mothers of 6 month olds from three socioeconomic groups (low, middle, high). The data from this study are being used by the authors to establish

reliability and validity of the revised ICI. For low-SES mothers, coefficient alphas ranged from .50 (physical health) to .90 (total) for the five subscales and total score. For high-SES mothers, coefficient alphas ranged from .54 (growth) to .91 (total) for the five subscales and total score. The shorter subscales had the lowest alpha coefficient. Construct validity of the Revised ICI was supported by two findings (Appendix D):

A. Low SES mothers had lower ICI scores than middle or high SES mothers for all scales except growth and health (Alpha of .05 was used). Growth and health were topics on which low SES mothers were most likely to have received information from health care providers.

B. For low SES mothers (n = 33), there was a significant and positive relationship between ICI scores and HOME scale (quality of stimulation in the home environment) total scores. The correlation coefficients were significant for all ICI scales except growth and ranged from .42 to .54 (total).

The internal consistency for the total score (coefficient alpha) for primiparas was .96 (n = 84) and for multiparas was .91 (n = 60).

Scoring of Data

The ICI was scored in two ways: (a) perceived strength of relationship and (b) awareness of relationships. The perceived strength of relationships score was: no = 1, slight = 2, moderate = 3, and strong = 4. For the scoring systems, four items are fillers and are not scored (Items 4, 8, 17, and 29). Each filler specifies a caregiving practice and an aspect of functioning which is not likely to be affected by the practice. Fillers are placed randomly among the items

(Parks & Smeriglio, 1983). The perceived strength of relationships score (with a possible score of 120) was used in this research study.

The Bayley Mental Scale was scored on a pass-fail basis. The raw score was the total number of items the infant was able to accomplish. The number varied with the infant's age and developmental level.

The manual for the BSID gave the correct index score in relationship to the raw score obtained and infant's age. The score used for analysis was the Bayley MDI for that infant; the total score had a possible range of 50 to 150.

The sociodemographic data were presented in descriptive form. The data were looked at to see if there was a correlation between the sociodemographic data and the strength of relationship ICI or the Bayley MDI.

Selection of Subjects

A convenience sample of 30 mothers were selected from the group of mothers who attend the Developmental Assessment Clinic (DAC) at E. W. Sparrow Hospital. All infants who have been hospitalized in the Regional Neonatal Intensive Care Unit (RNICU) at Sparrow Hospital were asked to return to the DAC at 6 to 9 months of age, 12 to 18 months, 24 months, and then yearly thereafter until they reach 7 years of age. The study was conducted with those premature infants returning for the 12- to 18-month visit. The researcher selected from the records at the clinic those infants who met the criteria for prematurity, born 36 weeks or less gestation and weighing less than 2,500 grams (Cohen, Parmelee, & Beckwith, 1982; Wright, 1974). Infants who were excluded

from this group were those with congenital anomalies and who weighed less than 1,000 grams, because of their poor developmental prognosis and the potential for biasing the results in a negative direction (Bennett, Robinson, and Sells, 1983). The criteria also required that the infants were living with their biological mother at 12 to 18 months of age to provide the potential for a consistent caregiver for the infant over this period of growth and development.

The infants' charts were reviewed by the researcher each week to identify those who met the criteria. Those infants who met the criteria were identified, and a list was given to the nurse at the DAC each week. The DAC visit usually takes 3 to 4 hours and includes a physical assessment by the neonatologist, a visit with the social worker, an evaluation by a physical therapist, and a developmental evaluation by the Lansing school psychologist.

Field Procedures

After the infants had been identified as meeting the criteria for the study, the researcher put the questionnaire and cover letter in the infants' charts. At the day of the visit, the nurse gave the cover letter and questionnaire to the mothers when she first talked with them. The nurse also spent a few minutes explaining the study, emphasizing that the participation was voluntary. If the mother chose to fill out the questionnaire, she was given a few minutes to do this before the infant was seen by any of the other staff members. The mother did not have to spend any extra time at the clinic because there

was a waiting time before the infants were examined by the staff. The selection of infants to be included in the study was approved by the nurse, based on the preestablished criteria for the study, before she gave the ICI to the mothers. There was only one registered nurse at the clinic who gave out all the questionnaires to the mothers, which prevented any variation in approach.

The procedure was for the nurse at the DAC to give the mothers whose infants met the criteria (as determined by the researcher before the DAC visit) an introductory letter telling them what the study was about, stating that participation was voluntary, and that their decision to participate would in no way affect the assessment of their child or the type of care they received at the clinic (see Appendix E for the letter). The letter also assured them that their names and data would remain confidential. The approximate amount of time required to fill out the questionnaire was also specified in the cover letter.

If the mother agreed to participate, she was given the ICI and a release form (see Appendix F) so that the researcher could obtain the results from the infant's BSID. At this time, the mother was given some time to complete the ICI in a separate patient room and then returned the questionnaire to the nurse, who put the ICI and the consent forms in an envelope to be kept at the nurse's desk until the researcher picked them up each week. The nurse at the DAC was briefed by the researcher to be able to answer basic questions the mothers might have about the research study. The mothers were also

given the researcher's name and phone number if they had concerns about the research study.

The BSID was completed by the Lansing school psychologist at the infant's scheduled visit. The BSID was administered in a private room with the infant and its mother being present. The psychologist has been specially trained to administer the BSID and has been evaluating infants at the DAC for several years. The researcher returned to the clinic each week to obtain the signed consent forms and the completed ICI. The results of the infant's BSID Mental Index were then photocopied (with identifying data masked) to be put with the other data. The researcher at this time completed a demographic data sheet on each infant-mother pair who agreed to participate. The demographic data included infant birth weight, gestational age at birth, length of hospitalization, whether the infant had received oxygen therapy during hospitalization, the mother's age and level of education, and the sex of the infant (see Appendix C). All of the data on each pair of participants were coded and kept in a file in the researcher's home.

Analysis

The data were analyzed using the Pearson product-moment correlation to examine the relationship between the two major study variables, the ICI and the BSID Mental Development Index. The demographic data from the infants' records were analyzed for relationships between the data and the strength of relationships scores on the ICI and the MDI. The strength of relationship ICI and the MDI were investigated for various subgroups of the sample. For example, sex has been

demonstrated to be a moderating variable in the relationship of levels of stimulation and the developmental level of premature infants (Hayes, 1980). Gestational age and birth weight, as well as amount of ventilatory assistance required by the infant, have been identified as potential risk factors for developmental delays in the premature infant (Siegel, 1982; Smith, Somner, & Tetzchner, 1982). The mother's age has been related to potential problems with maternal-infant attachment and potentially infant developmental level (Crinic, Greenberg, Robinson, & Ragozin, 1984; Jarrett, 1982). The mother's marital status has been related to potential social support system and the type of home environment provided for the infant (Poresky & Henderson, 1982; Riesch & Munns, 1984). The last demographic variable looked at was the length of hospitalization which can potentially affect the attachment of mother and infant (Klaus & Kennell, 1976). Any statistically significant relationships between the demographic variables and the developmental level of the premature infant or the ICI scores are further explored in Chapter V.

Human Subjects Review

The mothers were asked to sign a release form to allow this researcher access to results of the BSID for the purpose of this study. The mothers were made aware that the information received was to be coded and no names were used. There were no extra tests or expense to the families. The mothers were informed of their right to refuse to participate and assured that their participation or refusal to

participate would not reflect on the quality of care they received. The ICI was presented to the mothers by the nurse at the DAC, who explained to them that their participation was not mandatory and that they could refuse to fill out the ICI if they did not wish to participate. The nurse at the DAC asked the mothers if they wanted to participate before she gave them the ICI and the consent forms to follow.

If the mothers agreed to participate, the researcher then explained in writing about the study (see Appendix E). Any questions the mothers had were answered by the staff at the DAC; if the mothers had further concerns or questions, they were referred to the researcher. The researcher's name, address, and phone number were made available to the participants.

Approval for the proposed study and research protocol was received from the University Committee on Research Involving Human Subjects on December 4, 1984 (see Appendix G).

Summary

The chapter on Methodology and Procedures included a discussion of the population, methods, validity and reliability of the instruments, and the data analysis. In addition, Chapter IV contained the operational definitions, the hypothesis, and the mechanism used to assure human subjects' protection.

In Chapter V the data are presented, including a description of the findings, the results of the questionnaire and the BSID, and the correlation among the study variables.

CHAPTER V

DATA ANALYSIS

Introduction

The data presented in this chapter describe the study sample in regard to the demographic data collected concerning the study sample. The analysis of the two principal study variables, the ICI and the Bayley, are also presented. A discussion is included on the reliability of the ICI in regard to the study sample. An analysis of the data in relation to the hypothesis of the study is examined, and any additional significant study findings are included.

Descriptive Findings of the Study Sample

The sample consisted of 31 mothers and their infants who attended the DAC at E. W. Sparrow Hospital during a 3-month period. The descriptive data are presented in this section.

Data on Mothers

The mothers who responded to the questionnaire ranged in age from 15 to 36 years old. The majority of mothers (65%) were in their twenties. The age distribution of the mothers is presented in Table 1.

The marital status of the mothers was found to be primarily married or living with the infant's father. There were 29 married mothers

(93.5%) and only two single mothers. No data were available on those mothers divorced or separated.

Table 1: Frequency Distribution of Mothers by Age Range (n = 31)

Age Range	Number	Percent
15-19	3	9.7
20-24	10	32.3
25-29	10	32.3
30-34	5	16.0
35 or older	3	9.7
Total	31	100.0

Data on Infants

The infants were evenly divided between sexes, with 16 male infants and 15 female infants. The age range of the infants at the time of the study ranged from 13 months to 18 months with a mean of 15.4 months. The age range of the infants is presented in Table 2.

Table 2: Distribution of Infants by Age (n = 31)

Ages	Number	Percent
13 months	1	3.2
14 months	2	6.5
15 months	17	54.8
16 months	6	19.4
17 months	2	6.5
18 months	3	9.6
Total	31	100.0

The gestational age of the infants at birth ranged from 27 weeks to 36 weeks with the distribution being displayed in Table 3. The majority of infants' age at birth was in the range from 33 weeks to 35 weeks (61.3%).

Table 3: Distribution of Gestational Age at Birth (n = 31)

Age Range	Number	Percent
27-29 weeks	7	22.6
30-32 weeks	3	9.7
33-35 weeks	19	61.3
36 weeks	2	6.4
Total	31	100.0

The infant birth weight ranged from 1,000 grams to 2,500 grams with the distribution presented in Table 4.

Table 4: Distribution of Birth Weight of Infants (n = 31)

Weight Range	Number	Percent
1,000-1,500 grams	8	25.8
1,501-2,000 grams	7	22.6
2,001-2,500 grams	16	51.6
Total	31	100.0

The length of hospitalization after birth ranged from 2 weeks to 12 weeks with the distribution as shown in Table 5. The mean hospital stay was 4.6 weeks.

Table 5: Distribution of Length of Hospitalization of Infants After Birth (n = 31)

Number of Weeks	Number	Percent
2 weeks	10	32.2
3 weeks	7	22.6
4 weeks	6	19.4
5 weeks	1	3.2
6 weeks	0	0.0
7 weeks	0	0.0
8 weeks	1	3.2
9 weeks	2	6.5
10 weeks	0	0.0
11 weeks	1	3.2
12 weeks	3	9.7
Total	31	100.0

The type of ventilatory support and percentage of oxygen used while the infant was in the hospital ranged from ventilatory support with up to 100% oxygen to no oxygen support. The distribution is presented in Table 6.

Summary of Demographic Data

The mothers who participated in this study ranged in age from 15 to 36 years of age, with the majority (65%) in their twenties. Most of the mothers were married or living with the father of the infant (93.5%), with only two single mothers. The infants were evenly divided

between the sexes, with 16 male infants and 15 females. The age range of the infants was between 13 and 18 months, with a mean age of 15.4 months. The gestational age of the infants at birth ranged from 27 weeks to 36 weeks, with the majority (61.3%) being 33 to 35 weeks. The infants' weight at birth ranged from 1,000 grams to 2,500 grams, with the majority (51.6%) being 2,001 to 2,500 grams. The length of hospitalization ranged from 2 to 12 weeks, with the mean hospital stay being 4.6 weeks. The type of oxygen support ranged from ventilatory support with 100% oxygen to no oxygen support. The range was fairly evenly distributed, with the highest percentage of infants (29.0%) receiving ventilatory support with 100% oxygen.

Table 6: Distribution of Type of Oxygen Support Provided to Infants at Birth (n = 31)

Type of Oxygen Support	Number	Percent
Ventilatory support with 100-50% oxygen	9	29.0
Ventilatory support with 50% or less oxygen	7	22.6
Hood with 50-100% oxygen	9	29.0
Hood with 50% or less oxygen	1	3.2
No oxygen support	5	16.1
Total	31	100.0

Scores on the Infant Caregiving Inventory

The scores on the Total perceived strength of relationship scores of the ICI ranged from 88 to 120, with a mean of 107 and a standard deviation of 10. The highest possible score is 120. (See Table 7.)

Table 7: Total Perceived Strength of Relationship Scores on ICI (n = 26)

Scores	Number	Percent
88	1	3.8
90	2	7.8
92	1	3.8
93	2	7.8
101	1	3.8
103	1	3.8
104	1	3.8
105	1	3.8
108	1	3.8
109	1	3.8
110	1	3.8
111	1	3.8
113	3	11.6
114	3	11.6
115	2	7.8
118	2	7.8
119	1	3.8
120	1	3.8
Total	26	100.0

Subscales of the Infant Caregiving Inventory

The scores on the Personality scale contained five items with a range from 12 to 20 and a mean of 17.8. (See Table 8.) A score of 20 meant the mothers perceived that their caregiving practices strongly

influenced the infant's personality. A score of 12 indicated that the mother perceived her caregiving practices moderately influenced the infant's personality. (See Appendix A, Items 1, 2, 3, 5, and 6.)

Table 8: Distribution of Scores on the Personality Scale of the ICI (n = 29)

Scores	Number	Percent
12	1	3.4
14	1	3.4
15	3	10.3
16	3	10.3
17	4	13.8
18	4	13.8
19	4	13.9
20	9	31.2
Total	29	100.0

The scores on the Physical Growth subscale included three items, and the range was from 6 to 12, with a mean of 10.5. The distribution is presented in Table 9. A score of 12 meant the mother perceived that her caregiving practices strongly influenced the infant's physical growth. A score of 6 meant the mother perceived her caregiving practices slightly influenced the infant's physical growth. (See Appendix A, Items 7, 9, and 10.)

The scores on the Intelligence at School Age subscale contained 10 items with a range of 25 to 40 and a mean of 35. The distribution is presented in Tale 10. A score of 40 indicated that the mother

perceived that her caregiving practices strongly influenced the infant's intelligence. A score of 25 indicated the mother perceived her caregiving practices as slightly or moderately influencing the infant's intelligence. (See Appendix A, Items 11-16 and 18-21.)

Table 9: Distribution of Scores on the Physical Growth Subscale of the ICI (n = 31)

Scores	Number	Percent
6	1	3.2
8	2	6.5
9	5	16.1
10	4	12.9
11	8	25.8
12	11	35.5
Total	31	100.0

Table 10: Distribution of Scores on the Intelligence at School Age Subscale of the ICI (n = 28)

Scores	Number	Percent
25	1	3.6
28	1	3.6
29	1	3.6
30	2	7.1
31	1	3.6
32	1	3.6
33	1	3.6
35	4	14.3
36	2	7.1
37	5	17.9
38	2	7.1
39	3	10.6
40	4	14.3
Total	28	100.0

The scores on the Infant Happiness or Unhappiness subscale contained seven items. The range of scores was 21 to 28, with a mean of 25. The distribution is presented in Table 11. A score of 28 indicates the mother perceives that her caregiving practices strongly influence her child's happiness. A score of 21 indicates the mother perceives that her caregiving practices moderately influence the infant's happiness. (See Appendix A, Items 22-28).

Table 11: Distribution of Scores on the Infant Happiness or Unhappiness Subscale of the ICI (n = 28)

Scores	Number	Percent
21	3	10.7
22	2	7.1
23	1	3.6
24	4	14.3
25	2	7.1
26	3	10.7
27	7	25.1
28	6	21.4
Total	28	100.0

The scores on the Physical Health subscale included five items. The range of scores was 12 to 20, with a mean of 17.4. The distribution of scores is presented in Table 12. A score of 20 indicates the mother perceives her caregiving practices strongly influence the infant's physical health. A score of 12 indicates the mother perceives her caregiving practices have a slight to moderate

influence on the infant's physical health. (See Appendix A, Items 30-34.)

Table 12: Distribution of Scores on the Physical Health Subscale of the ICI (n = 31)

Scores	Number	Percent
12	1	3.2
14	3	9.6
15	4	12.9
17	7	22.6
18	4	12.9
19	6	19.4
20	6	19.4
Total	31	100.0

Reliability of the ICI

The reliability of the ICI was determined for this study sample. The statistical technique used was Cronbach's coefficient alpha. Coefficient alpha was determined for the total ICI scale and the individual subscales. The coefficient alpha for the total ICI was 0.92, indicating a high degree of internal consistency between the items. The coefficient alpha for the subscales was found to be: Personality = alpha of .76, Physical Growth = alpha of .45, Intelligence = alpha of .85, Baby's Happiness = alpha of .78, and Physical Health = alpha of .68. The subscales' internal consistency was not as great as that of the entire scale. The subscales were found to correlate highly with each other at a significance level of p = 0.05

or greater. The correlations ranged from .78 to .32, with the lower correlations being between the shorter subscales. (See Table 13.) This high correlation between variables indicates that the ICI really tests one major concept rather than the separate subscales of the instrument.

Table 13: Correlations and Alphas of ICI Subscales

	Personality	Growth	Intelligence	Happiness	Health
Personality	.76[a]				
Physical Growth	.50	.45[a]			
Intelligence	.69	.56	.82[a]		
Happiness	.76	.60	.54	.57[a]	
Physical Health	.59	.33	.78	.40	.68[a]

[a]Indicates the alpha of the subscales.

The data presented here indicate that the ICI instrument has a high internal consistency for all the items. The alpha of 0.92 indicates that the ICI is a reliable measure in terms of internal consistency. The validity of the instrument was not evaluated with this study population.

Scores on the Bayley Mental Development Index

The scores on the Bayley MDI ranged from 68 to 134, with a mean of 109.67 and a standard deviation of 12.99. The mode was 115 with one low outlier at 68. The scores on the Standardized MDI have a range of 50 to 150 with a mean of 100 and a standard deviation of 16. The

scores of this sample were slightly above the mean and had a smaller variability than the average population. (See Table 14.)

Table 14: Distribution of Infants' Scores on the Bayley Mental Development Index (n = 31)

Scores	Number	Percent
68	1	3.2
90	1	3.2
95	1	3.2
96	1	3.2
97	1	3.2
100	1	3.2
102	1	3.2
103	2	6.5
105	1	3.2
106	2	6.5
107	2	6.5
110	1	3.2
111	2	6.5
115	5	16.1
116	1	3.2
118	3	9.8
124	1	3.2
125	2	6.5
130	1	3.2
134	1	3.2
Total	31	100.0

The information that has been presented describes the demographic characteristics of the study population and the scores on the two study variables. The ICI has been examined for reliability for this population. The remainder of the chapter examines the correlations between study variables and demographic variables.

Data Presentation for the Research Question

The research problem presented in this study was to examine the relationship between the mother's perceptions about the influence of infant caregiving practices on the infant's present and future well-being and the actual cognitive developmental level of the premature infant at 12 to 18 months of age. The null hypothesis was: There will be no relationship between the mother's perception about the influence her caregiving practices have on the infant's present and future well-being and the infant's cognitive developmental level. The two study variables were the ICI total scores for strength of relationships and the Bayley MDI. The correlation was done using a Pearson product-moment correlation. The Pearson r for the two study variables was found to be -0.0410 with a p value of < 0.421, indicating there was no significant relationship found within the study population on the two study variables. The null hypothesis was accepted. This indicated that with this population there was no relationship between the mother's perceptions of how her caregiving practices influence her infant's present and future well-being and the infant's actual cognitive developmental level.

Significant Correlations Between Demographic Variables

Several significant correlations were found between the demographic variables. (See Table 15.) There were two significant relationships found between the Bayley scores and the demographic variables. The MDI was correlated negatively with the mother's age (r = -.36, p = 0.02). This indicates that older mothers had infants who

scored lower on the MDI. The MDI was also negatively correlated with the age of the infant. The Pearson r was -.2879 (p = 0.05). This indicates that in this study population the older infants tended to have lower scores on the MDI.

Table 15: Correlations Between Demographic Variables and the MDI and the ICI

	MDI		ICI	
	Correlation	Sig. Level	Correlation	Sig. Level
Infant's age	r = -.28	p = .05	r = -.25	p = .10
Infant's sex	r = .27	p = .06	r = -.01	p = .46
Infant's gestational age	r = .12	p = .25	r = -.09	p = .31
Infant's birth weight	r = -.02	p = .45	r = -.002	p = .49
Infant's hospital stay	r = -.001	p = .50	r = .01	p = .47
Infant's oxygen therapy	r = .13	p = .24	r = -.02	p = .46
Maternal age	r = -.36	p = .02	r = .01	p = .47
Marital status	r = .08	p = .32	r = -.13	p = .25

Several significant correlations were found between the demographic variables of the infants. Gestational age was positively correlated with the infant's weight r = .71 (p = .001). This indicates

the natural trend that smaller infants were born at a younger gestational age. The length of hospitalization was also correlated with the infant's weight at $r = -.81$ ($p = .001$). This correlation indicates that the lower the birth weight, the longer the hospital stay. Gestational age and length of hospitalization also correlated with the amount of oxygen therapy the infants were administered. The lower-weight infants who stayed in the hospital longer were more apt to have higher levels of oxygen therapy.

Another interesting finding was that the infant's age was negatively correlated with the sex of the infant. With the scales used in this study, the data indicate that from the study population the male infants tended to have a lower birth weight ($r = -.24$, $p = .09$).

Summary of Findings

The hypothesis that mothers who believe their caregiving practices have an influence on the infant's present and future well-being will have infants who score higher on the cognitive developmental measures than mothers who do not perceive their care influences the infant's present and future well-being was rejected.

The significant relationships found between the demographic variables were that the lower the birth weight the longer the hospitalization, and low birth weight and length of hospitalization correlated with amount of oxygen therapy. Gestational age was found to be correlated with the infant's birth weight, and the infant's birth weight was also correlated with sex. The lower-birth-weight infants tended to be male within this study population.

The Bayley MDI was found to correlate negatively with the mother's age and with the child's age, indicating that infants whose mothers were older and who were older themselves scored lower on the Bayley MDI.

In this chapter a description of the study sample in relation to the sociodemographic data was given. The reliabilities of the ICI scale in regard to this study population were included. Correlations of the demographic variables and the Bayley MDI were also provided. The data were given which rejected the hypothesis of this study because no significant correlation was found between the two major study variables.

In Chapter VI a discussion of the study findings is provided, with the researcher's interpretation of the data. In addition, nursing implications for practice, education, service, and research are included.

CHAPTER VI

SUMMARY, INTERPRETATION, AND IMPLICATIONS OF FINDINGS

Overview

In Chapter VI the summary and interpretation of the research findings are presented. In addition, the conclusions are made and recommendations for future research, nursing practice, and nursing education are included.

Summary and Interpretations of Findings

The research presented in this thesis was designed as a descriptive correlational study. The problem addressed in this study involves assessing the relationship between the mother's perception of how her caregiving practices influence an infant's present and future well-being and her infant's actual cognitive developmental level. The literature has related the home environment to infant development (Bradley, Caldwell, & Elardo, 1979) and parental perceptions of the infant to the infant's later emotional status (Broussard & Hartner, 1975). Less information is available on the mother's knowledge of infants, parenting behavior, and subsequent infant development. The need now is to identify measurable aspects of a mother's knowledge of infant development and the way a mother perceives she influences her infant's present and future well-being. Once researchers have been

able to measure the knowledge and perceptions of the mother's caregiving practices on infant present and future well-being, then health care professionals can develop and implement programs to affect parental knowledge and perceptions.

The hypothesis put forth by the researcher in this study is that mothers who believe their caregiving practices have an influence on the infant's present and future well-being will have infants who score higher on the cognitive developmental measures than mothers who do not perceive their care influences the infant's present and future well-being. The research data did not support this hypothesis.

The sample population consisted of 31 premature infants and their mothers who volunteered from the population of mothers who bring their infants to the DAC at E. W. Sparrow Hospital, Lansing, Michigan. Premature infants were chosen for this study because of the vulnerability of this group to developmental delays and potential alterations in the maternal-infant attachment process (DuHamel, Lin, Skelton, & Hantke, 1974).

The birth of a premature infant is a stressful experience involving both mother and infant. The maternal factors which are involved in the potential altered mother-infant relationship include the early delivery which is often stressful, the emotional crisis the mothers must go through while the infant is in the hospital, and the fact the mother is separated from her infant for an extended period of time. The infant factors which could influence the mother-infant relationship include the infant's delayed development because of

immaturity, the risk factors of a prolonged hospitalization, the unique physical appearance of the infant, and the infant's need for special care and stimulation to potentiate the developmental process. The mother may respond to the variety of stressors by having an altered perception of her infant and the developmental potential of the infant. The premature infant and its mother need special consideration by health care professionals both during the hospitalization period and after the infant goes home and the mother assumes responsibility for its needs.

A summary of the descriptive information collected regarding the maternal and infant characteristics is presented in the following section.

Maternal Characteristics

The mothers ranged in age from 15 to 36 years old, with the majority (65%) in their twenties. Most of the mothers were married or living with the father of the infant; only two single mothers participated in the study. This varies from the population of mothers usually identified with premature birth, who are young and single. The small number of single mothers could be related to the attendance at the DAC, which is voluntary. Many of the mothers do not feel they have the time to bring their infant in for a half-day session even though the infant gets a thorough evaluation at a minimal fee ($5.00).

Infant Characteristics

The sex of the infants was evenly divided, with 16 male infants and 15 females. The age range of the infants was between 13 and 18 months, with a mean age of 15.4 months (actual age, not corrected age). The gestational ages of the infants at birth ranged from 27 weeks to 36 weeks, with the majority (61.3%) being 33 to 35 weeks. The infants' weight at birth ranged from 1,000 grams to 2,500 grams, with the majority (51.6%) being 2,001 to 2,500 grams. This gestational age range is typical of the general population of the E. W. Sparrow RNICU premature infants but differs from the group of premature infants who are usually studied by researchers. The premature infants typically studied by researchers are the VLBW infants who are born under 30 weeks gestation and weigh under 1,000 grams at birth. The length of hospitalization stay ranged from 2 to 12 weeks, with the mean hospital stay being 4.6 weeks. The length of hospital stay relates to the gestational age of the infant. A typical estimate of hospital stay is to figure the number of weeks until the infant reaches 40 weeks gestation (33- to 35-week-gestation infants would be expected to stay in the hospital 4 to 7 weeks).

The type of oxygen support ranged from ventilatory support with 100% oxygen to no oxygen support. The range was fairly evenly distributed, with ventilatory support with up to 100% oxygen (29%) being the highest percentage of infants. The data on oxygen support vary from hospital to hospital. Further evaluation of the oxygen would be needed before any interpretation of the data presented in this study

concerning oxygen support could be used as significant findings. The data would include how many days the infant was on the ventilator, whether the infant received 100% oxygen for an extended period of time, the length of all oxygen support for the infant, and any respiratory distress after discontinuing oxygen support.

Reliability of the ICI

The ICI was evaluated for reliability within this sample population. The total scores were tabulated for the ICI, and the scale was evaluated for reliability using the alpha coefficients. The total scores ranged from 88 to 120 with a mean of 107. The highest possible score was 120 which one participant received. The reliability coefficient for the total ICI was .92, indicating a high degree of internal consistency. Parks and Smeriglio (1984) found a similar alpha coefficient (94%) with a group of 126 mothers of various socioeconomic levels.

The subscales of the ICI were also evaluated for reliability and correlation of the items. The subscales were found to be highly correlated at the $p = 0.05$ level of significance. The high correlation indicates the ICI deals with only one major concept rather than five separate subcategories. The alpha coefficient for the subscales ranged from .45 to .85 with the smaller scales having lower coefficients. Parks and Smeriglio (1984) found similar coefficients in their sample of 126 mothers.

The ICI appears to be a reliable scale for the major concept of how caregiving practices affect infant well-being. The drawback of the

ICI appears to be that the mothers answered the questionnaire as one concept rather than five individual aspects of the infants' present and future well-being. The scores also did not show a high degree of variability, which makes it difficult to find significant data when using this tool.

Findings on the Bayley Mental Development Index

The Bayley MDI scores ranged from 68 to 134 with a mean of 109.67. The standard deviation of the scores was 12.9. The low score of 68 appeared to be a low outlier with the next lowest score being 90. The low score of 68 brought the mean score down and also may have influenced the research findings. The Bayley MDI was found to correlate negatively with the mother's age, indicating that older mothers had infants with lower scores on the MDI. This finding is not supported by other research and would need to be further evaluated before any significance could be placed on it. Some of the possible explanations could be because the older mothers had infants who were younger, smaller, or sicker at birth, increasing the number of risk factors for developmental delay. Another possible explanation could be because of the low-lying score on the MDI. (The infant's mother with the score of 68 was 35 years old.)

The Bayley MDI was found to correlate negatively with infant age, meaning the older infants had lower scores. This could be a result of the maturational process, that as infants grow it is easier to detect subtle developmental delays. The last correlation between the Bayley

MDI and demographic variables was between the sex of the infant and MDI score. The data indicated that males had lower MDI scores. This finding is supported by other research (Hayes, 1980). The male infants tend to have more problems overcoming the effects of prematurity.

Correlations for Demographic Variables

The correlations between the infant's demographic variables followed the natural tendencies of the premature infant. The infants with younger gestational age had lower birth weights. The length of hospitalization correlated negatively with the weight and gestation, indicating the younger and smaller infants were hospitalized longer. The amount of oxygen therapy also correlated with the variables of infant weight and length of hospitalization with an increase in oxygen usage with a decreased weight and increased hospital stay.

The other correlation between demographic variables was the sex of the infant, which was found to be negatively correlated with weight, indicating male infants had a lower birth weight. This finding of lower birth weight has not been documented in other studies of premature infants, although male infants do tend to be more susceptible to risk factors of prematurity (Hayes, 1980). This finding would have to be further evaluated before any significance could be placed on it beyond the particular sample that was studied.

Findings Concerning the Hypothesis

The hypothesis that mothers who believe their caregiving practices have an influence on the infant's present and future well-being will have infants who score higher on cognitive developmental measures than mothers who do not perceive their care influences the infant's present and future well-being was rejected. The possible reasons for the inability to find any significant relationship between the two study variables are discussed in the following section.

The small sample size of only 31 mother-infant dyads will influence the ability to find any significant relationships in research data. The special population of infants, because of the natural variation in the premature infant in relationship to perinatal risk factors, could also influence the data by being confounding variables. This indicates a need in further research to identify specific risk factors and possibly use an analysis of variance to rule out the specific risk factors which could influence the infant's developmental level.

Another possible reason for finding no correlation between the major study variables could be because there may be a need for a time lag between the time the mother's perceptions are measured and the subsequent measurement of the infant's cognitive developmental level. The need may be to measure the ICI at one point in time and the Bayley MDI in 6 to 12 months. The time lag would give the mother's perceptions time to be transferred into behavior toward the infant, which could potentially affect the infant's developmental level on cognitive measures.

The home environment is also an important variable in the child's cognitive development. The study data have not controlled for the home environment. It may be necessary to go into the home environment and measure that variable by using the HOME instrument (Bradley & Caldwell, 1977). Then analyze the home environment as a variable which influences the results of the infant's cognitive developmental level. The other factor of the home environment is that even though the infant is brought to the clinic by the mother and has been living with its biological mother since birth, the mother may not be the primary caregiver for the infant.

The ICI has not been used with mothers of premature infants, which may have influenced the study results. The premature infant and its mother have special needs and have received special health care, which may make the use of the ICI inappropriate for this population. The mothers who participated in the study had all been to the DAC before and had seen their child evaluated developmentally with the Denver Developmental Screening Form. The mothers had also been instructed on the role they can play with the infant's development at this time; this may have affected the scores of the ICI to decrease the variability.

The research findings along with the interpretation of these findings have been presented in the first part of Chapter VI. In the next section, the implications for nursing practice, research, and education will be described.

Implications for Nursing

The fact that no relationship was found between the study variables of how mothers perceive their caregiving practices influence an infant's present and future well-being and the infant's cognitive developmental level does not negate the potential impact that these data and future research can have on nursing practice, research, and education. Nurses and other health care professionals need to support their practice with research on infant development and the impact of the mother-infant relationship. The information found in this research study has a variety of implications for the nursing profession.

Implications for Nursing Practice

The nurse can impact the maternal-infant relationship at a number of levels within the health care system. The CNS who works with prenatal clients is responsible for the initial assessment of the mother's health as well as the mother's knowledge concerning infant development. The CNS working with mothers during their pregnancy should be alert to the potential risk factors which could cause a premature delivery: poor prenatal care, either very young or older-aged clients, mothers with pregnancy-induced hypertension, diabetic mothers, low-income mothers, mothers who have had multiple pregnancies within a short time period, and mothers with poor nutrition. Lack of adequate prenatal care is also considered a risk factor for prematurity. The CNS in the prenatal setting needs to assess the mother's knowledge of infant development and caregiving practices. The education of mothers can occur during the prenatal visit or be incorporated

in the prenatal classes which the mothers may attend. Another way to educate mothers on infant development is to provide them with written materials that they can take home, read, and have available for reference.

The adolescent mothers could also be contacted through the public school system. The health education of the adolescent population should include the aspects of childbearing, as well as the effects of poor nutrition and lack of prenatal care on increasing the chances for premature delivery of an infant. The adolescents within the school system could be taught the basics of infant development and what they could expect from a newborn infant. This information could be helpful to the young mother who has had no contact with young infants. The adolescent girls who become pregnant could be contacted by a CNS to advise the girls as to where prenatal care is available and how they can get extra food supplementation through WIC. The CNS could emphasize the importance of obtaining prenatal care and maintaining good nutrition for the development of the infant. Many young girls have no idea of how a fetus grows and the importance of good nutrition on the development of the infant. The CNS needs to assess the girl's home environment and help the young mother deal with any stressors which could enhance the chances of a premature delivery.

The staff nurse in the RNICU as well as the CNS working with the unit can both function as teachers and assessors of the mother's knowledge of child development and caregiving practices. The multitude of stressors which the mothers of premature infants have to deal with

means that the maternal perceptions may be altered. The staff nurse working with the infant can encourage the mother to become involved with and begin to care for the infant on a daily basis. As the infant begins to grow and develop, the staff nurse can point out the infant's unique qualities and accomplishments. The staff nurse can also help the mother become comfortable with caring for her infant, encouraging her to handle and talk to the infant. The infant will have certain limits to the amount and type of stimulation it can take in because of the immature nervous system. The staff nurse as well as the CNS who helps coordinate activities in the unit can facilitate the mother's awareness of the limitations of the infant and help her see the positive interactions which take place between the mother and infant.

The CNS working with the unit personnel to help coordinate activities and develop programs which can benefit the mother-infant dyad can be an important resource person for both the mothers and the staff nurses. One of the approaches the CNS might use in working with the mothers of premature infants is to develop a support group for the mothers. Within the support group the CNS could facilitate discussion of infant development, the concerns the parents have concerning the prematuring of the infant, and the ways in which the mothers could become more involved with the infant, specifically by infant-stimulation programs to promote optimal infant development.

The assessment of the maternal-infant relationship is also an important function of both the CNS and the staff nurse within the RNICU. If the staff nurse working with the mother and infant on a

daily basis identifies a mother who appears to have a problem with bonding, the CNS could become involved with working out a care plan which would involve a multidisciplinary team to help the mother begin to accept her infant. The social worker may talk with the mother to help assess the financial concerns, and the physician may discuss the medical problems the infant is having to help the mother start to deal with the realities of caring for a premature infant. The early attachment of the mother and infant is important because the premature infant is at risk for child abuse (Stern, 1973). The staff of the RNICU must be alert to potential disturbances in the maternal-infant relationship. If there is a problem suspected, the CNS within the RNICU would then send a referral to the community health agency CNS to follow up in the home and in the physician's office.

The CNS in the primary care practice can assess the infant and mother at the well-child visits. It is important for the primary care setting personnel to identify the premature infant at the first visit and obtain records from the hospital concerning the history of the neonatal period. Important information to document in the chart would be the infant's gestational age at birth, birth weight, length of hospitalization, amount and type of oxygen support, and any special procedures the infant had, such as patent ductus, ateriosus ligation, or cutdowns for hyperalimentation. Each of these variables could be a potential risk factor for the premature infant. Prematurity should be on the problem list at the infant's primary care site to alert the CNS and other health care providers to the special needs of the infant.

The CNS in primary care practice can use her clinical judgment to identify any developmental delays in the premature infant. The premature infant should be assessed developmentally within the primary care setting and at the developmental assessment clinic in the area. The premature infant's development needs to be assessed in relationship to the infant's corrected age for prematurity. The premature infant should be assessed for developmental delays at least up until school age. Developmental assessments should be conducted with the child's mother in attendance. Watching the developmental assessment can help alleviate some of the mother's concerns about the development of her premature infant. The primary care provider needs to encourage the mothers of premature infants to treat their children as normally as possible. If a developmental lag is identified, the CNS in the primary care setting should consult and collaborate with other health care providers who specialize in the treatment of developmental delays. The CNS will then use her clinical judgment in the need for referral to specialized health care professionals.

The CNS at the primary care site could use the ICI as an assessment tool to identify the mother's perceptions of the influence her caregiving practices have on her infant's present and future well-being. By using the ICI as an assessment tool, the CNS can tailor her teaching to fit the individual client. The answers on the ICI will point out areas that the mother's perceptions may be inaccurate concerning how caregiving practices influence infant well-being. The mother may indicate that she perceives the kinds of toys infants are

given has only a slight influence on the infant's intelligence. The CNS could then discuss with the mother the importance of providing appropriate play materials to promote infant learning. In this way the ICI would help the CNS to individualize her teaching plan to the mother's specific needs.

The mothers of premature infants need support in their maternal role. The mother-infant relationship needs to be assessed to rule out any potential alterations which could affect the infant's development. The CNS in primary care needs to be aware of the increased potential for child abuse and neglect in the premature infants. The premature infant is often more difficult to handle than a term baby (Klause & Kennel, 1982). The CNS needs to help the mother work through the adjustment to the special needs of the premature infant. The CNS can help the mother to understand that the irritability may be related to the infant's immature nervous system and is normal for the premature infant. The CNS can assist the mother in exploring ways to deal with the infant. The mother's social support systems should be assessed to help the CNS have a better understanding of the home environment and what options the mother has in dealing with her infant. The CNS may need to do a home visit to assess the home environment and then, using clinical judgment, the CNS can determine if the family should be referred to a public health nurse for continued follow-up in the home.

The CNS in the community health organizations is an ideal person to work with the mother and infant in the home setting. The CNS should be aware of the special needs of the premature infant and the emotional

concerns the mothers may have concerning the premature infant. The CNS in community health can also function as an intermediary between discharge from the hospital and the time the mother begins to feel more comfortable with the care of the premature infant. The CNS can support and educate the mother in relationship to the special needs of the premature infant. The CNS on a home visit might assess the infant's developmental level with the Brazleton Neonatal Behavioral Inventory, which can help the mother see how the infant responds to stimulus. This inventory would show the mother that the infant has the ability to respond to cues from the environment at a very young age. The CNS can work with the mother to help identify ways to increase her ability to attend to the cues the premature infant uses to express the need for stimulation and for rest. The CNS can potentially improve the "goodness of fit" between mother and child.

The CNS in the community needs to assess the impact of the premature infant not only on the mother but also on the other family members. The father and other siblings are also affected by the premature infant. The CNS needs to become familiar with the family dynamics and develop a management plan which facilitates the adjustment of the entire family to the premature infant. The CNS while in the home also needs to be aware of the infant's risk factors for developmental delay, such as gestational age, birth weight, and sex. The data in this study support the fact that male infants are at greater risk for developmental delays. The male infant may need a more specialized home stimulation program developed (Hayes, 1980). The CNS within the

community is in an ideal position to work with the mother and premature infant in the home setting to help the mother develop accurate perceptions of the infant's developmental potential and to assist the mother in finding ways to positively influence the developmental potential of the premature infant.

The role of the CNS is one in which the nurse acts, reacts, and interacts with the client to develop mutually agreed upon goals. The client and nurse then go through the process of transaction with the mutually established goals. According to King (1981), the process of transaction involves not only working on the mutually established goals but also evaluating the results of transaction. The evaluation of the process may indicate the goal has been reached by the nurse and client, or it may indicate a need to return to the interaction phase to reassess the situation, perceptions, and needs of the client. The mother-infant dyad presents to various areas of the health care system, and the CNS can be instrumental in promoting an optimal mother-infant relationship, with accurate perceptions and expectations which promote the highest level of infant development.

Implications for Research

The lack of significant findings between the two study variables indicates a need to assess the study design and the outcome measures. The inability to find significant correlations may have been due to the small sample size or the need for a time lag between the measurement of the two variables. Other possibilities of lack of significant findings

may be that the ICI is not appropriate for this sample population of premature infants or that the ICI may not be sensitive enough to pick up the variability in the population concerning mothers' perceptions.

The ICI needs to be tested in different settings and with larger numbers of subjects. The data on the ICI have only been collected in populations of term infants, with the largest study population being 126 mother-infant dyads. The implications for future research include testing the ICI with a larger population group and using the tool with other populations besides the term, healthy infant. If the ICI were tested with a different size and type population, the usage of the tool and generalizability could potentially increase.

Another area which needs to be explored with the ICI is whether the tool should be given at one point in time and the infant's developmental level measured at a later date. A research study could be developed to measure the ICI when the infants were approximately 6 months old and then assess the infant's developmental level with the Bayley MDI 6 to 12 months later. By allowing for the passage of time, the behaviors which are influenced by the mother's perceptions might be reflected more accurately in the infant's developmental level. The other variable which could be controlled by testing the ICI at the mother's first visit to the clinic would be the effect of teaching done by the health professionals at the clinic visit. The ICI might also be given at the second visit to identify any changes in the mother's perceptions over time.

A problem identified in this study was the lack of variability in the ICI scores. One reason for the lack of variability could be that the group was very homogeneous in age and marital status. The mothers who participated in the study were not a typical group of mothers of premature infants. Further research is needed to reach a more heterogeneous population and one which resembles more closely the average population of mothers of premature infants.

One possible research study would be to collect the data in the homes of the premature infants. The names of the premature infants could be obtained from the RNICU records, the DAC records, or community sources such as WIC files, clinic files, or physician offices. Once the population had been identified, it would be important to collect demographic data on the mother's age, marital status, socioeconomic status, and educational level to assure the collection of data from a more heterogeneous group of mothers.

The data collection would take place in the home, where the researcher would assess both the infant's developmental level and the mother's perceptions about the influence of her caregiving practices on the infant's present and future well-being. The study design could be longitudinal, with collection of data when the infants were 6 months old and then again at 12 to 18 months to correlate infant development, and to identify any changes in the infants' or mothers' scores. A correlational analysis could be done on the study variables and a multiple regression analysis done with the demographic variables.

If significant correlations were identified, a quasi-experimental design could be set up as a research study. The mothers of premature infants could be divided into two groups, with both groups taking the ICI. Then one group would receive an intervention designed to educate mothers on influences of caregiving practices on infant well-being and the other group receive no intervention. The two groups' ICI scores 6 months after the intervention could be compared with each other and also with the infants' developmental levels. This study's purpose would be to see how the intervention influenced the mother's perceptions.

One of the possible research studies that nurses could use to help identify how mothers' perceptions influence infant development would include the assessment of the home environment. The HOME scale developed by Bradley and Caldwell (1977) could be correlated with both the ICI and the Bayley MDI to see if any relationship exists. The identification of the primary caregiver for the infant would be an important part of the home environment to be studied in future research. The infant, although spending time with the mother, may not be with her most of the time, and may in fact be influenced by the perceptions of the primary caregiver rather than the infant's mother. This aspect of who was the primary caregiver was not adequately assessed in this research study. The primary caregiver could be a confounding variable in the research presented in this thesis. A way to evaluate that would be to ask the mother to identify the primary caregiver and then have both the mother and the primary caregiver, if

these differ, respond to the ICI. The data from both sources, the mother and the primary caregiver, could be analyzed for any significant relationships between the results of the ICI and the infant's cognitive developmental level.

A way of ruling out confounding variables in future research studies with the premature infant would be to evaluate the other established risk factors. The potential risk factors for developmental delay include the infant's gestational age, sex, birth weight, presence of an intercranial bleed, and length of hospitalization. Other factors which could influence the infant's development are the mother's socio-economic status and her educational level. These risk factors could then be analyzed using an analysis of variance to establish any significant relationships between the factors including the mother's perceptions (ICI) and the infant developmental level (Bayley MDI).

Research studies also need to be done comparing the ICI with other variables related to the infant and the mother. The mother's perceptions may be related to the prematurity of the infant, whether the mother has other children, and whether the pregnancy was planned. A potential research study would be to measure the mother's perceptions of the influence her caregiving practices have on the infant's present and future well-being using a sample of mothers who have term infants and those who have preterm infants and assess the data to identify any differences in the two groups. the ICI might also be analyzed in relationship to whether the mother is a primipara or multipara. Other factors to explore would be whether the mother had any other premature

infants, how many children the multiparous women had, and where the premature infant came in birth order. The last variable to explore would be whether the pregnancy was planned or unplanned. These variables could be correlated with the ICI scores to identify any significant relationships to the mother's perceptions.

The other area of important research to explore is the validity and usefulness of the ICI as an assessment tool to accurately measure mothers' perceptions. The ICI scores showed little variability in this research and in studies done by Parks and Smeriglio (1983). This lack of variability may indicate a need to reevaluate the ICI tool and to redesign the questionnaire. The items in the ICI need to be redesigned to increase the sensitivity of the tool to identify differences in maternal perceptions. Perception is an important variable for researchers to assess because it is the person's representation of reality and relates to the behavior the person exhibits (King, 1981). The mother's perception of her infant shortly after birth has been measured by the NPI developed by Broussard (1974). The need now is for researchers to develop or redefine tools used to measure the mother's perceptions in relationship to her influence on the infant's well-being. The aspects of the ICI which researchers can explore are (a) the appropriateness of relating the infant's well-being at school age to caregiving practices the mother uses when the child is an infant; (b) the wording of the items should be evaluated to assess if there is a bias built into the wording which influences the participant's answer; (c) the intercorrelations of the subgroups need to be reevaluated to

see if there is a way to tap into different dimensions of the mother's perceptions concerning her influence on the child's different measures of outcome variables. Redesigning the ICI could be very helpful to health care providers. By developing a research tool which can measure accurately the mother's perceptions of the influence her caregiving practices have on her infant's well-being, the health care provider can intervene to promote appropriate maternal-infant interactions which influence the infant to develop to his/her optimal potential.

Implications for Education

There are numerous educational implications to the research presented in this study. Even though the specific variables used to measure mothers' perceptions and infant cognitive development were not found to be correlated, the literature supports strongly the need for nurses to have a sufficient knowledge base concerning infant development and the importance of the environment to the developmental potential of the infant. The importance of the mother-infant relationship to human development over time cannot be emphasized enough. The health care system has the opportunity to impact this relationship during pregnancy, immediately postpartum, and during the well-child visits to clinics and private offices. By incorporating information and education into these situations with the mother and infant, the health care system and nurses in particular can have an effect on the mother-infant dyad. The nursing curriculum needs to stress the importance of the infant's environment to nursing students, educating them in their role as advocates of the mother-infant relationship.

Nursing educators need to make sure the undergraduate nurse is exposed to theories of infant development as well as the importance of the mother and environment to the infant's development. The development of an infant is not an isolated event; it is an interrelated process in which the nurse can intervene to potentially improve the outcome. King (1981) states that the nurse functions to assist the patient to reach his/her optimum potential ability. The nurse, by assessing and educating the mother, can help the infant to reach its optimum potential.

Nursing educators need to include in the curriculum the study of nursing theorists. Nurses need to have a sound theory base on which to establish their practice. King's theory of nursing deals with the nurse and client as they respond to each other. The nurse and client act and react to each other mentally when they first meet. Then an interaction occurs, which is the exchange of ideas and feeling. The nurse working with the mother of a premature infant would interact with the mother to find out her knowledge of infant development and the mother's role in the infant's development. The nurse and client would then proceed to the process of transaction by setting goals and mutually agreeing on a plan to meet those goals for both the mother and infant. The transaction process also includes the evaluation of the process. The outcome of the evaluation may lead to new reactions, actions, and interactions to establish new plans and goals within the transactional process. The nurse, by having a practice firmly based in nursing theory, can assist the client in an organized, systematic

manner to promote the optimal level of health for both the mother and the infant.

The role of the client advocate should be introduced by educators of nursing students. Nurses have an ideal opportunity to become client advocates for premature infants and their mothers, both in the hospital and within the entire health care system. The CNS client advocacy role is important in working with the mothers of premature infants. The mothers are often overwhelmed by the complicated medical jargon and the fact that their infant is different from most infants. These factors allow the nurse to become a support person and advocate for the mothers and their infants. The nurse can help the mother to take control of the situation, assisting her in developing the skills needed to adequately provide for the premature infant within the health care system. The nursing student needs to be educated to the role of client advocate and feel comfortable in the role of advocate with mother and infant.

Nursing educators should be aware of the importance of the role of the nurse as an organizer for group meetings. The ability to develop groups is an important skill for the nurse to develop. The mothers of premature infants are often frightened and overwhelmed by the number of changes that are occurring in their lives. Group meetings and support groups have been found to be beneficial for the mothers of premature infants (DuHamel et al., 1974). The nursing student needs to be comfortable with developing new programs and leading group meetings for the benefit of the mother and infant. Group meetings are also a potential source of information about normal infant development, both

prenatally and postnatally. One of the fallacies of our society is that motherhood is a natural, innate process. The health care providers can provide information and support to the new mothers and infants during the crucial first few months and years of the mother-infant relationship. Setting up parenting groups can help provide information and support to mothers. The nurse needs to be skilled in the group process and the organizational needs of group programs.

Another aspect of education is the potential to educate the public and other health care providers to the new advanced practice role of the nurse within the health care system. Nurses at all levels of educational preparation need to support the new roles for nursing and provide information to the public about the advanced practice roles of nurse practitioner, clinical nurse specialist, nurse midwife, and nurse anesthetist. Nurses also need to be educated in the importance of supporting legislation which affects the nursing profession. Nurses working with mothers and infants also need to take an active role in promoting legislation which affects the funding and support of maternal-child services.

Educators also must emphasize the importance of research in everyday nursing practice. Research does not have to be a complicated process. The nursing students should be educated to the research process and encouraged to use it within their own practices. Research can be as simple as keeping track of the number of visits parents make to the physician's office. The number of visits could then be examined. The nurse could develop possible ways to assist the parents in

making more appropriate decisions concerning when to seek health care. The need for research which is backed by statistical findings is important, but on a daily basis the nurse can use whatever is available to her to promote a more efficient nursing practice. The economic changes occurring within the health care system make it essential for nurses to have research to back up the assumptions about the importance of nursing practice for the well-being of the client within the health care system. Research-based practice is essential for the nursing profession to survive in the present and future health care system.

Summary

The research data compiled in this study have not identified a significant relationship between the mother's perceptions of how her caregiving practices influence an infant's well-being and the infant's cognitive developmental level. Despite the lack of significant findings between the two major study variables, the research has identified some possible causes for the lack of findings within this study population. The causes could have been small sample size, or the outcome variables of the ICI and the Bayley MDI may not have been appropriate for this study population. There may need to be a time lag between the measurement of the mother's perceptions and the assessment of the infant's cognitive developmental level.

The research study presented support for the reliability of the ICI for a population of premature infants and identified some ways the ICI could be reevaluated to potentially increase the sensitivity of the

tool. The scores on the MDI indicated that for this sample the premature infant actually performed above average on its cognitive developmental assessment. The scores on the MDI support the assumption that premature infants, if given the right environment, can develop normally. The potential for future research to evaluate these factors, as well as implications for practice and education, has been explored.

APPENDICES

APPENDIX A

INFANT CAREGIVING INVENTORY

For each sentence, put an "X" beside the word which best describes your opinion. There are no right or wrong answers. Each mother has her own opinion.

Personality at School-Age

1. I think that the way babies are talked to has
   no _____ slight _____ moderate _____ strong _____
   influence on their personality when they reach school-age.

2. I think that the kind of person chosen as a babysitter has
   no _____ slight _____ moderate _____ strong _____
   influence on babies' personality when they reach school-age.

3. I think that the amount of time babies are left with someone else has
   no _____ slight _____ moderate _____ strong _____
   influence on their personality when they reach school-age.

4. I think that the age when babies are started on solid foods has
   no _____ slight _____ moderate _____ strong _____
   influence on their personality when they reach school-age.

5. I think that the amount of time babies see their relatives has
   no _____ slight _____ moderate _____ strong _____
   influence on their personality when they reach school-age.

6. I think that the kind of attention babies are given when they smile has
   no _____ slight _____ moderate _____ strong _____
   influence on their personality when they reach school-age.

Physical Growth

7. I think that things (like vitamins and proteins) in what babies eat and drink have
   no _____ slight _____ moderate _____ strong _____
   influence on their physical growth.

8. I think that reading to babies has
   no _____ slight _____ moderate _____ strong _____
   influence on their physical growth.

9. I think that the amount babies are given to eat and drink has
   no _____ slight _____ moderate _____ strong _____
   influence on their physical growth.

10. I think that taking babies for recommended physical check-ups has
    no _____ slight _____ moderate _____ strong _____
    influence on their physical growth.

For each sentence, put an "X" beside the word which best describes your opinion. There are no right or wrong answers. Each mother has her own opinion.

Intelligence at School-Age

11. I think that the amount of time babies see their relatives has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

12. I think that the way babies are played with has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

13. I think that the method used to teach babies to follow rules has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

14. I think that the kind of toys babies are given has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

15. I think that the kind of attention babies are given when they smile has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

16. I think that the age when babies are taught to follow rules has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

17. I think that the age when babies are started on solid foods has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

18. I think that reading to babies has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

19. I think that the amount of time babies are left with someone else has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

20. I think that the kind of person chosen as a babysitter has
no _____ slight _____ moderate _____ strong _____
influence on babies' intelligence when they reach school-age.

21. I think that the way babies are talked to has
no _____ slight _____ moderate _____ strong _____
influence on their intelligence when they reach school-age.

For each sentence, put an "X" beside the word which best describes your opinion. There are no right or wrong answers. Each mother has her own opinion.

Babies' Happiness or Unhappiness

22. I think that the way babies are played with has
no _____ slight _____ moderate _____ strong _____
influence on their feelings of happiness or unhappiness.

23. I think that the method used to teach babies to follow rules has
no _____ slight _____ moderate _____ strong _____
influence on their feelings of happiness or unhappiness.

24. I think that the kind of person chosen as a babysitter has
no _____ slight _____ moderate _____ strong _____
influence on babies' feelings of happiness or unhappiness.

25. I think that the age when babies are taught to follow rules has
no _____ slight _____ moderate _____ strong _____
influence on their feelings of happiness or unhappiness.

26. I think that the kind of attention babies are given when they smile has
no _____ slight _____ moderate _____ strong _____
influence on their feelings of happiness or unhappiness.

27. I think that the method used to toilet train babies has
no _____ slight _____ moderate _____ strong _____
influence on their feelings of happiness or unhappiness.

28. I think that the way mothers respond to babies' crying has
no _____ slight _____ moderate _____ strong _____
influence on babies' feelings of happiness or unhappiness.

Physical Health

29. I think that the age when babies are taught to follow rules has
no _____ slight _____ moderate _____ strong _____
influence on their physical health.

30. I think that the age when babies are started on solid foods has
no _____ slight _____ moderate _____ strong _____
influence on their physical health.

31. I think that the kind of person chosen as a babysitter has
no _____ slight _____ moderate _____ strong _____
influence on babies' physical health.

32. I think that things (like vitamins and proteins) in what babies eat and drink ha
no _____ slight _____ moderate _____ strong _____
influence on their physical health.

33. I think that the kind of toys babies are given has
no _____ slight _____ moderate _____ strong _____
influence on their physical health.

34. I think that taking babies for recommended physical check-ups has
no _____ slight _____ moderate _____ strong _____
influence on their physical health.

APPENDIX B

BAYLEY MENTAL SCALE

BAYLEY SCALES OF INFANT DEVELOPMENT

MENTAL SCALE RECORD FORM

NAME _____ AGE _____ SEX _____

	Year	Month	Day
Date Tested			
Date of Birth			
Age			

	Raw Score	Development Index*
Mental Scale		(MDI)
Motor Scale		(PDI)

* The standard score for the Mental Scale is called the MDI (for Mental Development Index); for the Motor Scale it is the PDI (for Psychomotor Development Index). See Manual for discussion.

NOTES:

Note.—If both the MENTAL SCALE and the MOTOR SCALE are administered to the child, the information below need only be filled in on the Record Form for the MENTAL SCALE.

ADDRESS _____

BIRTHPLACE _____

BIRTH WEIGHT _____ BIRTH ORDER _____

PRENATAL OR BIRTH DIFFICULTIES _____

CHILD'S HEALTH _____

PARENT'S NAME _____

FATHER: EDUCATION _____ OCCUPATION _____

MOTHER: EDUCATION _____ OCCUPATION _____

HOUSEHOLD COMPOSITION

	Father	Mother	Siblings 1	2	3	4	5	6	7	8	Other Children 1	2	3
Check if Present in Household													
Approximate Age													
Sex (M for Male, F for Female)													

Comments:

PLACE OF TESTING _____

TESTED BY _____

The Psychological Corporation, New York

Printed in U. S. A. 69-101 AS 9-026436

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score			Notes
				P	F	Other	
1	0.1	A	Responds to sound of bell				
2	0.1	B	Quiets when picked up				
3	0.1 (.1-3)	C	Responds to sound of rattle				
4	0.1 (.1-4)		Responds to sharp sound: click of light switch				
5	0.1 (.1-1)	D	Momentary regard of red ring				
6	0.2 (.1-1)	E	Regards person momentarily				
7	0.4 (.1-2)	D	Prolonged regard of red ring				
8	0.5 (.1-2)	D	Horizontal eye coordination: red ring				
9	0.7 (.3-3)	F	Horizontal eye coordination: light				
10	0.7 (.3-2)	E	Eyes follow moving person				
11	0.7 (.3-2)	E	Responds to voice				
12	0.8 (.3-3)	F	Vertical eye coordination: light				
13	0.9 (.5-3)	G	* Vocalizes once or twice				
14	1.0 (.5-3)	D	Vertical eye coordination: red ring				
15	1.2 (.5-3)	F	Circular eye coordination: light				
16	1.2 (.5-3)	D	Circular eye coordination: red ring				
17	1.3 (.5-3)	G'	* Free inspection of surroundings				
18	1.5 (.5-4)	E	Social smile: E talks and smiles				
19	1.6 (.7-4)	D	Turns eyes to red ring				
20	1.6 (.5-4)	F	Turns eyes to light				
21	1.6 (.5-5)	G	* Vocalizes at least 4 times				
22	1.7 (1-4)	B	Anticipatory excitement				
23	1.7 (.5-5)		Reacts to paper on face				
24	1.9 (1-4)		Blinks at shadow of hand				
25	2.0 (1-5)	E	Visually recognizes mother				

* May be observed incidentally.

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score			Notes
				P	F	Other	
26	2.1 (.7-6)	E	Social smile: E smiles, quiet				
27	2.1 (1-6)	E	* Vocalizes to E's social smile and talk				
28	2.2 (.7-5)	AC	Searches with eyes for sound (Specify)				____Bell ____Rattle
29	2.3 (.7-5)		Eyes follow pencil				
30	2.3 (1-5)	G	* Vocalizes 2 different sounds				
31	2.4 (1-5)	E	Reacts to disappearance of face				
32T‡	2.5 (1-5)	H	Regards cube				
33	2.6 (1-5)	D^1	Manipulates red ring				
34	2.6 (1-5)	AC	Glances from one object to another				
35	2.6 (1-6)	B	Anticipatory adjustment to lifting				
36	2.8 (2-5)	C	Simple play with rattle				
37	3.1 (1-5)	D^1	Reaches for dangling ring				
38T	3.1 (2-5)		Follows ball visually across table				
39	3.2 (1-6)	G^1	* Fingers hand in play				
40T	3.2 (1-5)	D^1	Head follows dangling ring				
41T	3.2 (1-6)	I	Head follows vanishing spoon				
42	3.3 (2-6)	G^1	* Aware of strange situation				
43T	3.3 (2-6)	G^2	* Manipulates table edge slightly				
44	3.8 (2-6)	D^1	Carries ring to mouth				
45	3.8 (2-6)	G^1	* Inspects own hands				
46	3.8 (2-6)	D^1	Closes on dangling ring (Check hand preference)				____Right ____Left ____None
47	3.8 (2-6)	A	Turns head to sound of bell				
48	3.9 (2-6)	C	Turns head to sound of rattle				
49	4.1 (2-6)	H	Reaches for cube				
50	4.3 (2-7)	G^2	* Manipulates table edge actively				

* May be observed incidentally. ‡ See Manual, Chapter 4, for explanation of "T."

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score			Notes
				P	F	Other	
51	4.4 (2-6)	H	Eye-hand coordination in reaching				
52	4.4 (2-7)	J	Regards pellet				
53	4.4 (2-7)	K	Mirror image approach				
54	4.6 (3-7)	H	Picks up cube (Check hand preference)				____Right ____Left ____None
55	4.6 (3-8)	G^3	* Vocalizes attitudes (Describe)				Pleasure: Displeasure: Eagerness: Satisfaction:
56	4.7 (3-7)	H	Retains 2 cubes				
57	4.8 (3-7)		Exploitive paper play				
58	4.8 (3-8)	E^1	* Discriminates strangers				
59	4.9 (4-8)	C	Recovers rattle, in crib				
60	5.0 (3-8)	H	Reaches persistently				
61	5.1 (3-8)	E^1	Likes frolic play				
62	5.2 (4-8)	I	Turns head after fallen spoon				
63	5.2 (4-8)	L	Lifts inverted cup				
64	5.4 (4-8)	H	Reaches for 2nd cube				
65	5.4 (3-12)	K	Smiles at mirror image				
66	5.4 (4-8)	G^2	* Bangs in play				
67	5.4 (4-8)	D^2	Sustained inspection of ring				
68	5.4 (4-8)	D^2	Exploitive string play				
69	5.5 (4-8)	G^2	* Transfers object hand to hand				
70	5.7 (4-8)	H	Picks up cube deftly and directly				
71	5.7 (4-8)	D^2	Pulls string: secures ring				
72	5.8 (4-8)	G^2	* Interest in sound production				
73	5.8 (4-11)	L	Lifts cup with handle				

* May be observed incidentally.

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score			Notes
				P	F	Other	
74	5.8 (4-10)	M	Attends to scribbling				
75	6.0 (5-10)	I	Looks for fallen spoon				
76	6.2 (4-12)	K	Playful response to mirror				
77	6.3 (4-10)	H	Retains 2 of 3 cubes offered				
78	6.5 (5-10)	A^1	Manipulates bell: interest in detail				
79	7.0 (5-12)	G^3	* Vocalizes 4 different syllables				
80	7.1 (5-10)	D^2	Pulls string adaptively: secures ring				
81	7.6 (5-12)	E^1	Cooperates in games				Note skill at pat-a-cake for Motor Scale item 44
82	7.6 (5-14)	H	Attempts to secure 3 cubes				
83	7.8 (5-13)	A^1	Rings bell purposively				
84	7.9 (5-14)	N	* Listens selectively to familiar words				
85	7.9 (5-14)	G^3	* Says "da-da" or equivalent				
86	8.1 (6-12)	H^1	Uncovers toy				
87	8.9 (6-12)	O	Fingers holes in peg board				
88	9.0 (6-14)	L	Picks up cup: secures cube				
89	9.1 (6-14)	N	Responds to verbal request				
90	9.4 (6-13)	L	Puts cube in cup on command (Note number placed)				Items 90, 100, 114 ____No. of cubes
91	9.5 (8-14)	P	Looks for contents of box				
92	9.7 (8-15)	L	Stirs with spoon in imitation				
93	10.0 (7-16)	Q	Looks at pictures in book				
94	10.1 (7-17)	M	Inhibits on command				
95	10.4 (7-15)	M	Attempts to imitate scribble				
96	10.5 (8-17)	H^1	Unwraps cube				
97	10.8 (8-17)	E^1	* Repeats performance laughed at				
98	11.2 (8-15)	M	Holds crayon adaptively				

* May be observed incidentally.

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Site-ation	Item Title	Score			Notes
				P	F	Other	
99	11.3 (8-15)		Pushes car along				
100	11.8 (9-18)	L	Puts 3 or more cubes in cup				
101	12.0 (9-18)	G[2]	* Jabbers expressively				
102	12.0 (9-17)	P	Uncovers blue box				
103	12.0 (8-18)	Q	Turns pages of book				
104	12.2 (8-19)		Puts whistle doll, in imitation				
105	12.4 (7-18)	D[2]	Dangles ring by string				
106	12.5 (9-18)	N	* Imitates words (Record words used)				
107	12.9 (10-17)	P	Puts beads in box (6 of 8)				
108	13.0 (10-17)	O	Places 1 peg repeatedly				
109	13.4 (10-19)	J	Removes pellet from bottle				
110	13.6 (10-20)	R	Blue board: places 1 round block (Specify)				Items 110, 121, 129, 142, 155, 159, 160 ____No. round placed ____No. square placed _____Completion time
111	13.8 (10-19)	H[1]	Builds tower of 2 cubes (Note number of cubes)				Items 111, 119, 143, 161 ____No. of cubes
112	14.0 (10-21)	M	Spontaneous scribble				
113	14.2 (10-23)	G[2]	* Says 2 words (Note words)				Heard: Reported:
114	14.3 (11-20)	L	Puts 9 cubes in cup				
115	14.6 (10-20)	P	Closes round box				
116	14.6 (11-19)		* Uses gestures to make wants known				
117	15.3 (11-23)	N	Shows shoes or other clothing, or own toy				
118	16.4 (13-20)	O	Pegs placed in 70 seconds (Note times)				Items 118, 123, 134, 156 Trial 1 2 3 Time ____ ____ ____
119	16.7 (13-21)	H[1]	Builds tower of 3 cubes				
120	16.8 (12-26)	S	Pink board: places round block (Specify)				Items 120, 137, 151 ____Round placed ____All placed ____All placed (reversed board)
121	17.0 (12-26)	R	Blue board: places 2 round blocks				

* May be observed incidentally.

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score P	Score F	Score Other	Notes
122	17.0 (12-24)		Attains toy with stick				
123	17.6 (14-22)	O	Pegs placed in 42 seconds				
124	17.8 (13-27)	T	Names 1 object (Check objects named)				Items 124, 138, 146 ____Ball ____Scissors ____Watch ____Cup ____Pencil
125	17.8 (13-26)	M	Imitates crayon stroke				
126	17.8 (14-26)	U	Follows directions, doll (Check parts passed)				____Chair ____Cup ____Handkerchief
127	18.8 (14-27)	G[3]	* Uses words to make wants known				
128	19.1 (15-26)	U	Points to parts of doll (Check parts recognized)				____Hair ____Eyes ____Mouth ____Feet ____Ears ____Nose ____Hands
129	19.3 (14-30+)	R	Blue board: places 2 round and 2 square blocks				
130	19.3 (14-27)	V	Names 1 picture (Check list)				Items 130, 132, 139, 141, 148, 149 Names Points Dog ____ ____ Shoe ____ ____ Cup ____ ____ House ____ ____ Clock ____ ____ Flag ____ ____ Star ____ ____ Leaf ____ ____ Purse ____ ____ Book ____ ____ No. Named____ ____No. Pointed
131	19.7 (14-30+)		Finds 2 objects (Check successful trials)				Trial 1 2 3 Ball ____ ____ ____ Rabbit ____ ____ ____
132	19.9 (16-28)	V	Points to 3 pictures (Check list at item 130)				
133	19.9 (15-27)	W	Broken doll: mends marginally				
134	20.0 (16-29)	O	Pegs placed in 30 seconds				
135	20.5 (14-30+)	M	Differentiates scribble from stroke				
136	20.6 (16-30)	G[3]	* Sentence of 2 words				
137	21.2 (16-30+)	S	Pink board: completes				
138	21.4 (16-30)	T	Names 2 objects				
139	21.6 (17-30+)	V	Points to 5 pictures (Check list at item 130)				

* May be observed incidentally.

To score: Check P (Pass) or F (Fail). If "Other," mark O (Omit), R (Refused), or RPT (Reported by mother).

Item No.	Age Placement and Range (Months)	Situation	Item Title	Score			Notes
				P	F	Other	
140	21.9 (15-30)	W	Broken doll: mends approximately				
141	22.1 (17-30+)	V	Names 3 pictures (Check list at item 130)				
142	22.4 (16-30+)	R	Blue board: places 6 blocks				
143	23.0 (17-30+)	H'	Builds tower of 6 cubes				
144	23.4 (16-30+)	X	Discriminates 2: cup, plate, box (Check which)				Items 144, 152 ____Cup ____Box ____Plate ____All
145	23.8 (17-30+)	Y	Names watch, 4th picture (Check at which named)				Items 145, 150 ____5th picture ____3rd picture ____4th picture ____2nd picture
146	24.0 (17-30+)	T	Names 3 objects				
147	24.4 (19-30+)	M	Imitates strokes: vertical and horizontal				
148	24.7 (19-30+)	V	Points to 7 pictures (Check list at item 130)				
149	25.0 (19-30+)	V	Names 5 pictures (Check list at item 130)				
150	25.2 (18-30+)	Y	Names watch, 2nd picture				
151	25.4 (18-30+)	S	Pink board: reversed				
152	25.6 (18-30+)	X	Discriminates 3: cup, plate, box				
153	26.1 (16-30+)	W	Broken doll: mends exactly				
154	26.1 (19-30+)	H'	Train of cubes				
155	26.3 (19-30+)	R	Blue board: completes in 150 seconds				
156	26.6 (19-30+)	O	Pegs placed in 22 seconds				
157	27.9 (22-30+)	M	Folds paper				
158	28.2 (22-30+)	Z	Understands 2 prepositions				
159	30.0 (22-30+)	R	Blue board: completes in 90 seconds				
160	30+ (22-30+)	R	Blue board: completes in 60 seconds				
161	30+ (22-30+)	H'	Builds tower of 8 cubes				
162	30+ (21-30+)	H'	Concept of one				
163	30+ (23-30+)	Z	Understands 3 prepositions				

APPENDIX C

SUBJECT CRITERIA AND DEMOGRAPHIC VARIABLES

CODE #_____

Subject Criteria

36 weeks gestation or less	yes___	no___
Birth weight less than 2,500 grams	yes___	no___
Birth weight more than 1,000 grams	yes___	no___
Hospitalized more than 1 week	yes___	no___
No congenital anomalies	yes___	no___
Living with biological mother	yes___	no___

Code #_____

Demographic Data

Infant's age
- 12-14 months____
- 15-16 months____
- 17-18 months____

Sex
- Male____
- Female____

Gestational age at birth
- 24-26 weeks____
- 27-29 weeks____
- 30-32 weeks____
- 33-35 weeks____
- 36 weeks ____

Birth weight
- 1001-1500 grams____
- 1501-2000 grams____
- 2001-2500 grams____

Length of hospitalization
- 2 weeks____
- 3 weeks____
- 4 weeks____
- 4 or more weeks____

Oxygen therapy
- Hood 50% or less____
- Hood 51%-100% ____
- Ventilatory support 50% or less____
- Ventilatory support 50% to 100%____

Mother's age
- 15-19 years____
- 20-24 years____
- 25-29 years____
- 30-34 years____
- 35 or older____

Mother's marital status
- Single ____
- Married ____
- Divorced____

APPENDIX D

CORRESPONDENCE WITH P. PARKS

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655 WEST LOMBARD STREET
BALTIMORE MARYLAND 21201

September 12, 1984

Ms. Katherine Jordan
1215 Weber #6
Lansing, MI 48912

Dear Ms. Jordan,

I'm pleased you are using the ICI in your nursing thesis. I would appreciate receiving a copy of the Abstract when it is completed. Also, I would like a full citation (Title, Author, Date of Completion, Program, School, University).

I presume in your question #1 you are referring to an item in the Intelligence subscale. We were not relating this to social support since there is not very much research on this aspect yet. We were referring to the variety of stimulation that relatives can provide for young children. Caldwell and Bradley used this same idea for the item in their HOME Scale which measures whether or not young children frequently see their relatives.

Dr. Smeriglio and I have analyzed our data for the revised ICI and have drafted 2/3 of the paper that we will submit for publication. As I'm sure you know, writing is slow and painful! We have data from 126 mothers of 6-month-olds from three socioeconomic groups (low, middle, high). For low SES mothers, coefficient alpha ranged from .50 (physical health) to .94 (total) for the five subscales and total scores. For middle SES mothers, coefficient alpha ranged from .50 (physical health) to .90 (total) for the five subscales and total scores. For high SES mothers, coefficient alpha ranged from .54 (growth) to .91 (total) for the five subscales and total score. The shorter subscales had the lowest alpha coefficients. Construct validity of the revised ICI was supported by two findings:

A. Low SES mothers had lower ICI scores than middle or high SES mothers for all scales except growth and health (Alpha of .05 was used). Growth and health were topics on which low SES mothers were most likely to have received information from health care providers.

B. For low SES mothers ($n = 33$), there was a significant and positive relationship between ICI scores and HOME Scale (quality of stimulation in the home environment) total scores. The correlation coefficients were significant for all ICI scales except growth and ranged from .42 to .54 (total).

Ms. Katherine Jordan
September 12, 1984
Page 2

I have enclosed the article you requested.

Sincerely,

Peggy Parks, Ph.D.
Assistant Professor

PP:ch

Enclosure

APPENDIX E

CONSENT AND COVER LETTER

Code #_____

MICHIGAN STATE UNIVERSITY
COLLEGE OF NURSING

Dear mothers of premature infants,

The study in which you are being asked to participate is being conducted by myself as part of the requirements for a master of science degree in nursing. The purpose of this study is to identify any relationship that might exist between a mother's perception of how caregiving practices influence a child's development and the infant's developmental level. Your completion of the following questionnaire will add to the knowledge base of nursing concerning infant development and the effect of caregiving practices.

Your participation in the study is voluntary. You are free to withdraw from the study at any time without penalty. Withdrawal from the study or participation in the study will not affect the care that you or your child will receive. The results of the study will be treated in strict confidence, and you will remain anonymous. Participation in the study does not guarantee any beneficial results to you. Furthermore, you will not be paid or receive any direct form of gratuity for participation.

If you are willing to participate in the study, please complete the following questionnaire. If you have any questions, ask the nurse who gave you the questionnaire. If you are willing to participate, I will also need your consent to obtain the results of the Bayley Scales of Infant Development, which will be routinely administered to your infant at the Developmental Clinic whether you participate in the study or not.

Participation in the study should take approximately 15-20 minutes of your time and will require you to respond to a series of questions as honestly and accurately as possible. Please complete the questions before leaving the clinic and return them with the signed consent form to the nurse who gave them to you. As a result of participation in this study you may become more aware of your feelings about child care practices and have some concerns or questions about your infant's development. If you have any questions, please call the researcher or ask the staff at the Developmental Clinic.

I will be pleased to send you a summary of the results of the study following its completion at your request.

Thank you for your cooperation.

Sincerely,

Kathy Jordan, R.N.
Family Clinical Nurse Specialist Student, MSU
Phone: (517) 372-3411

APPENDIX F

RELEASE OF INFORMATION

CODE #_____

Release of Information

I _____ give my consent to release data from the Bayley Scales of Infant Development on _____ to be used in the research study being conducted by Katherine Jordan as part of the requirements for a master of science degree in nursing through Michigan State University. I am aware that the data will remain confidential.

_____
Parent or legal guardian

_____
Witness

_____
Date

APPENDIX G

HUMAN SUBJECTS

MICHIGAN STATE UNIVERSITY

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

EAST LANSING · MICHIGAN · 48824

December 4, 1984

Ms. Kathy Jordan
1215 Weber
Lansing, Michigan 48912

Dear Ms. Jordan:

Subject: Proposal Entitled, "The Relationship Between the Mothers' Perceptions about the Influences of Infant Caregiving Practices and Infant Developmental Level"

UCRIHS review of the above referenced project has now been completed. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and the Committee, therefore, approved this project at its meeting on December 3, 1984.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to December 3, 1985.

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

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,

Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

cc: Dr. Barbara Given

APPENDIX H

CONSENT FROM SPARROW HOSPITAL

1215 East Michigan Avenue
P.O. Box 30480
Lansing, Michigan 48909
(517) 483-2700

Edward W. Sparrow Hospital Association

November 21, 1984

Barbra Given, MSN, Ph.D.
Michigan State University
East Lansing, MI

Dear Dr. Given,

This letter indicates our support of the proposed study by Katherine Jordan of patients who attend the E.W. Sparrow Hospital Developmental Assessment Clinic. The The Assessment team has reviewed the proposal and, as long as requirements are met and permission granted by the University, we will be more than willing to cooperate. We only require a copy of the final report when it is completed.

If there are any questions you may have, please feel free to contact me at Sparrow Hospital

Sincerely,

David S. Sciamanna, D.O.
Neonatologist
E.W. Sparrow Hospital, and
Asst. Prof. of Peds., COM/CHM
Michigan State University

DSS/rd

REFERENCES

REFERENCES

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