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MATERNAL PERCEPTIONS OF THE IMPACT OF INFANT HOME MONITORING ON SIBLING (AGE 2-5 YEARS) DEVELOPMENT

by

Diane M. White

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ABSTRACT

MATERNAL PERCEPTIONS OF
THE IMPACT OF INFANT HOME MONITORING ON
SIBLING (AGE 2-5 YEARS) DEVELOPMENT

By

Diane M. White

Using M. Rogers' nursing model and McCubben and Patterson's modified family stress model, this study was designed to describe maternal perceptions concerning the impact of the infant home monitoring on the psychosocial and cognitive development of the two-to-five-year-old sibling. The Sibling Developmental Issues tool was administered to a convenience sample of 22 mothers. Reliability coefficients of the study instrument were assessed to be acceptable. There were higher scores reported in the psychosocial area of development which includes: Aggression, jealousy, regression, and anxiety. The scores reported in cognitive development (namely, exploratory behaviors, memory/language, fantasy/imagination) revealed little change. There was a significant difference in the regression subscale between the younger age sibling (two years - three years six months) versus the older age siblings (three years eight months - five years). This information will aide in the understanding of sibling reaction to the home-monitored infant as perceived by the mother. In addition, strategies for nurses working with these families are presented.

This project is dedicated to the 22 mothers, infants, and young siblings who were a part of this study.

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Maternal Perceptions of The Impact of Infant Home Monitoring on Sibling Development

CHAPTER ONE

Introduction

In recent years the effort to gain knowledge and understanding of Sudden Infant Death Syndrome (SIDS) has intensified. As information began to emerge regarding the possibility of a causal relationship between sleep apnea and SIDS, physicians and parents began to believe that home monitoring should be used (Valdes-Dapena, 1980). In an attempt to prevent the protracted and complex mystery of Sudden Infant Death Syndrome (SIDS), the number of infants placed on 24-hour home monitor surveillance has increased greatly over the past several years. In the Kalamazoo, Michigan, area alone, there are well over 100 infants who are being monitored for a potential life-threatening episode (Care Tech, 1986).

The use of an apnea monitor in the home to limit the duration of apneic spells has raised a number of questions about the effect of such a device on the infant, the family, and parent-child interaction (Black, Hersher, & Steinschneider, 1978). Four studies have been reported in the literature pertaining to the impact of the apnea monitor on the parents and on family life (Black, et al., 1978; Cain, Kelly, Shannon & O'Connell, 1978; DeMaggio & Sheetz, 1983; and Goetz, 1981). However, investigations related to the

effect such monitoring has on brothers and sisters of these infants are absent. The American Academy of Pediatrics (1978) stated that, in relation to the monitored infant, the emotional and physical needs of siblings require comparable attention. Guntheroth (1982) stated that families, including siblings, should be evaluated and their strengths, weaknesses, resources, and needs assessed before monitor decisions are made and implemented. Goetz (1981) recommended that more family coping studies be conducted during the home monitoring period.

Families are the consumers of health care. The presence of a chronically or terminally ill child in a family has been considered a demanding, emotionally draining experience for the child and his/her family (Lavigne & Ryan, 1979). In a study by Lavigne and Ryan (1979), siblings of children with a chronic illness seemed more likely to experience more adjustment or behavioral problems than healthy children. The siblings appeared to be "at risk" for certain types of disturbances at certain ages. It is interesting to note that the severity of illness did not correspond to the degree of problems noted among siblings, but rather to the illness being a visible handicap--e.g., plastic surgery versus an invisible handicap such as a congenital heart defect (Lavigne & Ryan, 1979). However, the effect of illness on the sibling is certainly not well defined in the literature.

Articles are promulgated that encourage family assessment and nursing intervention directed toward the

parents to assist them in coping, parenting, and learning or strengthening care-giving skills. Nursing has extended its practice boundaries to include the family. Familiar terms such as "family as a unit of care" and "family-centered care" permeate the nursing literature (Friedman, 1981; Hymovich, 1979; Knafl & Grace, 1978; & Miller & Janosik, 1980). Often the family includes only the parents of the well or ill child. DiMaggio and Sheetz (1983) have noted that the mothers of apneic infants identify the nurse as being the most helpful to them during the infants' hospital stay. The major responsibility for the teaching of the families preparing to monitor their infants in the home is assumed by the professional nurse.

Observations of behavior, as well as parent reporting, are methods used in the study of young children. Behaviors of the two-to-five-year-old sibling that the mothers perceive to be attributed to the monitored infant experience will be described in this study. Many variables are present in the environment that will impact the child's development other than the monitored infant (i.e., divorce, poverty). However, the maternal perception of the effect of the monitor on the young sibling is the focus of this retrospective descriptive study. Furthermore, a knowledge of perceptual theory is important for nurses to possess in order to assist the client in the identification and achievement of health-related goals (King, 1981).

Siblings are the forgotten ones, yet they are a vital part of the family system that nursing purports to address. It is evident in the nursing literature that nursing practice has not yet begun to include the sibling (DiMaggio & Sheetz, 1983; Duncan & Webb, 1983;). The importance and impact of the sibling bond--as well as sibling reactions and roles in wellness, in situational and developmental crises, and in acute and chronic illness--requires much more study and research. Only through this new knowledge of the effect of crises and illness on sibling developmental patterns, will the nurse be able to use this knowledge to develop practice techniques. Not until nursing care encompasses the sibling, assisting siblings as well as parents to cope with the crises of family illness, will the words "family-centered care" have true meaning, as the nurse responds to assist the total family unit toward optimal health.

Statement of the Problem

The goal of this study is to examine the relationship of the home-monitored infant to the psychosocial and cognitive development of the sibling(s) (age 2 to 5 years) as perceived by the mother. The results of this study will assist in answering the following research questions:

1. According to maternal perceptions, how is psychosocial development of the sibling affected by the monitored infant as measured by sibling interaction, regressive behavior, aggressive behavior, and anxiety-stranger and separation?

2. According to maternal perceptions, how is cognitive development affected by the monitored infant as measured by explorative behaviors, memory, and language development, and fantasy/imagination?

Definition of Concepts

The following definitions of concepts will be used in this study:

Maternal is defined as the biological mother of the infant or the mother who has legally adopted the infant.

Maternal Perception is defined as the mother of the infant and sibling and her representation of reality (King, 1981). Perception is a process of organizing, interpreting, and transforming sensory data and memory (King, 1981). Specifically for this study, the term "perception" will encompass the mother's report of sibling behavior issues.

Home-Apnea Monitoring will be defined as the use of a respiratory/heart rate monitor for 24-hour home surveillance of an infant who has experienced or is at risk for prolonged apnea and/or bradycardia.

Apnea-Monitored Infant will be defined as an infant between newborn and one year of age who is being monitored at home for life-threatening apnea and/or bradycardia, and was placed on the home monitor between newborn and six months of age.

Toddler-Preschooler Sibling will be defined as the brother or sister between the ages of two and five years who lives in the home with the monitored infant.

Development Issues will be defined as those psychosocial and cognitive developmental tasks that are characteristic of the toddler-preschooler stage of the life cycle. These developmental tasks can also occur in the development sequence in children who do not necessarily have any identified stressors such as an ill sibling or family stress. The issues identified in the maternal survey will include specific areas of psychosocial and cognitive development.

Psychosocial Development is defined as the process of socialization and development of self-concept. The psychosocial area of development involves both the affective and the social domain. The affective domain encompasses the emotional aspect of self, which includes feeling, desire, values, motivation, aspiration, frustration, and identification (Schuster, 1980). The child's internal response to the external environment is the major focus of affective growth. The social arena includes an individual's relationship with family, society, and culture. Communication styles, roles, coping behaviors, and interactional patterns are behaviors included in the social aspect. In summary, the socialization of a child is concerned with the individual's overt response to the environment, including interpersonal relationships (Schuster, 1980). The subconcepts to be measured in the psychosocial area will be defined as follows in this study:

Sibling Interactions will be defined as those communication patterns used by the sibling to relate to the parents, other siblings, and the monitored infant. Communi-

cation within the family is a key element in the fulfillment of family goals, as well as a critical vehicle in binding the subsystems together to form a cohesive whole (Friedman, 1981). The family communication patterns within the system have a major effect, not only on the family, but on the individual members as well. Sibling interaction patterns comprise the ongoing communication methods which are used by the sibling. These patterns serve to influence the family members and produce the meaning to transactions between the family members. The researcher will report changes in sibling interactional patterns with the family members during the monitor period as reported by the mother.

Regressive Behaviors will be defined as those behaviors which indicate retreatment to a less mature state associated with an earlier developmental stage (Barker, Dembo, Lewin, 1976). Young children under stressful conditions often experience highly disorganized states, in that they lack retreat positions when a dominant behavior pattern is disrupted (Garmezy & Rutter, 1983). Adults experience an advantage from the progressive increase in the complexities of their bio-psychosocial and cognitive organization. Adults have more complex levels of organization to fall back on when under stress. By contrast, young children have fewer options that will serve to maintain an organized behavioral state because their current levels of organization are built upon a weaker and less complex developmental structure (Garmezy & Rutter, 1983).

The areas addressed in this study will be those most commonly observed by mothers of their two-to-five-year-old child in response to the monitored infant. The areas where regression is most apt to occur include sleeping, eating, toileting, rituals, and other self-care skill behaviors.

Aggressive Behaviors will be defined as those behaviors in which a kind of energy is built up within each person that must be periodically discharged (Montagu, 1976). The actual discharge of this built-up energy is the active behavior that will be measured as perceived by the mother. This may include forceful, attacking behavior either constructively as being self-assertive and protective, or destructively as being hostile to others and to oneself. Learning how to handle frustration and aggression is one of the most crucial tasks of the toddler-preschooler during this time of development. Aggressive impulses may occur as the child experiences some feeling of being thwarted. The toddler may become physically aggressive, frequently striking out at an adult or other object seen as the source of frustration. Temper tantrums also are a toddler's method of dealing with frustrating circumstances and can occur frequently in the toddler age group. Verbal aggression becomes more prominent in the preschool years as physical aggression decreases.

When the child learns to control frustration through alternative strategies, eventually the development of internally moderated, mutually cooperative behaviors will occur with other persons. The effect of the home-monitored

infant on aggressive behaviors of the two-to-five-year-old sibling as perceived by the mother will be a part of the present study.

Anxiety--Stranger and Separation. Stranger anxiety is defined as the tension felt by a young child when introduced to an unfamiliar person (Searles & Ashburn, 1980). Separation anxiety is defined as the fear experienced by a young child when he/she is removed from a familiar person, object, or environment (Bowlby, 1973). Since the child may display the same behaviors (i.e., screaming, withdrawing, and being uncooperative) when displaying either form of anxiety, it is important to differentiate between these two forms. Stranger anxiety begins in midinfancy (5-6 months), peaks in late infancy and the early toddler years (12-18 months), and gradually decreases. Because many infants begin to exhibit negative responses to strangers several months after specific attachments have occurred, it is thought that the infant may no longer be able to predict the stranger's response as he/she is able to do with the attachment figure.

Separation anxiety appears to peak when the child is beginning to feel secure in the ability to predict events (8-10 months) and again when the ability to control some events is realized. It is impossible for a child to predict events when removed from familiar persons or surroundings (Bowlby, 1973). Children's reaction to a threatened or a real separation depends on their age, stage of developmental functioning, and quality of attachment. Events that separate

young children from family members can create anger at being abandoned and fear that loved ones will not return (Brenner, 1984).

Children seem to experience psychological separation more deeply than they do physical distance from parents; however, every separation brings with it some form of change, pain, and dislocation (Brenner, 1984). Responses to separation start with some form of protest, which may include anger, anxiety, and denial (Bowlby, 1980). Following this response is a period of despair, sadness, withdrawal, and depression (Bowlby, 1980). Once the child reaches three to four years of age, a mental representation of the loved one can be maintained, allowing the child to receive partial reinforcement from the mental images of the significant other. An attempt to measure the effect of the home-monitored infant on separation and stranger anxiety as perceived by the mother will also be included in the study.

Cognitive Development is defined as the intellectual processes involved in thinking and memory. Intellect is a composite of skills, behaviors, and adaptive abilities that makes it possible for an individual to adjust to new situations, to think creatively, and to profit from experiences (Pulaski, 1971). Creative activities are involved in the cognitive area as the child forms new combinations of information in order to adapt to novel situations.

Piaget's stages of cognitive development present a theory of evolving changes in children's ability to solve problems (Piaget & Inhelder, 1969). Cognitive development is viewed as a series of qualitative changes in a fixed order, although the timing and overlapping of cognitive growth stages is unique to each child. The stages of development of the child age two to five years will also be discussed later in the text.

The subconcepts to be measured in the cognitive section will be defined as follows:

Exploring Behaviors are defined as those behaviors involved in the act of investigation to acquire knowledge. During the second year, the child becomes capable of incessant exploration of more aspects of the environment. Intense curiosity is one of the hallmarks of the child age two to five years. Over a short period, this age group progresses from a trial-and-error method of object manipulation to a retention of mental images (Piaget & Inhelder, 1969). Young children must manipulate new objects in their search for new information.

Skilled manual and visual exploration becomes increasingly complex with age, but it is those very behaviors that allow learning to take place. It is from these explorations that thoughts arrive which help to form mental images. From these explorations, an ability to problem-solve will emerge (Piaget & Inhelder, 1969). The impact of the current crises of a home-monitored infant on exploring

behaviors in the two-to-five-year-old sibling as perceived by the mother will be included in this investigation.

Memory is defined as the ability to recall previously learned information or past experiences and is intimately related to all cognitive processes (Kail, 1950). Piaget's preoperational stage begins at approximately two years of age with the acquisition of symbolic thought--the use of words and mental images to portray objects, actions, and events that are not present (Furth, 1969). Children begin to imitate, in some detail, objects or events that they have experienced in the past. For Piaget, memory is in the broad sense identical with the organization in any scheme (Furth, 1969).

Piaget considers three levels of memory: (1) Recognitive memory based on perceptual schemes, which belongs to the sensory-motor stage of development; (2) reconstructive memory based on imitation, which belongs to the representational-preoperational stage of development; and (3) evocative memory based on images which correspond to representational, preoperational, and operational levels of cognition (Furth, 1969). Transformations of memory go hand in hand with the acquisition of concrete operations. Environment has a strong influence on the intellectual development of the young child. The effect of the home-monitored infant on memory development of the sibling (age two-to-five years) as perceived by the mother will be explored in this study.

Language Development is defined as the process by which the child develops the ability to communicate thoughts and feelings by verbal sounds. Piaget, who suggests that symbolic life develops through interaction with one's world, believes that this formation of symbols is aided by the use of language. Piaget also proposes that the development of language and thought are parallel and it is not until the individual is seven or eight years old that language and thought become closely interrelated (Piaget & Inhelder, 1977).

During Piaget's preoperational stage, the use of language continues to be egocentric. This is the time when the child is observed to engage in thinking aloud or talking to him/herself. The importance of language development, according to Piaget and Inhelder (1977) is that the child learns to manipulate the symbols to understand the meanings of the objects and events. All four domains--biophysical, cognitive, affective, and social--contribute interdependently to the development of the ability to comprehend and use language (Grim, Goff, & Ashburn, 1980). An attempt to measure the impact of the home-monitored infant on the language acquisition of the two-to-five-year-old sibling as perceived by the mother will also be explored in this study.

Fantasy is defined as the act of imagining; a connected series of mental images, or mental play (Fraiburg, 1959). The preoperational child believes that his/her thoughts, gestures, and noises control the universe. Through the use

of fantasy or mental play, the child adapts to the fears, tensions, and anxieties he/she experiences about self and environment. From the beginning of toddlerhood, the egocentric child believes that his/her magical power of thought is the cause of all events (Schuster & Ashburn, 1980). Sometimes a child believes that his/her wishes actually caused some tragic event (Brenner, 1984).

Daydreaming is a form of mental fantasy and may begin during the preschool years. It can be a positive adaptive response to a stressful experience serving as a retreat or as entertainment to expand and understand one's world. The use of fantasy in the sibling (ages two-to-five years) of the home-monitored infant as perceived by the mother will be explored in this study.

Purpose of Study

Consequences of illness in a family are inevitable regardless of the age of the well sibling or the family structure. Lavigne and Ryan (1979) state that siblings are uprooted and displaced as their ill brother or sister assumes a more dependent role in the family. Siblings will react to crises in the family system and will manifest behaviors that reflect the crises (Lavigne & Ryan, 1979).

The purpose of this study is to describe the impact that the monitored infant has upon cognitive and psychosocial development of young siblings in the family as reported by the mother. An increased understanding of mother's perception of the young sibling's reaction to the home-monitored

infant experience will assist the nurse in the planning and implementation of interventions that will enhance parental coping and sibling developmental progress.

Limitation of Study

A small convenience sample of 22 mothers of home-monitored infants, with young siblings ages two to five years, comprised the study subjects.

In relation to this study, the following limitations have been identified by this researcher:

1. Due to small sample size and the convenience sample used in this study, the findings may not be generalizable to a larger population but only to the group of parents studied.

2. Due to the development of the parent perception tool by the researcher, reliability and validity will not have been established before use of the tool for the sibling study.

3. Maternal perceptions are not a direct measure of sibling development and are, therefore, biased by multiple maternal variables.

4. The researcher will not be assessing the mothers for other major stressors in their lives that may also affect their perceptions of sibling behavior.

5. The mothers who participate in this study may have characteristics that differ from those parents who refuse to participate in the study; therefore, the sample may not be representative of all parents who have experienced infant home monitoring.

6. The developmental level of the siblings will vary greatly depending on the chronological age and the maturational level of the child. Because of these wide variations, siblings between the ages of two and five years will be selected. It is also likely that couples in the childrearing stage will have a greater number of siblings in this age group.

7. The effect of a newborn in the family will also cause behavioral disruption in the siblings. In two studies (Dunn and Kendrick, 1982; Lamb and Sutton-Smith, 1982), there were significant behavioral changes in the toddler age group relative to a newborn arrival. Because of the "newborn effect" in relation to the apnea-monitored infant, the toddler-preschooler reaction to a new sibling may be part of the behavioral change perceived by the mothers.

8. Due to the one-time measurement of maternal perception of their (two-to-five-year-old) child's development during the monitor period, the results of the study will find the families in varying phases of adjustment to the monitor situation. Therefore, a longitudinal depiction of the child's development is not the study focus, but rather the maternal perception of the sibling at the time of data collection.

Assumptions of Study

In this study, the investigator makes the following assumptions:

1. Prolonged apnea will be viewed by the researcher as a chronic disease.

2. Mothers will perceive the home monitor as a stressor.

3. Mothers will be willing to report developmental problems that indicate stress in the sibling subsystem.

4. Mothers will be able to perceive developmental patterns within the family context pertaining to the two-to-five-year-old sibling.

5. The level of sibling cognitive and psychosocial development strongly influences sibling response to the home monitor experience.

Overview of the Chapters

This research study is presented in its entirety in six chapters. In Chapter One, an introduction, statement of the problem, conceptual definitions, purpose and statement of limitations and assumptions of the study are presented. Included in Chapter Two are the concepts and theories of the study which assist in constructing the conceptual framework of the study. Chapter Three includes the review of literature for each concept germane to the research question. In Chapter Four, the research methodology--including the research design, subject selection, procedures, instrumentation, and statistical analysis--is presented. In Chapter Five, the data presentation and analysis is shown. In Chapter Six, the research findings are summarized and

interpreted with the presentation of conclusions, implications, and recommendations for nursing practice.

CHAPTER TWO

Introduction

Maternal perceptions of the impact of the home-monitored infant on the two-to-five-year-old siblings' psychosocial and cognitive development is the focus of this investigation. In Chapter Two the concepts of parental perception, growth and development of the sibling, sleep apnea, and home monitoring will be defined. Secondly, the Modified Family Stress Model (ABCX) (McCubbin & Patterson, 1983) and Martha Rogers' (1981) nursing theory will be used to develop the conceptual framework.

Crucial to the nursing profession is the social network of the family, which forms the basic unit of our society. In order to restore, maintain, and promote health, the family needs to be the primary target for health education. Furthermore, too little research has been devoted to examination of the relationship within the family--its structure and function, and the health and development of its individual members (Friedman, 1981).

It is imperative that the profession identify particular events in health care that can become problematic to the progression of individual and family development so that interventions can be planned to address the specific needs of the families, including the well siblings.

Sibling health is a complex phenomenon, as siblings play a unique role in each other's life. Lamb and Sutton-Smith (1982) state:

> The sibling relationship may be especially important in the life of a child. Thus, any disruption in that relationship (i.e., death, separation) for any reason might have dramatic effects. In any case, it seems clear that siblings may be in many ways special and, therefore, an important focus for future research. (p. 28)

Sibling coping within the family during acute and chronic illness has presently received minimal research attention. Lack of research related to the effect of the apnea monitor on the sibling is just one example of this deficit. It is well known that children vary in their response to stressful events and environmental changes (Shrier, 1984). As the developmental process evolves, it is important to study the responses of siblings within given developmental levels.

Illness is a disruptive factor in the established pattern of a family. According to Griffin (1980), illness represents a change in one part of the family system which is followed by a compensatory change in other parts. This would imply that the life pattern of the parents, as well as the siblings, is affected. Illness is not an isolated occurrance but rather an important event in the interaction between the person and the environment. Each family member will react to illness in a unique way, which will result in the evolution of new patterns--not only for the individual members but for the family as well.

Maternal Perception

King (1981) defines perception as a process of organizing, interpreting, and transforming information from sensory data and memory. Through perception, an individual

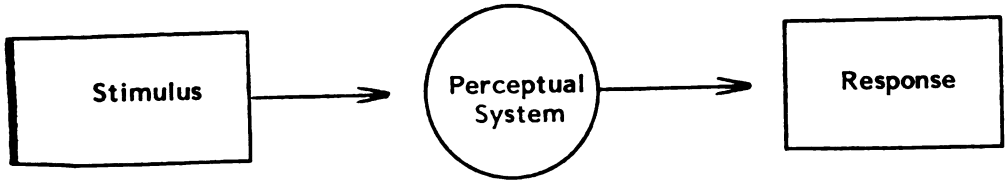
interacts with the environment. Perception gives meaning to one's experience, represents one's image of reality, and influences one's behavior (King, 1981). Individuals will react to events in terms of their perception of them, since perception is a person's portrayal of reality.

Perception can be conceived of as an intervening process between stimuli and response (Garner, Hake, Eriksen, 1974). Stimuli and responses can be directly observed; however, perception can be known only as a concept whose properties are induced from subjectively determined relations between stimuli and responses (Garner et al, 1974). (See Figure 1.)

The concept of perception according to King (1981) has several characteristics. The first characteristic is that perception is universal in that all persons perceive other individuals and objects in the environment. These experiences provide information about the world; however, the unique person with similar senses may observe the same event but perceive it differently (King, 1981). The maternal perceptions concerning the two to five year old sibling of the home-monitored infant will be the focus of the study.

The second characteristic identified by King (1981) is that perception is subjective, personal and selective for each unique person; therefore, one cannot assume that each person will perceive an event in the same manner. Experiences vary in each person relative to spatial-temporal relationships, the integrity of the nervous system, the level of development, and the context in which the perceptions are

Figure 1. Concept of Perception
(Garner, Hake, Erikson)



experienced (King, 1981). Perception is affected by an individual's life participation including events, interests, needs, goals, values, roles, work, and recreation. All of these serve to formulate one's perceptions. The similarities and differences in the maternal perceptions of a two to five year old sibling of the home-monitored infant will be investigated.

The third characteristic is that perception is action oriented in the present (King, 1981). The sample will be mothers who are currently caring for an infant on a home monitor. Data concerning maternal perceptions of the developmental issues of the two to five year old sibling will be aggregated and compared with the socio-demographic items which define selected characteristics of the sample population.

Ittleson and Cantrell (1954) identify the fourth characteristic of perception as transaction. The identity of the individual will be affected by active participation in events and situations. Each mother who participates in this study will respond from her own position in time and space with her unique combination of experience and needs.

Parenthood is a major phase in the lives of many adults. Parenting requires an intense, vigilant, personal relationship with continuous and complex interactions between parent and child. Parents, as they care for and nurture their offspring, are frequently able to detect growth and change in the child, no matter how subtle it may be. The

role of the parents in caring for an ill child is a major one. Many mothers remain in the home to care for their chronically ill child because they cannot find adequate child care, and are often too involved with the care required to be able to work outside the home. The degree and manner of family burden will, of course, depend on the family structure, family resources, and type of illness involved. Social isolation, sleep interruptions for long continuing periods, and physical burdens such as complicated special regimes are all a part of the family changes required (Travis, 1976). Chronic illness creates financial burdens as well, which seem to impact all areas of the budget from nutrition to a need for housing adaptation (Travis, 1976).

Relationships within the marital dyad and the family change with the arrival of an ill child. A recurring distortion of relationships occurs when the mother's nurturing functions are heightened and the father's role minimized (Travis, 1976). This may result in an intense, close relationship between mother and child, with the father feeling left out of the newly formed dyad. The guilt of parents in producing a "defective" child and the over-protection stemming from it are, so often described, as to create a stereotype (Travis, 1976). Ambivalent feelings toward the ill child are frequent. Parents love but also resent the child for the burden imposed on themselves and the rest of the family.

Perception is a very important concept for nurses to develop, as it is the basis for gathering and interpreting information (King, 1981). A nurse caring for children and their families will quickly learn that parents' perception of their offspring is vital. The continuous nature of the parent-child relationship affords longitudinal observations and data that are crucial to the nursing assessment.

Barr (1979) has described three phases that parents experience while adjusting to a home-monitored infant. The first phase, labeled as the initial phase, consists of the first few days through several weeks at home. This initial phase is described as extremely stressful. Parents report being tense, tired, fearful, and depressed, with little energy or patience to deal with siblings. The parents are suddenly placed in a situation of expecting a medical emergency at any time. At this point, they really do not trust the monitor. They are not convinced that a simple nudge could start their baby breathing again, and they have little confidence in their ability to resuscitate the infant.

Furthermore, it is during this time that parents come to realize how restricting the monitor is. The dishwasher or vacuum cannot be operated while the infant is sleeping because it muffles the alarm. Going outside to get the mail or quickly chat with a neighbor, while the baby naps, is not a safe practice. The entire household must be rearranged around the infant. At this point, most parents are nervous

and depressed. They wonder how they are going to get through this period.

During the second phase, called the "adjustment period", the parents begin to learn to live with the device and all its problems. While some parents adjust quickly, others work through the adjustment phase gradually. Parents state that they definitely have problems sleeping at first, but this lessens with time. Two reasons for the lack of sleep are nervousness and fear of not waking when the alarm sounds. In the beginning, the parents would not leave the monitor, but gradually they became more confident that the alarm would be activated if the infant stopped breathing (Barr, 1979). After several weeks, the parents were comfortable being in one room while the infant slept in another; and they no longer found it necessary to check the infant every few minutes. The parents do become more relaxed in this period, but they do not negate the fact that there are still problems (Barr, 1979). Learning to live with the problems is the major aspect of this period--such as a 10-second distance from the alarm, arrangement of home for immediate response, noise control, traveling with family, and mobilizing support systems. Each family had to work out its own solutions to their unique problems (Barr, 1979). Barr (1979) states, "the adjustment period is the time during which parents learn to live with all the problems that seem incredibly huge and unsolvable during the initial phase" (p. 4) Parents have to

come to realize that they are doing all that can be done to assure the safety of their infant.

The third phase, titled the "time thereafter," emerges slowly and unnoticed (Barr, 1979). In this phase the parents have full confidence in the monitor and in their ability to handle an emergency. It is the time during which the parents now believe their infant is going to live. What at first seemed like a great hardship is now a real convenience (Barr, 1979). It is reassuring for them to know that the absence of alarms indicates that the infant is not in any distress. The monitor is viewed as needed security to promote parent rest and to decrease stress and worry.

It is assumed that, just as the monitor experience consumes parental time and energy and impacts the family unit, so will it affect the young siblings in the family. Research that addresses sibling impact during the monitor experience does not exist. One of the mothers quoted in Barr's (1979) monitor guide for parents stated, "My other children drove me crazy, all I could think about was the baby and trying to cope with the others was just too much." (p. 3) The investigators involved in the few studies about the impact of the monitor on parents, (Black et al, 1978; Cain et al, 1980; DeMaggio et al, 1983; Goetz, 1981), mention that sibling studies are needed to address the effect of this stressful period on the young siblings.

It is important for the nurse to gain insight into perceptions of family members. By understanding their

particular frame of reference, we will be able to plan more effective intervention strategies that will be mutually acceptable to both client, family, and nurse (Hymovich, 1979). This study, therefore, will seek to gather information concerning mothers' perceptions of the impact of the monitored infant on their two-to-five-year-old child. The following section will discuss stress in the young child as well as toddler-preschooler development.

Toddler-Preschooler Development

The focus on the family rather than solely on the ill child generates from the belief that the child's illness is a family's illness. The child's disability affects interaction in the entire family (Azarnoff & Hardgrove, 1981). When a child becomes ill, it is natural that family energy is focused on the ill or handicapped member. Health professionals, as well, attend to the needs of the patient, forgetting that the well sibling will also be affected by the stress of this family experience.

Stress is defined by Schneider (1984) as any stimulus requiring an organism to adapt to that stimulus. McCubbin and Patterson (1983) define family stress as a life event or transition impacting upon the family unit which produces, or has the potential of producing, change in the family social system.

Temporary behavioral dysfunction is commonly manifested in the two-to-five-year-old child as a typical coping response to the stresses encountered along the developmental

continuum. Coping encompasses the problem-solving efforts that individuals make when faced with the demands that are relevant to their well-being (Baumann, 1983). Murphy (1962) defines coping strategies as "the child's individual patterning and timing of his resources for dealing with specific problems, needs or challenges." (p. 274) This involves both efforts to manage the environment and the tension aroused by problems, needs or challenges (Murphy, 1962). Encountering some new or not-yet-mastered situation initiates the process of coping (Bauman, 1983). Because each child copes differently with stressful experiences, personalized interventions are necessary. The coping process is seen as consisting of both active efforts and defense methods. Once the child learns methods of coping successfully in certain situations, the child may integrate these solutions in other situations. The child displays variations in coping strategies, depending on the degree of perceived threat of the problem, developmental level, age, previous experience, parental involvement, and the child's unique coping repertoire (Bauman, 1983).

Young children are often unable to verbalize their thoughts and feelings; therefore, certain behavioral observations are essential in assessing a child's reaction to stress. Behavioral patterns may emerge, regress, and/or exaggerate as the child attempts to cope with the stressful environmental events. Any event may be considered disruptive

for the well sibling if it hampers mastery of growth and development skills.

Most children encounter a considerable amount of stress in our complex society. A relatively scarce amount of literature has been concerned directly with children's response to stress (Humphrey, 1985). This degree of research neglect is puzzling in that children are frequently among the most affected victims of a multitude of threatening events (Garmezy, 1983).

One of the many problems of stress in children is that they are not likely to be able to cope with it as adults do. They do not have the readily available options that the adult has. An important home condition that can induce stress in children is the experiencing of stress by the family (Humphrey, 1985). When a child is ill or handicapped, there are major shifts in family routines. Parents have less time for healthy siblings and often expect more independence from them. Youngsters worry that they have caused the illness or will catch it themselves. The healthy sibling often resents the energy and attention that parents afford the ill child. A mixture of jealousy, anger, sadness, and fear is felt when interacting with or thinking of the ill sibling. Children may express their distress through such behaviors as fighting, wetting the bed, being afraid to leave home, experiencing headaches, stomachaches, or depression and doing poorly in school (Humphrey, 1985). When the brother or sister requires frequent hospitalization, the family

separations precipitate feelings of loss and fear of abandonment when any family member is temporarily absent. In many cases, the disabled youngster remains at home and the separation is psychological rather than physical (Humphrey, 1985). Often the healthy sibling feels lonely and isolated from friends who misunderstand their "weird" sibling. Frequently it is the child who is closest in age to the disabled sibling who is most affected by the illness (Travis, 1976).

Common stressors in early development include parental restriction, punishment, prolonged depression, and occasional apathy (Garmezy, 1983). Humphrey (1985) states, that the objective of adults who deal with children under stress should be to reduce stress by making a change in their environment and/or assisting the child to use positive coping measures. An effort to observe, record, and study the reactions of children to stress is indeed a fruitful area for research and one that nursing must address.

What behaviors and responses might be observed in a child from two to five years who is experiencing the traumatic scenario of an infant sibling with an apnea monitor attached? According to Hymovich (1979), the ability of each family member and the family as a unit to cope with the problems of chronic illness is defined as their ability to accomplish the developmental tasks arising at each phase in the life cycle. It seems evident that one must use a developmental framework in the study of sibling impact.

The home and family unit is the main influence for the individual age two to five years. Therefore, any disruption that causes separation and fear or a major change in family operation may cause some degree of anxiety. Some children develop self-protective or compensatory measures to cope with stress. Murphy (1976) studied the self-protective measures that assist the preschool child to cope, namely: The ability to facilitate resilience by timing and rest and the ability to limit excessive stimulation.

Strategic withdrawal is seen as an important resource at a stage when mastery is limited. The child can limit the environmental input by the capacity for speedy orientation, "to use delay for appraisal" and to forestall danger by knowing when to stop (Murphy, 1976). The child develops the ability to select, impose his/her own structure, and to restructure the environment. Children can carry on these operations either self-protectively when coping with vulnerabilities or as a part of a strategy toward positive goals (Murphy, 1976). Due to their limited cognitive resources, young children are quite sensitive to traumatic situations (Pynoos & Spencer ETH, 1985). In the face of fear from external threat, they feel defenseless, being unable to imagine ways to prevent or alter the trauma. More than any other age group, preschoolers can appear withdrawn, subdued, or perhaps mute (Pynoos et al, 1985). These young children commonly engage in reenactments and play involving traumatic themes. Children less than four years of age are notably

dependent on their parents, and they commonly react to crises with anxious attachment behavior (Bowlby, 1980). There may be an intensification of separation and stranger anxiety or a return to a former transitional object. The younger child may become visibly nervous with whining, crying, clinging, and tantrum behavior. Other regressive behaviors may also emerge, such as a partial loss of acquired toilet training, the reappearance of autoerotic activity, and the abandonment of previously learned skills. Considering the number and variety of stressors that children's lives entail, along with the fragility of coping skills and the scarcity of buffering supports, parents, teachers, and health care providers must find methods to assist children to cope with stress.

The toddler years, from ages one to three, are years of rapid change and emerging competencies. The dominant theme of toddlerhood, according to Erikson (1963), is autonomy versus shame and doubt. The child experiences the turbulent struggle of being an independent individual as well as being a dependent one. The enormous task for a child of this age is that of resolving the struggle between being controlled by outsiders and learning controls for him/herself (Brazeton, 1974). Learning to detach from the family and viewing oneself as a separate being is a difficult task, and outer controls are firmly reassuring (Erikson, 1963).

The toddler begins independent exploration with the newfound skills of locomotion such as walking, running, and climbing. Curiosity motivates the child to seek unique ways

to undertake new experiences. Neuromuscular maturation and repetition of movement result in further development of fine motor skills, which allows the child to develop simple self-help skills such as dressing, eating, and toileting.

Rapid advances in language and cognitive development enable the toddler to communicate simple requests and thoughts. The cognitive transition from infant to toddler allows the child the move from a sensori-motor period (birth to two years) into the preconceptual stage (two to four years) of operational thinking (Piaget & Inhelder, 1969). The preconceptual stage precedes the onset of the logical cognitive operations. According to Piaget's (1969) theory, the toddler enjoys the pursuit of new experiences and is able to anticipate the effect of one action on another action. Imitation of family and friends is a common method for learning new behaviors.

Once the toddler can use images and symbols to characterize the thought process, the child enters the phase of preoperational thought (preschool two to seven years). The ability to represent one thing by another increases speed and range in thinking, particularly as language develops. Because language is acquired slowly and does not immediately take the place of action, thinking remains to a considerable degree tied to the child's actions (Piaget & Inhelder, 1969). Piaget states that transducive reasoning in a young child moves from particular to particular without generalization or logical rigor (Piaget & Inhelder, 1969). The preoperational

child remains egocentric and is only able to view a situation from his/her own perspective.

The preschooler period begins at age three and continues to the child's sixth birthday. The child is actively changing in all areas, expanding both within and beyond the confines of the family unit to nursery school, neighbors, and playmates. The central psychosocial theme of the preschooler is one of initiative versus guilt (Erikson, 1963). It is the time of conscience development. The child is eager and able to make things cooperatively, to combine with other children for purposes of constructing and planning (Erikson, 1963), and yet may be rather shy and inept with peers. Communication is more sophisticated and incessant questioning related to "why" demonstrates the intense curiosity and boisterous behaviors of this age. Punishment for wrongdoing is accepted as it relieves the guilt that is present.

Gross and fine motor skills are more sophisticated. The improved control that fosters more independence and a wide radius of self-care activities with less supervision of personal duties required. Periods of rapid fluctuation occur between dependence, independence, competence and ineptitude, maturity and infantilism.

Cognitive development progresses in the preoperational stage with thinking mainly dominated by the use of mental symbols. Thinking can now include events of the past, anticipation of the future and also thoughts of what may be occurring elsewhere (Furth, 1969). This age group finds it

difficult to attend to more than one aspect of a situation at a time. Egocentricity, or the inability to consider the perspective of others, plus the static and irreversible quality of thought, makes the child unable to perceive the process of change.

Object constancy is developed so that this age can accept separation for short periods of time. The toddler-preschooler, because of his/her limited knowledge and experience, ascribes to different levels of animism, or a tendency to believe that inert objects (such as a monitor) possess consciousness and have life and feelings (Furth, 1969). For these siblings, environmental stress can cause disequilibrium. It is hypothesized that many of the stress behaviors seen in the two-to-five year old, such as temper outbursts and nightmares, will increase in frequency during the first six months of the monitor experience. Altered behavior patterns may be perceived and reported by the parents in the psychosocial and cognitive areas including:

Psychosocial Development

Sibling interaction

Regressive behaviors

Aggressive behaviors

Separation and stranger anxiety

Cognitive Development

Exploring behaviors

Memory/Language

Fantasy/imagination

These areas were incorporated in a tool which will assist the researcher to determine the developmental issues perceived by the parents to be prevalent in the sibling (age two to five years) of a home-monitored infant.

Effect of the Newborn on Toddler-Preschooler Sibling

With the birth of a sibling, the world of the first-born child is transformed (Dunn & Kendrick, 1982). The change in the first-born's social world with the addition of a new infant sibling is profound. The child's relationships with parents are altered dramatically, and the first-born is faced with someone who is not only a rival for love and attention, but who is insensitive and nonresponsive to the first-born's needs and wishes (Dunn & Kendrick, 1982). The birth of a new sibling has important significance for both children involved. Adequate sibling attachment occurs sometime during the first year of life, and this relationship is a significant part of the children's growth and development (Bank & Kahn, 1982). The closer siblings are in age, the greater the opportunity for sharing developmental events (Bank & Kahn, 1982).

The term "sibling rivalry" is most popular in the literature and has become synonymous with sibling aggression. Sibling rivalry focuses on the jealousy of older children toward their younger sibling, or vice versa (Felson, 1983). Supposedly, the older sibling resents the younger sibling because the focus of the parents' attention on the younger

deprives the older child of needed attention. Felson's (1983) sibling rivalry model implies that anything that increases jealousy between siblings will result in more aggression. If parents show favoritism toward the younger child, the older child's feelings of jealousy may be enhanced and conflict will arise.

Little is known about children's reaction to sibling birth since there has been little systematic study of changes in behavior following the arrival of a sibling, and little understanding of the importance of such a disturbance (Dunn & Kendrick, 1982). Several investigators have studied the significance of reciprocal interactions among siblings (Abramovitch, Corter, & Peplar, 1980; Dunn & Kendrick, 1980; Lamb, 1978; Samuels, 1980). A few studies concerning the arrival of a new sibling have recently been reported in the literature. Fering, Lewis, and Jaskir (1983) studied the mother/first-born child relationship as it is affected by the birth of another child. Results suggested that children who are less than two years of age when a sibling is born become more dependent and develop less positive social behaviors than do children who are older than two years of age when a sibling is born. Mothers of two children displayed more proximal and distal behaviors and less toy play than did mothers of one child. With the birth of a sibling, Dunn (1980) found that toddlers age children were those most likely to show at least some form of disturbed behavior. Several current studies found that younger children were

those mostly likely to show at least some behavioral disturbance with the birth of a sibling (Feiring et al., 1983; Dunn & Kendrick, 1980, 1982).

In a longitudinal study by Dunn and Kendrick (1982) of first-born children who experienced the arrival of a new sibling, more than 50 percent of 40 two-to-three year olds became more tearful after the birth of a sibling. Twenty-five percent of these children developed sleeping difficulties, and 45 percent developed new toileting problems. Additionally, most first-born children in the sample experienced a decrease in maternal playful attention with the arrival of a sibling. In these families, the first-born was responsible for a greater proportion of the initiations of interactions between mother and child, with the mother initiating fewer times. The mother also evidenced more prohibitions, confrontations, and negative verbal interactions with the first-born child. Dunn and Kendrick (1980) hypothesized that some of the changes in the child's behavior following sibling arrival closely related to changes in the patterns of family interactions. In summary, limited research is present in the literature to develop the concepts of sibling reaction to a newborn or sibling rivalry.

In the next two sections the concepts of sleep apnea and home monitoring will be discussed.

Sleep Apnea

In the intense search for the etiology of sleep apnea, the "near miss" for Sudden Infant Death Syndrome (SIDS)

Infant has been identified. The American Academy of Pediatrics (1978) identifies this vulnerable infant as:

> ...one between two and sixteen weeks of age who has experienced an episode of prolonged apnea, cessation of breathing for twenty seconds or longer or a brief episode associated with bradycardia, cyanosis or pallor (p. 15).

Probably the single most exciting aspect of the last five years in the realm of SIDS is the evolving concept of a subtly handicapped baby (Valdes-Dapena, 1980).

The etiology of prolonged apnea probably represents multiple clinical entities and may include seizure disorders; severe fulminate infections; significant anemia, especially in preterm infants; gastrointestinal reflux; cardiac anomalies; hypocalcemia and other metabolic disorders, as well as impaired respiratory function (Valdes-Dapena, 1980). Despite the above identified diagnoses listed as causes of sleep apnea, there seems to remain a number of infants who for some unknown reason have experienced an inexplicable episode of near-death (Valdes-Dapena, 1980). Little is known about the effects of day-to-day living with the potential death of one's child or new sibling. With the increased use of home monitoring of these infants, research in these areas is crucial.

Home Monitoring

Home monitoring of infants is a relatively new form of treatment that is being used with increasing frequency. Inasmuch as the basic mechanism(s) behind this cause of post-perinatal infant mortality (SIDS) remain unknown, the only

possible preventative measure that can be offered to parents is a monitor that allows the identification of a series of events known to be precursors of death (American Academy of Pediatrics, 1983).

Home monitoring is recommended for four types of infants: (1) The otherwise healthy premature infant whose hospitalization is prolonged because of recurrent apneic and cyanotic episodes; (2) the infant who develops observed apnea or cyanotic episodes; (3) infants with abnormal sleep recordings (pnemograms); and (4) subsequent infants who are siblings of Sudden Infant Death Syndrome (SIDS) infants (Valdes-Dapena, 1980).

A medical decision for 24-hour home surveillance of an infant using a home monitor is a difficult and complex one. When this decision is finalized, an extensive teaching plan is initiated. Nursing has a major role in the teaching of home care management to families of monitored infants. A thorough family assessment must be performed in order to identify parents, caregivers, and support persons who will need to learn to care for the infant. The family teaching may include infant diagnosis, infant cardiopulmonary resuscitation, monitor knowledge, medication administration, care of the monitored infant, emergency plans, and wide use of community resources (Haight, Kelly, & McCabe,1980). By providing this training and support, the nurse makes it possible for the parents to willingly and appropriately assume responsibility for the apneic infant (Duncan & Webb,

1983). The home monitor does not guarantee the infant's survival (Guntheroth, 1982). The literature written on this topic implies that the monitoring of an infant who is at risk for sudden infant death is a crisis of life-threatening proportions. Beckwith (1975) implies that there is reason to be seriously concerned about the adverse effects of monitors on parental behavior and family emotional health. While some families might find that the monitor reduces their level of anxiety, others experience significant heightening of emotional tension when this electric surrogate and ever-present reminder of SIDS is present in the home (Beckwith, 1975). The assumption that the monitored infant creates an acknowledged stressful event is a logical one. The potential for assault to family and sibling integrity is apparent.

Black, Hersher, and Steinschneider (1978) state that prolonged apnea is a chronic if self-limiting condition, and the fear of a child's sudden death has been raised. According to Griffin (1980), chronic illness includes all conditions that require long periods of supervision, observation, or care and depends for maximum recovery on the patient and family. Strauss (1973) has listed some common problems surrounding chronic illnesses, namely (1) preventing and dealing with medical crises as they occur; (2) controlling symptoms; (3) following a medical regime; (4) normalizing interactions with others; (5) arranging payments for treatment; and (6) adjusting to recurrent patterns in the course of illness. These six problems relate

to the family experiencing a monitored infant. The regime of caring for a monitored infant requires a lifestyle change. DiMaggio and Sheetz (1983) reported that the mothers of monitored infants found it difficult to take care of the infant as well as their personal needs and all of their previous tasks. The addition of a new family member is a time of stress, and that stress is even greater when the baby is ill or handicapped. For the mothers in this study, stress was increased by having to respond 24 hours a day to a monitor and knowing that she was responsible for the survival of this child. Emotional tension was the highest-ranking individual concern (DiMaggio & Sheetz, 1983). The mothers found that meeting the demands of other children was especially difficult. Being required to maintain the constant surveillance of their infant, along with the feeling of isolation and decreased time for personal needs, resulted in increased stress and little energy to cope with other children. Further detail concerning the sibling was absent from this study.

Adjusting to the recurrent patterns of illness requires that the parents acknowledge three realities of home monitoring (Duncan & Webb, 1983). The first is that their infant with apnea has a condition that causes the infant to stop breathing. Secondly, they must cope with the operating requirements and limitations of a mechanical device. Finally, they must assume direct and full-time responsibility

for appropriate intervention should their infant stop breathing at home (Duncan & Webb, 1983).

At present, the outcome for an infant with prolonged apnea is uncertain and the handicap undefinable. The surveillance may be indicated for months; therefore, for the purpose of this study, the apnea-monitored infant was viewed as a chronically ill child.

Nursing Theory

The goal of nursing in caring for the family is to assist each member in creative change and steady growth, thus realizing maximum health potential. It is the right of each sibling to be included as a vital family member and a client of the nurse. That right assumes assessment of physical, psychosocial, and cognitive life processes as part of planning and evaluating interventions for parents and siblings. Nursing will then possess a twofold direction, that of the concept of the holistic individual and the inclusion of the holistic family unit.

Martha Rogers' (1981) theory of nursing expresses attributes of the person that constitute assumptions upon which nursing science builds its foundation. Fundamental to Rogers' model are five basic assumptions about the individual.

The first assumption is that a person is a unified whole possessing an individual integrity and manifesting characteristics that are more than, and different from, the sum of its parts (Rogers, 1981). A child is sometimes viewed

as a small-size adult instead of the complex, changing, shifting, integrating person that vibrantly exists during the childhood years. The "parts" of the child are not stagnant, and energies are directed toward making new "parts" and fitting together and readjusting new "wholes" in each stage of development. This dynamic individual creates new challenges for nursing that require reassessment, flexibility, and revision in addressing the health care needs of the child client.

The second assumption in Rogers' (1981) framework is that there exists a continuous interchange of matter and energy between the individual and the environment. Rogers' (1981) theory is characterized by Riehl and Roy (1980) as a "systems theory" which possesses characteristics of unit boundary, stress and tension, equilibrium and feedback. Portrayed as an open dynamic system, Rogers' (1981) main theme is one of the individual's interaction with the environment. The sibling can be viewed as a unique interactive human being, capable of receiving and transmitting interactions with the environment, the parent, the baby, and the health care provider. These interactions impact and alter the family and the environment as well.

That the general life process of human beings evolves irreversibly and unidirectionally along the space/time continuum is the third assumption of Rogers' (1981) framework. The infant and child progress rapidly along this space/time continuum. In just nine months, the single-cell-

fertilized ovum is transformed into a complex system of approximately 15 trillion cells, possessing a synchrony of function capable of sustaining life outside of the uterus (Schuster, 1980). As the infant makes the transition into the world, the process of human growth and development moves at swift tempo along the time axis. A multitude of new patterns and change await the child as he/she relates constantly through an intense and mutual interaction with the environment. The slinky spirals that depict the rhythmical nature of Rogers' (1981) life processes might be viewed in infancy through adolescence as moving at a greater speed and velocity through time with a shorter distance between spirals, indicating a highly charged energy field. The timeliness of nursing interventions will take on new meaning as nursing attempts to address the needs of the rapidly changing child. Just as the child grows and moves into adulthood through a multitude of environmental interactions, so does the family unit. The young childbearing family is a dynamic entity, ever changing and growing (Friedman, 1981). These individuals who come together as a family are organized into a single unit so as to attain family goals and tasks, moving through time in order to address the ever-changing individual and family needs. Material, energy, and information are exchanged with the environment. (See Figure 2.)

The fourth assumption present in Rogers' (1981) theory states that pattern and organization identify people and reflect their innovative wholeness. The child truly reflects

Figure 2. Rogers' (1981) Life Processes

Infant-Toddler-Preschool-School Age-Adolescent-Adult

Child Bearing and Child Rearing Family

his wholeness as he/she relates to the environment. One only has to observe a child's wonder at a budding flower or become proudly excited about the self-built tower of blocks to sense the total involvement that reflects the awesome energy of life. Rogers' (1981) fourth assumption can be easily applied to the family as well--a goal-directed system consisting of interdependent and interacting parts which endure and change over a period of time. The interrelationships which are present in the family units are so intricately tied together that a change in any one part inevitably results in a change in the entire system (Friedman, 1981). The subsystems within the family become the basis for the family structure and organization (Friedman, 1981). Friedman (1981) states:

> One of the important properties of the family as an open system is called nonsumativity, which means that the family cannot be considered merely as the sum of its parts, but that a system is greater than and different from the sum of its parts. (p. 75)

The unique and innovative wholeness of the family unit certainly speaks to Rogers' (1981) theory of nursing.

In the fifth assumption of Rogers' (1981) framework, an individual is characterized by the capacity for abstraction and imagery, language and thought, sensation and emotion. This fifth assumption supports the evolving aspect of cognitive growth. Furth (1969) in a discussion of Piaget's Theory of Intelligence states, "Human adult intelligence is the terminal stage of an evolutionary and development process that is inherent in the self-regulation of an equilibrated organism" (p. 18). The individual must proceed through the

successful accomplishment of cognitive growth periods using his/her capability in order to develop the ability for abstraction, imagery, language, and thought. To apply this assumption in a broad sense will permit its application to the entire age continuum from the growing child to the elderly individual. The role of the family in the growth and development of its individual family members is one of major importance, as the family is a nurturing center for its members. The parents must now differentiate themselves to perform mutual support and child-rearing functions (Friedman, 1981).

The key concepts in Rogers' (1981) framework center on wholeness, openness, continuity, and dynamic creative change. Using the above assumptions, the purpose of nursing is to promote symphonic interaction between human beings and their environment, to strengthen the coherence and integrity of the human field and to direct and redirect patterning of the human environment field for realization of maximum health potential (Rogers, 1981). The nursing profession must gain more knowledge of the siblings in the family in order to assist the sibling to adapt to and cope with environmental stress and change.

Murray and Zentner (1975) define health as a purposeful adaptive response--physically, mentally, emotionally, and socially--to internal and external stimuli in order to maintain stability and comfort. Health is seen as a complex

dynamic fluctuating state that can be visualized on a health/illness continuum.

The latter part of the above definition may be revised in light of Rogers' (1981) principle of helicy that assumes man-environment interactions are directed toward achieving new dimensions of complexity. They are not directed toward achieving homeostasis or equilibrium, as the life process is continuously innovative and requires, for its understanding, a concept of man evolving (Rogers, 1981).

Thus, a revised definition of health may be stated as: Health is an optimal adaptive response of the holistic person (biopsychosocial, cognitive, and spiritual) to the internal and external environment in order that an individual may continually evolve, change, and grow. The health of the individual must indeed be a priority for nursing in order to promote total family health. By assisting the family members to evolve, change, and grow in response to the environmental changes, nursing will truly have accomplished its mission of individual and family health. The unifying principle and hypothetical generalizations basic to nursing seek to describe, explain, and predict the phenomenon central to nursing's purpose--human beings (Rogers, 1981). Mothers' perceptions of their young children was described in this study.

Conceptual Model

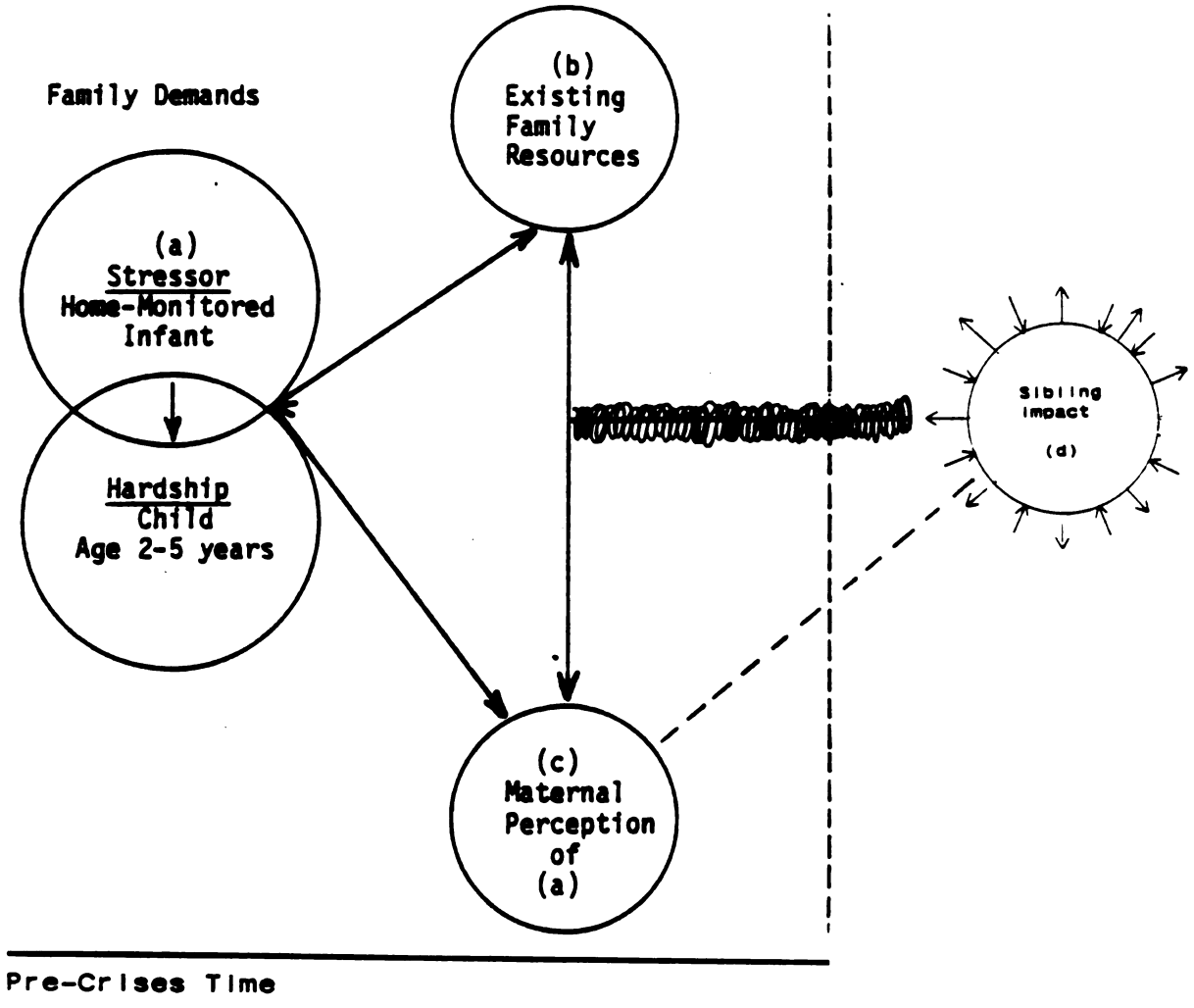
The conceptual scheme portrays the effect of the apnea-monitored infant on the toddler-preschooler sibling and the

impact of this event on growth and developmental processes as perceived by the mothers.

A modification of the Double ABCX Model of Adjustment and Adaptation (McCubbin & Patterson, 1983) and M. Rogers' nursing theory will be used to illustrate those concepts previously discussed. (See Figure 3.)

The family demands, stressors and hardships (a factor) will include the home-monitored infant (stressor) and the two-to-five-year-old sibling (hardship). Stressor, as defined by McCubbin and Patterson (1983) is a life event or transition impacting upon the family unit which produces, or has the potential of producing change in the family social system. Furthermore, family hardships are defined as "those demands on the family unit specifically associated with the stressor event" (McCubbin & Patterson, 1983, p. 8). Both the stressor and hardships place demands on the family system which require management. Family capabilities is the (b) factor; the family's resources for meeting the demands of the stressor and hardships (McCubbin & Patterson, 1983). This factor is the family's ability to prevent an event from creating a crisis in the system. The family's positive adaptation will depend on its ability to meet obstacles and change its course of action. The (c) factor in the ABCX will be the mother's perception of the impact of the monitor on her two-to-five-year-old child. The (c) factor is the maternal definition of the sibling adjustment to the home

Figure 3. Modified ABCX Model
(McCubbin & Patterson, 1983)

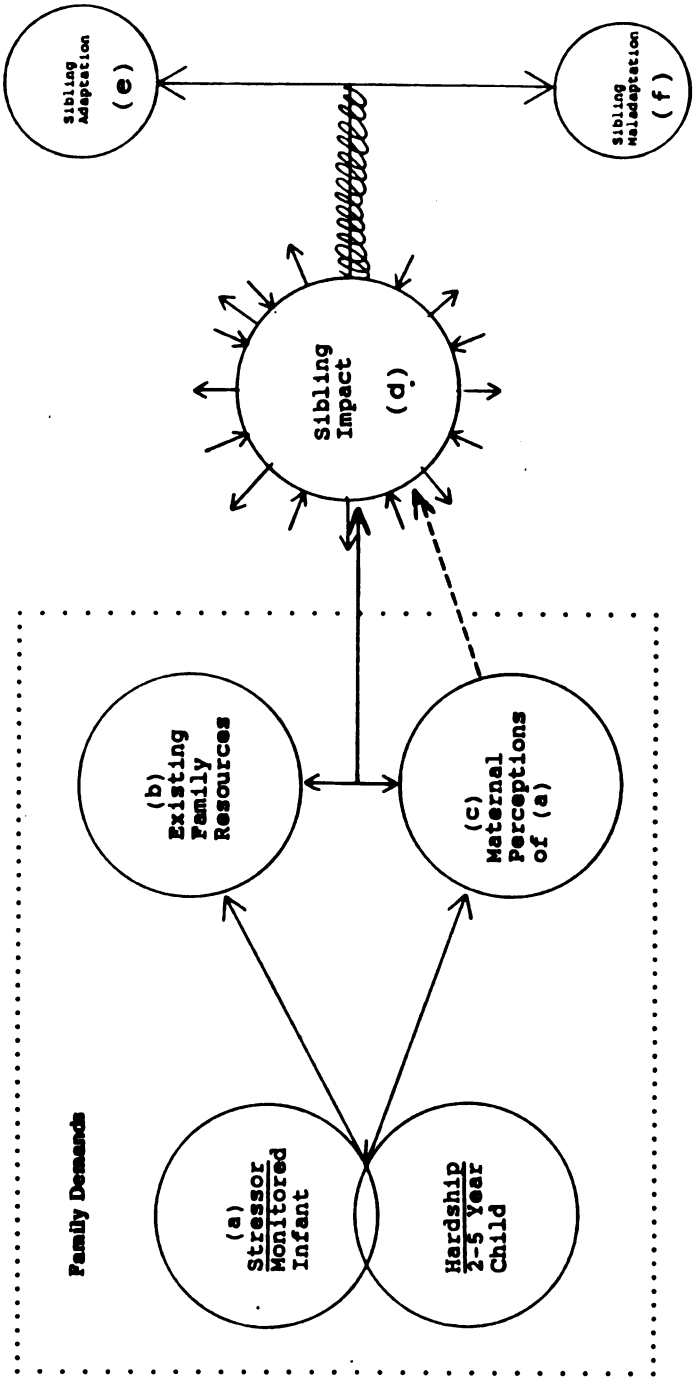


monitor experience. These concepts taken together: (a) the stressor event and hardships; (b) the family's resources; (c) the maternal perception of this situation; and (d) the resulting sibling impact are the basic concepts of this study, which will assist in laying the groundwork for nursing to intervene with the mothers of the home-monitored infant in relation to the young sibling.

The complete conceptual model extrapolates the two-to-five-year-old sibling from the modified family stress model and focuses on the impact of the stressor on selected developmental events as perceived by the mother. (See Figure 4.) The sibling impact circle (d) symbolizes the concept of a person as a unified whole, who behaves as a totality (Rogers, 1981). The arrows around the sibling impact circle denote the open system which constantly interchanges materials and energy with the environment (Rogers, 1981). The slinky circles that lead from the modified family stress model and also extend to and from the sibling impact circle, represent the evolution of the life process and the dynamic process of patterning, repatterning, organization, and change.

The sibling adaptation circle (e) denotes the child-environment transaction, which requires adaptation and positive change in response to the family stress variables. The sibling maladaptation circle (f) represents the effect of the stressful life events that may become greater than the child's coping abilities (such as competencies and sources of

Figure 4. Conceptual Model for Study Combining McCubbin and Patterson's Modified Family Stress Model and M. Rogers' Nursing Theory



support) leading to a vulnerable child who displays signs of stress. The lines connecting the circles indicate a continuum of adaptation/maladaptation.

This study will assist the nurse to gain insight and knowledge about maternal perceptions of the effect of the home-monitored infant on the two-to-five-year-old sibling. Interventions can then be planned with the family to decrease sibling stress factors present and to promote positive sibling interaction and coping with the new and different environment.

In Chapter Three the related literature is reviewed. Apnea, home management, siblings of chronically ill children, and reaction to sibling birth will be critiqued to form a foundation for this study.

CHAPTER THREE

Review of the Literature

Introduction

The following review of literature will include research specific to the concepts within the research questions.

1. According to maternal perception how is the psychosocial development of the sibling affected by the home-monitored infant as measured by sibling interaction, regressive behavior, aggressive behavior, and separation anxiety both stranger and separation?

2. According to maternal perceptions how is the cognitive development of the two-to-five-year-old sibling affected by the home-monitored infant in the areas of explorative behaviors, memory/language and fantasy/ imagination?

The discussion will be related to a short overview of major research findings regarding Sudden Infant Death Syndrome and infantile apnea. In addition, literature concerning well siblings' adjustment to the chronic illness or handicapping condition of these brothers/sisters as well as the siblings' response to a newborn will be presented.

Sudden Infant Death Syndrome - Infantile Apnea

While the investigation of the relationship between prolonged apnea in infants and SIDS began in the 1970's, uncertainty of this relationship still remains (Barr, 1979). Sudden Infant Death Syndrome (SIDS) is the leading cause of postneonatal infant mortality, accounting for approximately

one-third of all deaths in infants between one week and one year of age (Beckwith, 1975). The literature abounds with speculation and theories about the etiology of SIDS. The cause has not been determined, but current research is directed toward a deficit in the infant's respiratory system (Valdes-Dapena, 1981).

Beckwith (1975), in a synthesis of epidemiologic and pathologic findings, discusses the eligibility factors of SIDS. Age and sleep were the two constant features of the syndrome. More than 90 percent of SIDS deaths occur between midnight and 8:00 a.m., predominately in the two-to-four-month age group. Beckwith (1975) explained that death is silent and rapid with minimal pathologic factors, which suggest (1) an agonal episode of motor activity and (2) an accompanying elevated intrathoracic negative pressure. Contingency factors of SIDS include minor infections, prematurity, low socio-economic status and polygenic genetic factors. All of these may play a role in altering the infant risk for Sudden Infant Death Syndrome.

Beckwith (1975) discussed SIDS as representing a "final common pathway" in which similar agonal mechanisms are shared by the vast majority of cases. Tonkin (1975) postulated that the airway of an infant with SIDS may be anatomically vulnerable at the oropharyngeal level between the soft palate and base of the skull, resulting in airway occlusion and cardiac arrest, following periods of partial or complete oxygen deprivation.

Brady, Ariagno, Watts, Goldman, and Dumpit (1978) conducted a study to address the safety of preterm infants in relation to airplane travel. Sixteen infants, age two weeks to six months, were subjected to a mild (17 percent oxygen) induced hypoxia. Eight of these infants had a history of recurrent apneic spells (five of these had been "near-misses"), and eight infants were preterm infants. There were no changes observed in the control group; however, in the apneic group, the authors observed an increase in periodic breathing as well as total duration of respiratory pauses. These authors concluded that infants prone to apnea may have unique respiratory responses to a mild induced oxygen deficit. These results lend support to the hypothesis that some cases of SIDS may be related to abnormal ventilatory responses to oxygen and carbon dioxide, preceded by recurrent hypoxic episodes.

Kelly, Shannon, and O'Connell (1978) assessed ventilatory control during quiet sleep in 11 infants who had required two resuscitations due to prolonged apnea. The authors found that these infants had a deficit in the regulation of alveolar ventilation which results in hypoventilation. Williams, Vaueter, and Reid (1979), who discovered increased muscularity in the pulmonary circulation of fifteen victims of SIDS theorized that some SIDS victims are hypoxemic before death.

Valdes-Dapena (1980) stated that idiopathic protracted apnea during sleep may be part of the pathogenetic mechanism

in some instances of SIDS. She theorized that upper airway obstruction induces the greatest and most dangerous changes. Infant feeding can also produce prolonged apnea and transient airway obstruction (Steinschneider, 1976).

Five apneic infants were investigated by Steinschneider (1972). The findings supported the hypothesis that prolonged apnea is a physiological component of sleep, and the mechanism needs to be identified prior to the final tragic event. Naeye, Ladis, and Drage (1976) conducted a prospective study of 125 SIDS victims. Compared with matched controls, a significant number of future SIDS victims showed evidence of neonatal brain dysfunction, including abnormalities in respiration, feeding, temperature regulation, and neurological tests. A significant number of these babies were mildly underweight for gestational age. Mothers who smoked and had a history of anemia were in greater number in the SIDS infant population.

Summary of Research Studies Related to SIDS

Sleep Apnea. The relationship between SIDS and sleep apnea was not determined in the reviewed literature. The etiology of SIDS is still not known. Seven studies report that age and sleep are two definitive factors that interact with a respiratory deficit, hypoventilation and chronic hypoxia (Beckwith, 1975; Brady, 1978; Guntheroth, 1982; Kelly, 1978; Tonkin, 1975; Valdes-Dapena, 1980; and Williams, 1979). Other predisposing variables include minor infections, low socioeconomic status, smoking mothers, low

birth weight, subsequent SIDS, genetic factors, feeding and temperature regulation (Beckwith, 1975; Naeye, 1976; Valdes-Dapena, 1980). No studies demonstrate a correlation between sleep apnea and SIDS, however. The relationship between the two is implied by several of the studies reviewed.

Apnea Monitor - Home Management. As the causal relationship between SIDS and the "near-miss" infant is implicated, the hypothesis that apnea may be one of the final pathways to Sudden Infant Death Syndrome has received considerable supporting evidence (American Academy of Pediatrics, 1983). The "near-miss" infant is defined as the presumed-to-be-healthy infant who has a life-threatening event (i.e., stopped breathing) reported by the caregiver; the infant's life is saved by a timely intervention that revives the infant (Valdes-Dapena, 1980). Various treatment interventions are being used to help prevent the tragic event of Sudden Infant Death. Home apnea monitoring with resuscitation is one of these interventions.

Kelly et al., (1978) conducted a study to determine if infant mortality could be altered by the identification and treatment of prolonged apnea during sleep at home, by mothers and fathers trained in resuscitation methods. Kelly et al., (1978) trained 84 sets of parents in the identification and treatment of prolonged sleep apnea (i.e., stimulation of the infant). The 84 infants were assigned to three groups as follows: 1. Group I (N = 35) had 17 infants with episodes of sleep apnea requiring resuscitation during home

monitoring. Four of these infants were not successfully resuscitated and died.

2. Group II infants (N = 25) had experienced apnea while awake. Nine of these infants required resuscitation. The study does not report the number of deaths in this infant group.

3. Group III infants (N = 24) were monitored because they had sleep apnea lasting more than 20 seconds; however, none of these infants required resuscitation. None of the infants in Group III expired.

This study suggests that infants who have multiple episodes of prolonged apnea are at risk for life-threatening apnea. The study concluded that the survival rate of infants with the use of home monitoring and parents trained in CPR was 93 percent.

Self-reports of 133 parents (74 families) who had a monitored infant revealed that 71 percent of families reported were highly anxious during the first week of home monitoring (Cain, Kelly & Shannon, 1980). While the majority of the families (73 percent) reported that the monitor made them feel more comfortable and relaxed with their children, there were some negative aspects of home monitoring reported. After the first month of monitoring, 27 percent of the parents continued to describe themselves as highly anxious. Fifty-six percent of the parents reported restrictions in their social life, and 14 percent reported worsening marital relationships. Eleven (approximately 10 percent) parents

stated that the monitor made them more irritable with their other children. The parents' initial anxiety, the fact that some parents continued to feel stressed, and the other problems the parent experienced during the monitoring period underscores the need for an ongoing support system.

A descriptive, retrospective study by Black, Hersher, and Steinschelder (1978) of 50 infants on home apnea monitors found this management approach burdensome for the parents, especially the mothers who found it to be an isolating experience. Approximately 36 percent of the parents report that the monitor negatively affected their lives slightly, while 43 percent were significantly affected. Eighteen percent were drastically affected, and 3 percent reported no effect. Of those families with other children, 60 percent reported that the monitor appeared to have no effect on the siblings. Ten percent of the parents observed some increase in sibling rivalry and also reported that discipline "broke down."

Goetz (1981) conducted a descriptive study of 22 families who had experienced, or were experiencing, a home-monitored infant. The study purpose was to identify the relationship between a family's perceived severity of the infant's condition, threat of loss, impact of monitoring, available support, and family functioning. Several different scales and indices were used to measure the parents' beliefs and perceptions. It was found that a high percentage of caregivers believed their child's condition was serious. The

use of the monitor and the feedback from the monitor (i.e., the number of real alarms) supported the parents' beliefs about the seriousness of the infant's condition. The subjects believed that, overall, home apnea monitoring affected family life only slightly to moderately.

The areas of family life that subjects felt home monitoring affected somewhat, to very much, included: Anxiety (50 percent), level of fatigue (46 percent), social life (46 percent), family finances (32 percent), and family travel (32 percent). Parents (41 percent) stated that home monitoring would affect their views on having more children. No significant relationship was found between the families' perception of the scope of impact and the level of family functioning. Goetz concluded that a home monitor is a stressor and significantly impacts family life; however, most monitoring families use effective coping mechanisms (such as use of support systems) in adapting to the stress after the initial crisis of monitoring. This study had a sample of predominantly middle-class families. The articulation, and measurement of specific coping mechanisms, were not reported by this author.

Through the use of a questionnaire and interviews, Barr (1979) surveyed 15 families. Three phases of adjustment were identified: (1) The initial or breaking-in phase, (2) the adjustment phase, and (3) the "time thereafter" phase.

The initial phase consists of the first few days or weeks at home when the parents are suddenly placed in the

situation of expecting a medical emergency. At this point parents do not trust the monitor; they question whether the baby will start breathing again, or if they are competent enough to resuscitate the infant. During the adjustment period the parents learn how to live with the monitor, seek help from friends and neighbors, and entertain socially. The last phase, called "the time afterward," occurs slow and unnoticed. Parents now trust the monitor and have become confident that the baby will "make it." It appears that the parents have made a successful adjustment when this stage is reached.

DiMaggio and Sheetz (1983) interviewed 19 mothers whose major concerns were the adjustment to a new baby, coping with the demands of other children, emotional tension, lack of time for personal needs, feeling tied down, unavailability of baby-sitters, and lack of time for household tasks. Other concerns were responding to monitor alarms, mouth-to-mouth resuscitation, amount of attention to monitor malfunction, ability to hear the monitor, and other questions about the monitor. Learning to care for, and establishing a relationship with the infant was identified as another major category including growth and development, traveling, feeding, infant appearance, and being a good mother. The mother's physiological restoration was the last major category of concern with specific interest in restoration of figure, fatigue, inability to lose weight, depression, and family planning.

Summary of Literature Related to Home Monitoring

Six studies concerning the apnea monitor were reviewed. One study (Kelly et al., 1978) evaluated the effectiveness of monitoring on infant mortality in sleep apnea. The researchers concluded that infant deaths could be prevented by a home-management program. This study may have influenced the increased use of apnea monitors in home management programs.

Five research studies (Barr, 1979; Black, et al., 1978; Cain, et al., 1980; DiMaggio and Sheetz, 1983; and Goetz, 1981) suggested that the impact of monitors on family life was a stressful event. In particular, Cain et al., (1980) reported high parental anxiety during the first week of the monitoring, as well as restrictions on social life and irritability with their other children.

Three of the studies had subjects who were mainly white, middle-class families (Black, 1978; Cain, 1980; Goetz, 1981). This is not representative of the SIDS infant population. A typical demographic profile of SIDS families proved to be black infants with young, unmarried mothers of low socioeconomic and low educational levels. Unfortunately, both studies by Cain et al., (1980) and Black et al., (1978) were conducted by members of the monitoring program and, therefore, it is difficult to know how many of these replies may have been biased (American Academy of Pediatrics, 1983).

Well Siblings of Chronically Ill Children

Cystic Fibrosis. Many studies of siblings focus on factors of birth order, sex status, and family size, while few look at the impact of illness on the sibling. Gayton, Friedman, Tavormina, and Tucker (1977) conducted an interview and a psychological evaluation of 43 families who had children age five to 18 years with diagnosed cystic fibrosis. The study purposes were to determine: (1) The degree of emotional upset or distress experienced by the child with cystic fibrosis; (2) the relationship between the presence of a child with cystic fibrosis and its effect on parental personality functioning and family interaction; and (3) specific emotional impact of cystic fibrosis on siblings. There were 33 children with cystic fibrosis and 31 well siblings also from five to 18 years. Twenty-nine fathers and 43 mothers were also part of the sample. Data gathering was divided into two main sections. Each member of the family was interviewed via a semistructured schedule. Following the individual interviews, psychological evaluations of the patients, siblings, and parents were conducted.

Parents completed the Family Concept Q Sort (FCQS) and the Minnesota Multiphasic Personality Inventory (MMPI). The FCQS test provides information about family adjustment and family satisfaction. The test results for the parents were analyzed in two ways: First, differences between the parents on the various instruments were examined and, second, in those cases where comparison data were available, the parent

responses were compared with similar data obtained by other researchers from parents who had a cystic fibrosis child.

No significant differences between mothers and fathers were found in their perceived family adjustment or family satisfaction scores. Parents, however, perceived more family satisfaction and adjustment in a hypothetical family situation involving a noncystic fibrosis child than in their own family as it existed. The findings suggested that the impact of cystic fibrosis on family functioning tends to be perceived similarly by both parents.

Findings on the MMPI, indicated that mothers scored significantly higher on the Depression and Introversion scale and significantly lower on the Mania variable than the fathers. Fathers had significantly higher scores on the Lie, Hypochondrias, Hysteric, and Psychopathic Deviate MMPI scales than control parents. Mothers of the cystic fibrosis child scored significantly higher on the Depression and Masculinity-Femininity scales than parents of well children. The scores of 17 parents who had at least one MMPI clinical scale in the abnormal range were closely examined. From this subgroup it was found that 64 percent of these parents had male children and that 78 percent of the fathers who had MMPI scores in the abnormal range also had a male child.

The cystic fibrosis children and the 26 siblings completed the Piers-Harris Self-Concept Scale, Missouri Children's Picture Series, and Holtzman Ink Blot test.

The test results for patients and siblings (five to 15 years) were compared. No significant statistical differences were found between the mean scores of the cystic fibrosis children and their siblings on either the Piers-Harris Self-Concept Scale or the Missouri Children's Picture test. The mean percentile scores in terms of personality functioning on the HIT were well within normal limits for both groups.

The results of this study provide data that suggest that the effect of cystic fibrosis on family interaction occurs primarily in terms of decreased family satisfaction and family adjustment. Both fathers and mothers reported their family would be more what they wanted it to be if the child did not have cystic fibrosis. This study does not support the idea of emotional upset in the child with cystic fibrosis. The profile scores for the children with cystic fibrosis were well within normal limits and did not differ from the profiles obtained from the siblings. Inspection of the individual profiles suggests that the overwhelming majority of children with cystic fibrosis present themselves as psychologically stable. Evidence for psychological problems related to well sibling development was lacking.

Psychological test performance of the siblings was consistent with that of the children with cystic fibrosis and well within normal limits. The average total self-concept score for siblings (63 percent) is higher than the data reported by the Piers-Harris Scale for normal children (56 percent). Gayton et al., (1977) state that, "It is clear

from this study that the conception of chronically ill children as invariably and significantly disturbed and their families handicapped, is not true for cystic fibrosis" (p. 893).

Cancer. Iles (1979) interviewed five healthy school-age siblings (six to 11 years) of children with cancer to obtain their perceptions about family life, the ill sibling, and their experiences. The pervading theme in Iles' study was one of change in the area of interpersonal relationships and the external environment. The siblings perceived a loss of quantity and quality of relationships with parents and the ill sibling, as well as concern about changes in the ill sibling's appearance. The well sibling acquired empathy for parental needs, cognitive understanding, and respect for the ill sibling, as well as an increase in self-concept.

Cairns, Clark, Smith and Lansky (1979) also conducted a study of the impact of childhood cancer on healthy siblings (ages six to 16 years) in 71 families who had a school-age child with cancer. Three psychological tests were administered: The Piers-Harris Self-Concept Scale, the Bine-Anthony Family Relations test, and the Thematic Aperception Test (TAT). The Piers-Harris test was administered to 47 patients and 55 siblings. The siblings scored within normal ranges on the Piers-Harris Self-Concept Scale. The Family Relations test was administered to 36 patients and 31 siblings. Analysis of 14 patient-sibling pairs showed significant differences between the patients and their

siblings on two Family Relations test scores. Siblings perceived mother as overprotective and overindulgent. Marked differences were present between the patient and the sibling groups on the TAT Test in the length of responses and the number of prompting and clarifying questions asked by the examiners during the test session. Seventeen patients and 20 siblings were administered the TAT. The siblings had higher scores than the patient in 12 of the 14 content categories (anxiety, depression, good mood, independence, dependence, hostility, friendliness, negative and positive body image, failure, achievement, social involvement).

The authors (Cairns et al., 1979) reported that siblings of children with cancer had significant anxiety and fear for their own health, and for social isolation. The similarities between the cancer children and their healthy sibling were striking, as both populations had a negative body image and high anxiety scores. Although the healthy siblings did not experience the same body image assaults as the ill siblings, the illness did have a profound effect on them. The well siblings suffered severe anxiety about their <u>own</u> health and felt isolated from parents, other family members, and friends. Parental postponement in attending to the siblings' needs and parental resources directed toward the ill family member were reported. In summary, the siblings in this study revealed anxiety often manifested as the symptoms of headache, abdominal pain, and/or symptoms similar to their ill brother or sister.

Diabetes. Carandang, Folkins, Hines, and Steward (1979) conducted a home study of 36 children (six to 15 years of age) whose sibling had Diabetes to find out the children's understanding of the cause and treatment of their sibling's illness. These children were matched with 36 control children who had healthy siblings. Pretesting was done to determine the children's level of cognitive development, and then interviews were conducted to find out each child's understanding of the cause and treatment of their sibling's illness.

Within each group, 12 children functioned at each of three cognitive levels of Piagetian theory; namely, concrete operational, transitional, and formal operational. The authors hypothesized that children would display differences in their level of understanding of the cause and treatment of their sibling's illness that could be correlated with the different level of cognitive development. There was a significant association between the pretested cognitive level and levels of conceptualization for the cause of illness ($p < .001$). Differences in the levels of illness conceptualization between the children with a diabetic sibling and the healthy matched control group revealed significant values for comparison of conceptualization levels on illness causality and illness treatment (< .001). The study demonstrated that the siblings' ability to conceptualize illness is associated with their level of cognitive development. The researchers found that the living

with a diabetic sibling also influences illness understanding, especially for adolescents who are formal operational thinkers. The authors concluded that the disorganizing effect of stress may prevent a child from applying an advanced pattern of cognitive analysis to a given topic. Long-term stress, such as the stress from chronic illness, may interfere with understanding in a more permanent fashion. The authors speculated that causes of the lower level of cognitive development may be the result of an information deficit, the specific family task orientation, and the mother's coping style.

Crain, Sussman, and Weil (1966) compared the behavior of the diabetic child with a well sibling, and the relationship differences between diabetic child and mother relationship versus the well sibling and mother relationship. Nineteen diabetic children, age range eight to 11 years, comprised the experimental group; the control group consisted of 16 well children the same age who had one or more diabetic sibling(s). In five of the 16 children, the diabetic child and the well sibling were in the same family. During home visits the mother-child dyads were observed as they engaged in task activity. A rating of mother's warmth and control toward the child was observed and documented on the Fels Parent Behavior Rating scale. A parental acceptance scale also measured the mother's acceptance of the child where the mother indicated what changes she would like to see in the child's behavior. The child also completed a self-esteem

measure as well as an instrument that measured the child satisfaction with his/her own behavior. In addition, the child's academic achievement was determined by comparing scores on the California Test of Mental Maturity and the California Achievement Test. Each child variable was then correlated with each maternal variable through the use of the Pearson Product-Moment Correlation Coefficient.

The findings of this study revealed that the diabetic child did not differ significantly from that of the nondiabetic sibling in the areas of academic achievement, self-esteem, satisfaction with behavior, and level of aspiration. The second hypothesis examined the mother-diabetic child relationship and the mother-well child relationships. The findings suggest that the mother's behavior is highly related to the performance of the child who is diabetic. The well sibling did not appear to have the close relationship with his/her mother that characterized the diabetic sibling maternal relationship.

Chronic Illness and Handicapping Conditions. LaVigne and Ryan (1979) studied 203 children ages three to 13 years to examine the psychological adjustment of the siblings of children with handicapping conditions. In addition to the healthy control group (N = 46), siblings from three clinic populations were chosen; namely, hematology (N = 63), cardiology (N = 57), and plastic surgery (N = 37). The parents of the children completed the Louisville Behavior Checklist (LBCL), a standardized 164-item questionnaire and

provided data on demographic and family-related dimensions. The hematology and cardiology sibling groups were used to demonstrate invisible chronic disease not readily observable to the layperson. The combined group was compared to siblings of plastic surgery patients whose medical condition was highly visible.

Several significant findings resulted from this study. With all ages combined, significant sex differences were obtained on the scales of hyperactivity, total aggression and irritability. Males displayed more symptomatic behaviors than females. Additionally, the seven-to-13-year-old male siblings tended to show more behavioral disturbance than the females in the control group. On measures of anxiety-based behavior problems, the siblings in the three combined illness groups were significantly more withdrawn than the healthy controls. The siblings of patients with visible handicaps (plastic surgery) were significantly more withdrawn than siblings of patients with an invisible condition (cardiology and hematology [$p < .01$]). On measures of overall sibling behavioral disorders and psychopathology, the illness and control group differed significantly on the severity level scale of psychopathology among siblings ages three to six years of age ($p < .05$). Also, siblings of plastic surgery patients scored significantly higher on the severity level of psychopathology measures than siblings in the combined cardiology-hematology groups ($p < .01$). In the sibling group, age seven to 13, male siblings tended to show more

likelihood of emotional problems than the females in the control groups, with the greatest difference presented in the hematology group. The irritability scale displayed significant illness group differences with the siblings of the combined patient groups being more irritable than the siblings of the healthy controls ($p < .05$). The siblings in the visible illness group were more irritable than siblings in the two invisible illness groups combined ($p < .01$).

Finally, the results of this study revealed that siblings of chronically ill and handicapped children were more likely to display symptoms of irritability, psychopathology, and social withdrawal. A significant difference in degree of behavioral disturbance was found among younger children, ages three to six years, with siblings of patients undergoing plastic surgery, and male siblings, ages seven to 13 years, of brothers and sisters with blood disorders. No group differences were noted on measures of aggression or learning problems.

A second study focused on the mental health of siblings of congenitally abnormal children (Gath, 1972). The sample consisted of 36 school-age siblings of 22 children with Downs Syndrome and 35 school-age siblings of 21 children with repaired cleft lip/palate deformities. Each of the 71 subjects was individually matched with a control using the following criteria: Same age within six months; sex; family size and ordinal position in the family; type of school; school year; and residential area. The research instruments

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were behavioral scales devised by Rutter for completion by parents and teachers. The parents (N = 71) were interviewed concerning management problems occurring in the previous 12 months in relation to the older siblings. The investigator rated the severity of the management problem concerning the handicapped child in relation to the other children in the family with a three-point scale indicating few/none, moderate, and severe. Parental and teacher behavioral rating revealed no significant difference between the school-age siblings with a Downs Syndrome child and their controls or the school-age siblings of a cleft lip/palate child and their controls group. However, parents of more than half of the Downs Syndrome children reported moderate or severe management problems, while only two of the families with cleft lip/palate children reported moderate difficulties. Little information was given in the article related to the instrument. The "deviant" children were divided into diagnostic categories labeled as neurotic, antisocial, and mixed. The results of this study are questionable due to the small sample size.

Nephrotic Syndrome. Vance, Fazar, Satterwaite, and Piess (1980) studied the parents and siblings of children with Nephrotic Syndrome. The hypothesis that the family members were more likely to develop psychosocial problems than those members of families with healthy children was tested. Seventy-nine siblings (age range four-to-nine years) from 36 families with a Nephrotic patient were compared with

79 control subjects. Family interviews, parent rating scales, and teacher reports were part of the data collection. All children completed a set of Self-Observation Scales (SOS). The scales comprised a series of self-reports about the way children perceive themselves and their relationship to peers, home, teacher, and school. The SOS covers the ages from four to 17 years by using three different standardized forms. Few differences were revealed between the two groups, although parent responses suggest that school performance of siblings of nephrotic children was significantly worse than parent reports of the control children. This finding was also confirmed by teacher ratings, with a higher proportion of nephrotic siblings underachieving (21 percent versus 9 percent), a difference in favor of overachieving was found in the nephrotic sibling group as well (9 percent versus 0). Behavior assessment failed to indicate any major differences in the frequency of abnormal behavioral symptoms. Although not statistically significant, nearly twice as many siblings of those with nephrosis were described by themselves as not having "enough friends" (22 percent) as compared with siblings in the control families (13 percent) (Vance et al., 1980). Siblings in nephrotic families were reported to be more often embarrassed by each other, although the child with the disease was not often mentioned as the cause. Less fighting was noted among the nephrotic siblings compared with the control (52 percent versus
76 percent).

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The results of the psychological testing (SOS) found the scores divided into three age groups: Primary, intermediate, and adolescent age groups with 53 sibling pairs compared--11 from the primary group, 28 from the intermediate group, and 14 in the adolescent group. None of the values of any of the subgroups was more than one SD below the mean. Thus, no clinically important psychological abnormalities were found based on this measure. However, when the T scores were combined for all three groups, the means of two factors--namely self-security and social confidence--were significantly lower in the nephrotic sibling group ($p < .05$). The researchers reported few differences of importance when siblings and parents in nephrotic families are compared with closely matched families without the presence of chronic illness. This study suggests that stress on members of a family where there is a child with Nephrotic Syndrome is generally less than what has been thought in the past. Well siblings of Nephrotic Syndrome children were reported to have poorer school performance, a decrease in sibling fighting, and a decrease in self-security and confidence as compared to the control group.

Summary of Literature Review Related to the Siblings of Chronically Ill Children

The literature on the impact of chronic illness and handicaps on well siblings is inconclusive. Because of the variability of the eight studies reviewed in regard to sample number, instruments used, wide sibling age range, as well as

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the variety of diagnoses used, only a few trends and conclusions can be presented. There are few recent studies on sibling response to chronic illness. Furthermore, only three studies had children five years of age or below in the study sample (Gayton et al., 1977; LaVigne & Ryan, 1979; Vance et al., 1980). Gayton et al., (1977) found no evidence of negative psychological function in the siblings age five to 18 years of age of cystic fibrosis patients. In Iles' (1979) interviews of five school-age siblings of cancer patients, there was evidence of perceived loss of quantity and quality of relationships with family members. Cairns et al., (1979) found that school age siblings of children with cancer had many of the stresses that the child with cancer had, including anxiety and fear for their own health and social isolation.

The research by Carandang et al., (1979) revealed a lower level of cognitive development in the older sibling of diabetic patients. Crain et al., (1966) found no significant differences in psychosocial functioning between diabetic children and nondiabetic siblings. A large study performed by LaVigne and Ryan (1979) found that siblings in the handicapping conditions group were more withdrawn and irritable than the control group. The siblings who lived with brothers and sisters with visible handicaps were even more with drawn and irritable than the sibling with invisible handicaps. Behavioral disorders were significantly more frequent in siblings age three to six years of age for the illness

groups. With the plastic surgery patient, siblings were significantly higher on severity level of psychopathology than the invisible illness group. Gath (1972) also conducted a matched control study of school-age siblings with sisters and brothers with Downs Syndrome or Cleft Lip/Palate deformities. The behavioral ratings revealed no significant differences among the sibling groups. Vance et al., (1980) suggests that siblings (age four to nine years) of children with Nephrotic Syndrome have lower self-security, confidence, and school performance.

The investigations reviewed mainly the school-age child. There is minimal research that addresses the younger sibling (two to five years). It is interesting to note that several of these studies used parent reporting to address behavioral changes in siblings. From the literature reviewed, there appears to be a lack of empirical evidence linking chronic illness to sibling impact. However, several interesting themes have emerged in the analysis of the research:

1. Only three studies include siblings under five years of age.

2. Most of the sibling studies use school-age children.

3. The study results reviewed are inconclusive.

A cumulative structure is lacking related to sibling impact and contradictions in the research remain (McKeever, 1982). The fact that many siblings of chronically ill children do not develop symptoms that require professional intervention may reflect their capacity to function

effectively with stress. Furthermore, most of the subjects in the studies reviewed were middle-class, where support systems are more readily accessible for these siblings.

In summary, it appears that the research designs are inconsistent and deal with a multitude of variables (i.e., age, family structure, and disease status), which makes it difficult to draw a generalization from the reviewed research studies.

Effect of Sibling Birth on First-Born Child

Little is known about children's reaction to sibling birth, even though the topic of sibling rivalry is found frequently in the textbooks, there is little research supporting the theory of sibling jealousy (Ashburn & Shuster, 1980; Brazelton, 1974; Dunn & Kendrick, 1982).

Dunn and Kendrick (1982) conducted one of the few longitudinal studies on how the birth of a sibling affects the first-born child. The sample was comprised of 40 first-born children of working-class British families observed and interviewed at home over a 14-month period. Mother-child dyads were sampled at four intervals: During the last month of pregnancy, during the first month after the birth, when the baby was eight months old, and again at 14 months of age. During each of these periods, two-to-three one-hour visits were made to the home. Mothers were questioned about the children's feeding, sleeping and toilet habits, attention-seeking behavior, independence, dependence, fears, worries, and "miserable moods."

After the birth of the baby, marked changes were reported in the behaviors of the majority of first-born children, particularly in interaction with the mothers. A majority of children (93 percent) had an increase in "naughtiness" and demanding behavior directed toward mother. More than 50 percent also had a reported increase in clinging and tearful behavior after the sibling birth with sleeping problems also increased by 28 percent of the children. Signs of regression were observed by 28 percent of the mothers, which included baby talk, demand to be carried around, and requests to be fed. Over half of the mothers (50 percent) reported an increased independence in their first-born child, in that the child insisted on feeding, dressing, and toileting independently, as well as for solitary play. An increase in child imitative behaviors (75 percent) was reported by the mothers (Dunn & Kendrick, 1982).

Thirty-five measures of maternal and child behavioral changes from pre-sibling birth to post-sibling birth were assessed by the Wilcoxon T Test (Dunn & Kendrick, 1980). Several measures which reflected maternal attention to the child were decreased, such as time spent in joint play; time for which the child was held by mother; maternal affectionate contact; and maternal giving, showing, and pointing out objects, helping the child, or making suggestions--which were features of whatever was the current focus of the first-born. These above measures were all decreased by more than 24 percent of the mean pre-sibling birth observation level.

Analysis of the changes in nine categories of the interaction of verbal exchange showed that there were significant changes in five of these: An increase in frequency of verbal exchange initiated by mother prohibiting the child, and significant decreases in the frequencies of positive interaction initiated by mother, as well as the percentage of verbal interactions started by mother's positive comments.

A correlation matrix was formed using the Spearman Rank Correlation to study measures of mother and child behavior in the pre-sibling period. There were significant positive correlations between measures of maternal showing, highlighting features of whatever was the current focus of the child, and joint play between mother and child. The above measures were negatively correlated with a group of measures reflecting maternal attempts to control the child. The group of measures reflecting "control" was positively related to child behaviors of fussing, wandering, sitting without playing, and to the incidence of the child looking at the mother without the mother looking at the child.

The Spearman Rank Correlations between measures from the post-sibling observations were then examined; the relationship between the same 18 variables studied in the pre-sibling birth observations were analyzed. There were marked changes from the pre-sibling observations in the relationship between some of the measures of child behavior. Among the most pronounced were wandering, sitting, fussing, and verbal demands for objects. In the pre-sibling observation, for

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example, a high frequency of wandering was associated with a low frequency of joint play, a low frequency of maternal showing and suggesting (highlighting), was associated with a high frequency of prohibition and confrontation, and a high frequency of the child looking at mother without a reciprocal gaze. In the post-sibling observation, this correlation pattern had changed. Some of the children with playful and permissive mothers spent a relatively high proportion of their time wandering around aimlessly and sitting without playing.

Most children in the studies experienced a decrease in maternal playful attention with the infant's arrival. This decrease in maternal attention was reflected in the more subtle aspects of sensitivity to the child's interest such as showing and suggesting behaviors, initiation of conversation with verbal games, and suggestions.

A general change in the balance of responsibility for initiation of interactions between mother and child was noted in conversation, in play, and in attention to a common focus. In most families, the first-born child following sibling birth became responsible for a greater proportion of conversation initiation, and the mothers for a correspondingly smaller proportion.

Dunn and Kendrick (1980) state that the change in the relationship links, in an important way, with the individual responses in children's behavior over this period. In summary, Dunn and Kendrick (1980) have reported a decrease in

maternal attention and play, an increase in confrontation, and changes in the balance of responsibilities for initiating interactions with the first-born child following the birth of a sibling.

Feiring, Lewis, and Jasker (1983) conducted a longitudinal study of the effect of a new sibling on mother/first-born child interaction during the first two years of life. Observations were made of mothers and children in a laboratory play setting. The children were 12 and 24 months of age. The study sample consisted of 49 first-born children. At 12 months, none of the children had experienced the birth of a sibling; and at 24 months only nine children acquired a sibling, leaving the remaining 40 children as the only child until 48 months. The methodology of the study required laboratory observation of mother-infant dyads while at play. The dyad was placed in a playroom marked with carpet squares and containing 13 toys, a chair, a table, and a magazine. The dyad was observed and videotaped through a one-way mirror during a 15-minute free play, a three-minute separation of mother and child, and a three-minute reunion period. For analysis of general categories of behavior, mothers' behaviors were grouped as proximal (i.e., touching, kissing, holding, and seeking proximity) and distal behavior (i.e., vocalizing, looking, smiling, giving directions). Infant behaviors were grouped as proximal (i.e., touching, lap seeking, holding, hugging) and distal (i.e., vocalizing, looking, smiling, fretting, and crying).

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Analysis of variance on mean differences at the 12- and 24-month observations was performed, in order to determine if differences existed at each of the age points, as influenced by sibling group and sex. Repeated analysis of variance on child's and mother's behavior measures at 12-to-24 months was conducted in order to examine changes over time. Discriminate analysis was also performed separately on mother's and child's behavior, in order to determine the behaviors that distinguished first-born with sibling (Group A) from first-born without siblings (Group B).

The data suggest that, at two years of age, the children with siblings showed a tendency to increase dependency behavior toward their mothers. First-born children with early acquisition of a sibling (Group A) show a greater increase in seeking help from mother during the period from 12-to-24 months. At 24 months "early first" children show a significant sex difference in help-seeking behaviors, with female siblings seeking the most help from mother as compared to the male sibling. A significant increase in crying behavior is shown in the 24-month age group with a new sibling, with the male sibling group crying the most. In general, the data suggests that the children with a new sibling exhibit a tendency toward dependent behaviors and are more fussy at 24 months of age, especially with close spacing of children. The sex of a child appears to play a role in the early expression of the "dethronement" phenomenon, with the male sibling expressing insecurity through increased

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crying and seeking close proximity to mother; and females are more likely to demonstrate increased help-seeking behaviors.

Results of the discriminate analysis on the social behavior of mothers suggested that mothers as a group behave differently toward their first-born children, depending on whether they had a second child. Mothers with a first-born and an infant were characterized by more proximal and distal behaviors but less toy play. In conclusion, this study must be interpreted with caution due to the small sample of nine 24-month siblings, five males and four females.

Summary of the Literature Review of Effect of Sibling Birth on First-Born Child

The two studies reviewed reveal some common findings. The toddler-preschool first-born sibling displays behavioral disruption with the birth of a new sibling. In the studies reviewed, only the mothers were observed.

Dunn and Kendrick (1980, 1982) found marked changes in the behavior of the first-born child following sibling birth in the areas of demanding behavior directed at mother. Fifty percent of these children displayed an increase in clinging and tearful behavior, regression, sleeping problems, and imitative behaviors. The researchers also found a decrease in maternal attention and play and an increase in confrontation. The balance of responsibility for initiating interactions with the first-born child had changed in that the first-born was initiating more interactions than the maternal parent. Feiring et al., (1983) suggested that

two-year-old first-borns show an increased tendency toward irritability and dependent behavior following sibling birth.

Summary

The review of the existing literature in the areas of apnea, home management, siblings of chronically ill children, and siblings of new-born children reveals a variety of findings and few consistent trends.

1. A correlation between sleep apnea and SIDS has not been proven.

2. One study concluded that infant deaths could be prevented with the use of home apnea monitoring and parents trained in CPR.

3. Five studies identified the monitor as a stressful event for the family including parental anxiety and restrictions on social life.

4. Only three studies of sibling response to chronic illness included siblings under five years of age. School age children were the most frequent age group studied.

5. Due to the variety of methods of data collection, the wide age range, and the instruments used it was impossible to draw conclusions relative to study outcomes concerning the impact of chronic illness on the well sibling.

6. The toddler-preschool firstborn displays behavioral disruption in the areas of demanding behavior, clinging behavior, regression, sleeping, and initiative behaviors following the birth of an infant sibling.

The multitude of variables in the reviewed research concerning sibling responses to illness made objective study results hard to compare and consistent patterns difficult to identify. Additionally, the younger child is more problematic to study although it is evident that the younger sibling is affected by the family crises. Many of the studies reviewed used parent perception tools to gather young sibling data. This method in itself has many pitfalls as described in Chapter One. Chapter Four will describe the research methodology and procedures used in this study.

CHAPTER FOUR

Overview

An increased number of infants are being monitored in the home for apnea with the parent(s) as caregiver(s). Several authors have researched the impact of the monitor on these parents (Black et al, 1978; Cain et al, 1980; DiMaggio et al, 1983; Goetz, 1981). However, studies that address impact on siblings during the infant monitor experience are not present in the literature.

This research study was designed to describe how siblings (age two-to-five years) of home-monitored infants are affected in certain areas of psychosocial and cognitive development as perceived by the mother. Sibling interaction, regression, aggression, and anxiety (both of stranger and of separation) are dimensions included in the variables of psychosocial development that have been addressed in this study. The dimensions of cognitive development include exploratory behaviors, memory/language, and fantasy/ imagination. An instrument, the Sibling Developmental Issues Tool, has been developed by the author to measure these dimensions of cognitive and psychosocial development.

In this chapter the research methods and the procedures to protect human rights are described. In particular, the discussion of research methods addresses the definition of variables, the sample selection, and the data collection procedures. The instrument and scoring information, as well

as the statistical analysis to be performed on the data, are also presented.

Research Design

The research methods used parent-report survey tools. The statistical analysis included both inferential and descriptive statistics. The mother of the monitored infant with a sibling age two-to-five years living in the home was asked to complete a questionnaire containing socio-demographic data and the Sibling Developmental Issues Tool (see Appendix C). Demographic variables used to describe general characteristics of the sample--specifically characteristics of the mother, the family, the monitored infant, and the two-to-five-year-old sibling. The Sibling Developmental Issues Tool was used to identify the mother's perception of behavior changes in the two-to-five-year-old sibling during the monitored period. The subjects in this study sample participated voluntarily.

Sample

A convenience sample of 22 mothers contained all the subjects for this study and was selected from several sources. Two sites included the Apnea Support Groups of the Hillsdale and Kalamazoo areas. Families who completed the home-monitor programs were referred, with their permission, to the community Apnea Support Groups. The purpose of the support group is to provide information and support to families who are caring for their infants on home monitors.

There were also five local monitor companies that assisted in sample selection. Each family who has a monitored infant is assigned a staff member employed by one of the five main monitor companies that serve the Southwestern Michigan area; namely, Foster, Glassrock, Plaza Supply, Allegan Home Health Services, and Care-Tech. These providers maintain the mechanical functioning of the monitor and assist the families with problems related to monitor care. Finally, the new SIDS Research Center at Bronson Methodist Hospital was opened in the fall of 1986. In January of 1987, the Bronson Hospital Research Committee approved the use of the SIDS Center as a data collection site (see Appendix A). This equals a total of eight sites.

Subjects were selected for inclusion in the study according to the following criteria:

1. Mother currently caring for a monitored infant whose age does not exceed 12 months of age.

2. Infant is the first child in the family to be on a home monitor.

3. Infant has a sibling in the age range of two to five years living in the home.

4. Mother will select only <u>one</u> child in the two-to-five year-old age range for whom the questionnaire will be completed.

Operational Definition of Variables

The variables under consideration for this study measured the impact of the infant monitor experience on

psychosocial and cognitive development of the two-to-five-year-old sibling as perceived by the mother.

The operational definitions of the above variables are presented as follows:

1. Psychosocial development was operationalized and presumed to consist of four dimensions; namely, sibling interaction, regressive behavior, aggressive behavior, and stranger and separation anxiety.

2. Cognitive development was also presumed to consist of three dimensions of exploratory behavior, memory/language, and fantasy/imagination.

The variables that were hypothesized to measure the selected psychosocial and cognitive dimensions were defined in terms of the mother's responses to the 69 items on the Sibling Developmental Issues Tool (SDIT) (see Appendix D). Each item listed a statement about a particular behavior. Respondents were asked to indicate on a five-point Likert type scale whether the behavior or activity occurred (1) much less than before, (2) slightly less than before the infant/monitor, (3) same as before infant/monitor, (4) slightly more than before infant/monitor, and (5) much more than before infant/monitor. Behaviors that were not observed by the mother were indicated in the "not applicable" column. The mothers were requested to mark the response that best depicts their perception of each behavior in the two-to-five-year-old child.

Variables Measuring the Dimension of Psychosocial Development

Sibling interaction was defined as communication patterns used by the sibling to relate to parents, infant, and other siblings as perceived by the mother. This concept was operationally defined and presumed to be measured by 11 items on the SDIT (see Appendix D). For example: "Does your child behave in a manner that indicates jealousy of your time with and concern for your infant?"

Regressive behavior was defined as behaviors that indicate retreatment to a less mature state associated with an earlier developmental stage (Barker et al, 1976). This variable is operationally defined and presumed to be measured by eight items on the SDIT (Appendix D). An example could be: "Does your child have daytime toileting accidents?"

Aggressive behavior was defined as complex individual behaviors in which a kind of energy is built up within each person that must be periodically discharged (Montagu, 1976). The discharge of this energy as perceived by the mother was thought to be measured by 13 items on the SDIT (see Appendix D). For example: "Does your child have temper tantrums or anger outbursts?"

Anxiety encompasses two definitions--stranger and separation anxiety. Stranger anxiety is the tension felt by a young child when introduced to an unfamiliar person. Separation anxiety was defined as the fear experienced by a young child when he/she is removed from a familiar person,

subject, or environment (Bowlby, 1973). Eleven items on the SDIT were operationalized and hypothesized to measure anxiety (see Appendix D). For example: "Does your child have difficulty going to sleep at night?"

Variable Measuring Dimensions of Cognitive Variable

Exploratory behavior was defined as behaviors involved in the act of investigation to acquire knowledge, as perceived by the parents. Seven statements on the SDIT were presumed to measure this variable (see Appendix D). For example: "Does your child seem interested in or curious about his/her surroundings?"

The areas of memory and language are intricately related. Memory was defined as the ability to recall previously learned or past experiences and is intimately related to all cognitive processes (Kail, 1950). Language development was defined as the process by which the child develops the ability to communicate thoughts and feelings by verbal sounds.

These concepts of cognitive development were presumed to be operationally defined by 10 items of the SDIT (see Appendix D). Example questions were as follows:

"Does your child speak rapidly and/or stutter?"

"Does your child use words to tell you about objects, actions, or events in the past?"

Fantasy/imagination was defined as a connected series of mental images, or mental play (Fraiberg, 1959). Nine

statements on the SDIT were assumed to measure this concept (see Appendix D). For example: "Does your child have an imaginary playmate?"

In summary the eight dimensions of psychosocial and cognitive development were thought to be represented by seven subscales incorporated in the Sibling Developmental Issues Tool, as explained in this chapter.

Moderating Variables

In order to study the mother's perception of the impact of the monitored infant on sibling (age two to five years) psychosocial and cognitive development, it was necessary to collect data on other variables that may influence the study outcome. Information about the mother and family includes age, sex, ethnic background, marital status, level of education, occupation, family income, and age of children (see Appendix D). Three sections of variables were identified from the socio-demographic questionnaires: (1) Mother and family socio-demographic data, (2) infant monitor data, and (3) child (age two to five years) data.

Variables in this area included:

1. Age of mother responding to questionnaire, as well as birth date and sex of infant and sibling, are measured by six items (numbers 2, 15, 16, 28, and 29) (Appendix C).

2. Ethnic background (item number 3) (Appendix C).

3. Marital status (item number 4) (Appendix C).

4. Educational level, occupation, and income of family members are measured by seven items (numbers 5, 6, 7, 8, 10, 11, and 12) (Appendix C).

5. Family composition is measured by three items (numbers 9, 13, and 14) (Appendix C).

6. Age of infant when placed on monitor and length of monitoring is addressed in two items (number 18 and 19) (Appendix C).

7. Reasons for infant monitoring is addressed in item number 20 (Appendix C).

8. Other infant illnesses including type of illness/congenital problem is addressed in two items (number 21 and 22) (Appendix C).

9. Mother's perception of stress level during the monitor experience consists of one item (number 23) (Appendix C).

10. Mother's involvement in a home-monitoring teaching program is measured by one item (number 24) (Appendix C).

11. Mother's involvement in support group is measured by three items (numbers 25, 26, and 27) (Appendix C).

12. Health problems of the two-to-five-year-old sibling are identified in two items (numbers 30 and 31) (Appendix C).

13. Involvement in sibling preparation classes for new infant is measured in item number 32 (Appendix C).

Having defined and operationalized the variables for this study, protection of human rights are explained.

Protection of Human Rights

The study participant rights were protected during the data collection by following the Michigan State University Committee of Research Involving Human Subjects Protocol. The protocols and criteria for this study were approved by the committee before data collection was initiated. Approval for this research was also obtained from Bronson Methodist Hospital in February of 1987.

Prospective subjects received a brief letter to introduce the study, delineate the purpose, and seek their participation. This letter was given to prospective subjects by the chairpersons of the Apnea Support Groups, the supervisors of the monitor company, and the SIDS Research Center coordinator. This gave the subjects the opportunity to decline contact with the researcher (Appendix B). Those mothers interested in participating in the study mailed a postcard to the researcher. Upon receipt of the postcard, the researcher mailed a packet to the mother which contained a follow-up letter, consent forms, and the questionnaires. Subjects were also assured that their names and responses would remain anonymous and that they were free to terminate their participation in the study at any time. Additional study details and participant rights were included (Appendix B). Two consent forms were enclosed in the packet; one consent form remained with the mother, and the second consent form was signed by the parents before completion of the

questionnaires. A summary of the results was offered to the subjects.

Upon receipt of the returned questionnaires, the researcher separated the identifying data from the questionnaires and used only the coded data for analysis. The researcher also specified that participants' questions would be answered at any time with the researcher's name, address, and phone numbers made accessible to the subjects.

Research Instruments

The Sibling Developmental Issues Tool (SDIT) used in this survey was developed by this researcher. The Personality Inventory for Children (Wirt, Seat, & Broen, 1977) and the Vineland Adaptive Behavior Scale (Sparrow, Balla, & Cicchetti, 1984) were used as guides in developing an instrument which measured the mother's perception of her two-to-five-year-old child's behavior in relation to the monitored infant. The Sibling Developmental Issues Tool (SDIT), a 69-item questionnaire, was developed by the researcher following an extensive literature review of psychosocial and cognitive development of the two-to-five-year-old child.

Each item in the questionnaire, subject to confirmation through a reliability test, described a behavior which addresses the subconcept in question. For each item listed, the mothers were asked to indicate which of the five responses most accurately describes the frequency of the behavior related to the sibling of the monitored infant.

Each of the eight subconcepts were addressed in several question items to promote greater instrument reliability. These items were then randomly ordered. For example, the SDIT measuring the mother's perception of sibling interaction has 11 questions addressing this specific area.

Reliability

Reliability was defined as the degree of consistency and dependability with which an instrument measures the attributes it is designed to measure (Polit & Hungler, 1983). Reliability can be equated with the stability, consistency, or dependability of a measuring tool (Kerlinger, 1974).

Stability refers to consistency of the measures on repeated applications of the instrument. Determination of the stability of a measuring tool is accomplished through a test-retest reliability procedure (Williamson, 1981). The researcher administers the same test to the same sample on two occasions and compares the scores obtained by computing a test-retest reliability coefficient. The test-retest approach to estimating reliability has several disadvantages:

1. An individual in the sample may be influenced by the effect of the first test.

2. The individual may experience a change in attitude, behaviors, or knowledge over time and between the two test administrations.

3. There may be transient personal factors at the times of testing that change the test response (Williamson, 1981).

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In any case, the test-retest stability measure of reliability will not be applied to the SDIT as there are no repeated measurements in this study.

Another interpretation of reliability refers to the consistency of an instrument. An instrument is considered to be internally consistent or homogenous to the extent that all of its subparts measure the same characteristics (Polit & Hungler, 1983). Estimating the internal consistency of the instruments provides the researcher with information concerning the influence of errors due to content sampling (Williamson, 1981). In the theory of measurement error, the primary concern is with item sampling. It is assumed that each person has a hypothetical true score, one that would be obtained if there were no errors of measurement (Nunnally, 1978). The difference between the true score and the obtained score is the result of the many factors that affect this score.

The major source of error within a test is due to the sampling of items; for example, including items in the instrument that are outside the domain of the construct (Nunnelly, 1978). Sampling errors are decreased by increasing the sample size. Consequently, reliability measures will be higher as the number of test items is increased (Nunnelly, 1978).

In this study, the Cronbach Alpha was used to determine the reliability (i.e., the internal consistency) of the SDIT. This statistic provides an average measure inter-item

correlations for all items comprising a scale and represents the best estimate of internal consistency (Williamson, 1981). The coefficient alpha score ranges from 0.00 to 1.00, with the higher score reflecting internal consistency (Borg & Gall, 1979). Reliability coefficient in the area of .70 are considered sufficient for assuming scale consistency.

Equivalence refers to the extent to which different, but parallel, instruments may be applied to the same population at the same time, or by different researchers using the same instrument to measure the same attributes at the same time (Williamson, 1981). The purpose is to determine the equivalence of the instrument(s) in yielding measurements of the same traits in the same subjects.

Under the first condition, the method of reliability discussed is parallel forms. In this method, two forms of the instrument are developed and administered to the same individuals at the same time. Estimates of reliability are determined by comparing the two individual measures using correlational statistics. Measures of equivalence can be determined when comparing the results of different investigators using one instrument to measure the same individuals (Williamson, 1981). This is referred to as inter-rater reliability. An investigator is concerned with inter-rater reliability when the nature of the instrument is such that the observer's influence can contribute to errors of measurement. The parallel form of equivalence will not be computed on the SDIT because of the time element in devising

two test forms and retesting the small sample population. Furthermore, inter-rater reliability is not appropriate for the SDIT.

Validity

The validity of an instrument refers to the degree to which the instrument measures what it is intended to measure (Williamson, 1981). The data provided by an instrument should be relevant to the characteristics being measured. The validity of an instrument can also be defined as the extent to which the differences in the scores reflect true differences among individuals on the characteristics that the researcher seeks to measure (Williamson, 1981).

Instrument validity is extremely difficult to establish, especially in psychologically oriented measures (Polit & Hungler, 1983). Three types of validity and their relevance to the Sibling Developmental Issues Tool will be discussed.

The first type, content validity, is the "representativeness" or sampling adequacy concerning the content of the measuring instrument (Kerlinger, 1973). Content validation is basically judgmental, as each test item must be evaluated for its presumed relevance to the property being measured. This can be accomplished by the use of content experts who will judge the content of each item. The SDIT was submitted for evaluation of content validity, including instrument direction and readability, to a psychologist with expertise in child development. This investigator's thesis committee and three pediatric nurses involved in home apnea monitor

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teaching programs also evaluated the tool. The tool was then revised according to the suggestions of the content experts.

Predictive Validity, the second type of validity, is appropriate when the purpose is to use an instrument to estimate some form of behavior or criterion that is external to the measuring instrument itself (Nunnelly, 1978). After the criterion is obtained, the validity of a predictive function is determined by correlating scores on the predictor test with scores on the criterion variable. The predictive validity of the SDIT will not be measured as the tool's predictive value is not known.

The third type of validity, construct validity, involves the aggregation of empirical evidence to support the inference that a particular measure has meaning (Williamson, 1981). The examination of construct validity--a most difficult task--involved validation of not only the measuring instrument, but of the theory underlying it. The measuring instrument needs to be related to an overall theoretical framework in order to determine whether the instrument is related to the concepts and theoretical assumptions that are employed (Williamson, 1981). There are three major aspects of construct validation:

1. Specifying the domain of observables related to the construct.

2. Determining the extent to which the observables measure the same thing, several different things, or many

different things obtained from empirical research and statistical analyses.

3. Performing studies of individual differences and/or controlled experiments to determine the extent to which the measures of the construct produce results that are predictable from accepted theoretical hypotheses concerning the construct (Nunnally, 1978). The way to test the adequacy of a domain, related to a construct, is to determine how well the observable measures fit together in empirical investigations. One common approach to construct validation is the "known group techniques." In this approach, groups are expected to differ because of differences in characteristic on critical attributes known to be related to the construct. Factor analysis is another technique used in construct validation (Kerlinger, 1973). It is a method of identifying clusters of related variables (Polit & Hungler, 1983). Each cluster, called a factor, represents a unitary attribute. Factor analysis can reduce a larger number of measures to a smaller number by identifying which measures are similar and the relationships between the clusters (Kerlinger, 1973). Tests for construct validity are beyond the scope of this study due to the small population size and the preliminary descriptive nature of this investigation.

Scoring

Scoring procedures for the SDIT are based on a five-choice Likert type scale given to each item. The assignment of a numerical value will occur in ascending order from one

to five, from "much less than before monitor" to "much more than before monitor," with the latter being assigned the score of five. A mean score was calculated for each subject and subsequently reported in Chapter Five. Subjects who had a mean score of 3.0 indicated no change in the frequency of measured behavior since the monitor according to the mother's perception. A mean score from 1.0 to 2.5 indicated a decrease in the frequency of behavior since the monitor according to the mother's perception. A mean score between 3.5 to 5.0 indicated an increase in the frequency of measured behaviors since the home monitor according to the mother's report.

The four subconcepts' mean scores surveyed in the psychosocial area and the three subconcept mean scores of cognitive development were scored separately. In this manner, comparisons will be made between subscale scores to determine specific areas of impact in the sibling population, as perceived by the mother.

Data Collection Procedures

Following permission from the research committee, the researcher contacted the chairperson of the Apnea Support Groups of Hillsdale and Kalamazoo, Michigan, the SIDS Research Center, and five monitor services; namely, Foster, Glassrock, Plaza Supply, Allegan Home Health Services, and Care-Tech to explain the purpose of the study. An abstract of the research proposal, consent forms and questionnaires, were provided for review. The study project was presented to the chairpersons of the two support groups, the SIDS Research

Center coordinator, and five monitor services, in order to seek endorsement by the groups and to seek assistance in the identification of mothers who are currently monitoring infants in the home.

In addition, the researcher provided a letter for distribution at sites to recruit potential subjects. The letter contained a description of the study and also requested parent participation (Appendix B). The chairpersons/supervisors at the sites offered the letter of introduction to those mothers who fulfilled the study criteria. This allowed the client to decline contact with the investigator. A self-addressed and stamped reply postcard was attached to each letter. Parents who met the established criteria indicated their willingness to participate in the study by mailing the postcard to the researcher.

Subjects expressing a willingness to participate, and who met the criteria, were contacted by telephone by the researcher to answer questions and explain the purpose of the study. Furthermore, the content of the questionnaires as well as the time needed to complete the questionnaires and the consent forms was explained to the subjects over the phone. The assurance of confidentiality was emphasized, plus the fact that neither refusal nor agreement to participate would affect present or future health care. A research packet was mailed to those families who were enrolled in the study. The packet contained a cover letter which instructed

the subjects to complete the two questionnaires, as well as the consent forms delineating participant rights (Appendix B). Mothers were instructed to complete the designated consent form and questionnaires and return them to the researcher in a self-addressed, stamped return envelope. A telephone call was made to each participant who failed to return the questionnaires within two weeks, and prompt return of the questionnaires was encouraged. Questions which arose during administration of the tool were answered by the investigator. A code number was assigned to each mother who returned the set of questionnaires. Data from each questionnaire were coded and entered into a data log sheet. The raw data were destroyed after completion of the study. Ongoing contact was main- tained at each site by the investigator to insure continuity of the selection procedure and to provide a channel of communication with the participating sites.

A pretest of the instrument was performed using three parents who have cared for their infant on a monitor with a two-to-five-year-old sibling living in the home. The researcher was unable to use parents for the pilot study who were <u>currently</u> monitoring infants due to the threat of inadequate sample size for the major study. Individuals who participated in the pilot study were questioned concerning their reactions to the instrument and overall impression of the study.

Data Analysis Procedures

The data analysis was designed to answer the original two study questions:

1. According to mother's perception, how is the psychosocial development of the (two-to-five-year-old) sibling affected by the monitored infant in the areas of sibling interaction, regression, aggressive behaviors, and stranger and separation anxiety?

2. According to mother's perception, how is cognitive development of the (two-to-five-year-old) sibling affected by the monitored infant in the areas of explorative behavior, memory/language development, and fantasy/imagination?

To answer the stated research questions, descriptive statistics were computed on the Sibling Developmental Issues Tool outcomes in the following manner:

1. Frequencies were run for the seven subconcept scores of the SDIT. Percentages were used to indicate the proportion of siblings that were perceived to have increased, decreased, or not to have changed certain behaviors.

2. To measure the central tendency of a distribution of scores on a scale, means were calculated for the total psychosocial and cognitive scores as well as the seven subscores. A mean is the point on the score scale that is equal to the sum of the scores, divided by the number of scores (Kerlinger, 1975). In addition, the age groups were divided in half at the median point. The median is a point on a numerical scale above which and below which 50% of the

cases fall. The median division enabled the researcher to compare the younger to the older sibling scores.

3. The variability of the scores was measured by standard deviation. The concept of variability describes how data depart from their centrality (Williamson, 1981). The Standard Deviation (SD) is a measure of how much the values deviate from the mean. More precisely, it is defined as the square root of the difference of each value from the mean. The standard deviation statistic describes an important characteristic of a distribution and can be used to interpret the cognitive and psychosocial scores.

4. Finally, Pearson product moment correlations were computed between the subscale scores of the SDIT, using the .05 level of statistical significance (Williamson, 1981).

These correlations were used to evaluate the relationship among the subscale scores of the SDIT. The r is a numerical index that expresses the direction and magnitude of a linear relationship. The value ranges from a -1.00 to +1.00. All values that fall between the -1.00 and 0.00 represent a negative relationship, and values computed between 0.00 and +1.00 represent positive relationship.

The data analysis also covered additional questions addressed in the study. They included:

1. How does the level of mother's stress affect her perception of sibling impact?

2. Is there a difference in the younger versus the older sibling in degree of impact as perceived by mother?

3. Does the length of time on the monitor affect the sibling scores as perceived by mother?

4. Does attendance in support group affect sibling scores as perceived by mother?

Again, the Pearson Product Moment Correlation was employed to address the relationship between the SDIT subscale scores and mother's reported stress, as well as length of time on the monitor. To explore the impact of the (nominal variable) support group attendance and the (grouped variable) sibling age, a one-way analysis of variance was employed to see if the means on the subscale differed between groups. This statistic describes the variability between and within these groups (Polit & Hungler, 1983).

Summary

In Chapter Four an overview of the research design, study sample, and sample selection criteria were specified. Variables were operationally defined and measurement methods described. Standard procedures to protect the rights of the research subjects were explained. The instrument, including reliability and validity tests, and scoring was discussed. Data analysis procedures were presented. Descriptive statistics were computed for the socio-demographic questionnaire, as well as the Sibling Developmental Issues Tool. Responses to the 69-item SDIT questionnaire were submitted for data analysis with the purpose of measuring several dimensions of the mother's perception of the sibling.

The results of the data analysis will be presented in Chapter Five.

CHAPTER FIVE

Data Presentation and Analysis

Introduction

In this chapter the data will be described and analyzed. First, the results of the pilot study will be presented. Then the sociodemographic characteristics of the subjects will be described. Next, the discussion will center on the reliability of the subscales of the Sibling Developmental Issues Tool (SDIT). Finally, correlational techniques and analysis of variance will be used to answer the major research study questions as well as the related subquestions.

Results of Pilot Study

A pilot study of the SDIT instrument was conducted with three volunteer mothers who had cared for home-monitored infants with a toddler-preschool sibling living in the home during the past year.

The pilot sample of three mothers was selected from the Southwestern Michigan Apnea Support Group who volunteered to test the instrument for readability and the identification of potential problems in the administration of the instrument. The data obtained from the three mothers were not included in the final study results. The following changes were made in the SDIT based on the pilot study:

1. The addition of a "not applicable" column to be placed to the left of the Likert scale. This allowed for the identification of behaviors that had never been observed by the mother.

2. The addition of a sentence which instructed the mother how to use the "not applicable" column (see Appendix D).

3. Question 12 was changed from "Usually play alone" to "Play alone" for better readability.

Descriptive Findings of the Study Sample

Following the procedure outlined and approved for procurement of the sample, five monitor companies, two parent apnea support groups, and finally the new SIDS Research Center were approached by the investigator. A total of 25 questionnaires were returned over a six-month period; however, only 22 mothers met the study criteria which included:

1. The mother lives in the home with the monitored infant.

2. The currently monitored infant is no older than 12 months of age.

3. This infant is the first child in the family to ever be on a monitor.

4. A sibling between the age of 2 and 5 years lives in the home with the infant on a monitor.

Sociodemographics of the Sample

Study subjects were classified according to site, mother's personal characteristics, spouse or significant other's occupation, and income. In addition, information on siblings and the infants (including some basic medical information) is presented below in Tables 1 through 6.

Sites Where Data Collected. Three sites--namely Glassrock, Plaza Supply, and the SIDS Research Center--had four mothers each who participated in the study. Care-Tech and Hillsdale Apnea Support Group followed with three mothers who participated in the study. The remaining sites--Allegan Home Health Services, Foster, and the Apnea Support Group of Southwestern Michigan--contributed one to two clients. (See Table 1.)

Mothers' Age. The age of the mothers ranged from 19 to 35 years. The mean age was 27 years with SD of 4.54 (see Table 2).

Race. The majority of the population was Caucasian (N = 19, 86%) with two black (9%) and one oriental (4%) mother.

Marital Status. The majority of the mothers (N = 19, 86%) were married, two (9%) reported being single, and one (4%) was widowed.

Education of Mothers. The levels of education varied considerably among the respondents. Three mothers (14%) reported partial high school completion while seven (32%) reported completion of high school. Eight (36%) of the mothers had a partial college education. Three (13%) had completed four years of college, and one mother (4.5%) had gone beyond four years of college. (See Table 3.)

Work Status of Mothers. Eleven (50%) of the mothers were full-time homemakers, while another 11 (50%) worked outside the home. Eight (72%) of the mothers worked part-time, and three (14%) of the mothers worked full-time.

Table 1

Name of Sites Where Data was Collected and Number and Percentage of Subjects from each Site

Category	Number	Percentage (%)
Site	N = 22	100.00
Allegan Home Health Services	1	4.5
Care-Tech	3	13.6
Foster	1	4.5
Glassrock	4	18.2
Hillsdale Apnea Support Group	3	13.6
Plaza Supply	4	18.2
SIDS Research Center	4	18.2
Southwestern Michigan Apnea Parent Support Group	2	9.1
TOTAL	22	100.00

Table 2

Age of the Mothers - Number and Percentage

Category	Number	Percentage (%)
Age	N = 22	100.00
19 - 22	4	18.20
23 - 25	6	27.20
26 - 29	4	18.10
30 - 32	5	22.60
33 - 35	3	13.50
TOTAL	22	100.00

[Mean Age = 27 years]

Table 3

Mothers' Educational Level - Number and Percentage

Category	Number	Percentage (%)
Education	N = 22	100.00
Partial High School	3	13.6
Completion of High School	7	31.8
Partial College Education	8	36.4
Completion of Four Years of College	3	13.6
Beyond Four Years of College	1	4.5
TOTAL	22	100.00

Occupation of Mothers. Among the 11 mothers who worked, five (42%) reported working in clerical positions. Three (25%) were reported to be in professional positions, and two (17%) reported skilled worker positions. One mother was in an executive position.

Husbands' Educational Level and Occupation. One spouse (4.5%) completed junior high school and one (4.5%) completed partial high school. Four spouses (18%) were high school graduates. Ten (45%) of the 19 spouses had completed partial college while one (4.5%) completed four years of college. Two spouses (9%) were reported to be educated beyond four years of college. Spouses' occupations were reported as the following: Five spouses (22.7%) were in professional positions, eight spouses (36%) were skilled workers, and six (27%) of the spouses were semi-skilled or unskilled workers.

Family Income. The income per household ranged from less than $10,000 a year (N = 1, 4.5%) to above $60,000 a year (N = 1, 4.5%). The average income was between $20,000 and $30,000 a year (N = 8, 35%).

Number and Ages of Children Living in the Home. The number and ages of the children regardless of family is presented in Table 4. Thirteen (59%) of the families had two children living in the home, the monitored infant, and the (two-to-five-year-old) sibling. Seven families (31%) had three children living in the home, and two families (9%) had four children living in the home. The age distribution of the children was as follows: Twenty-one families (91%) had

one monitored infant between the age of newborn to one year, while one family (4.5%) had two infants in this age range. Eight families (36%) had a child living in the home between one and three years of age. Fourteen families (64%) had a child between three and six years of age in the home. Seven families (32%) had a child living in the home in the age range of six-to-nine years, while one family (4.5%) reported two children in this age group. One child (4.5%) was reported in the nine-to-12 year age group. No siblings 12-to-18 years of age were reported in the study. (See Table 4.)

Sex of Siblings. There were 10 females (45%) and 12 males (54%) reported in the sibling sample.

Infant Age in Months. The infants' age ranged from two months to nine months of age, with the mean age of the infant being five months.

Birth Weight of Infants. Infant weight at the time of birth ranged from three pounds (9%) to 11 pounds (9%). The mean weight was 7.3 pounds. The weight of the infant was rounded to the nearest pound.

Sex of Infant. The infant sample consisted of 13 males (59%) and nine females (40.9%).

Age of Infant When Placed on Monitor. As can be seen in Table 5, most infants were placed on the monitor within the first 20 days after birth. The mean age was between 11-to-20 days, while all infants in the sample had been placed on the monitor after two months. (See Table 5.)

Table 4

Ages, Number and Percentage of Children Living in the Home

Category	Number	*Percentage (%)
0 - 1 yr	23	43.0
1 year 1 day - 3 years	8	15.0
3 years 1 day - 6 years	14	26.0
6 years 1 day - 9 years	8	15.0
9 years 1 day - 12 years	1	2.0
TOTAL	N = 54	100.00

*based on total number of children

Table 5

Age of Infant When Placed on Monitor - Number and Percentage

Category	Number	Percentage (%)
Age When on Monitor	N = 22	100.00
0 - 10 days	7	31.80
11 - 20 days	8	36.50
21 - 30 days	4	18.20
31 - 40 days	1	4.50
41 - 50 days	1	4.50
51 - 60 days	1	4.50
TOTAL	22	100.00

Length of Time Infant was on Monitor. Due to the uneven spacing of the intervals and one open interval in questions 19 of the sociodemographic questionnaire, the precise length of time on the home monitor cannot be computed. The average length of time the infant was home monitored fell somewhere between four and six months of age. (See Table 6.)

Reason for Monitoring. An abnormal pneumogram was reported (N = 19, 86.4%) as the most frequent reason for the home monitoring. Observed apnea and/or bradycardia (N = 13, 59.1%) was the second-most-stated reason for monitoring. Only one mother (4.5%) reported prematurity as the reason for monitoring. Three mothers (13.6%) reported previous SIDS death in the family as a reason for apnea home monitoring. Two reasons for monitoring at home were given in (63.6%) of the cases.

Illness of Infant. Most of the mothers (90%) reported that the infants did not have any other known illness other than the apnea. Two mothers (9.1%) reported the presence of other illness. One mother reported frequent respiratory infections. One mother reported a congenital heart defect (ventricular septal defect).

Sibling Health Problems. Most mothers (91%) also reported their two-to-five-year-old child to be healthy. However, two (9%) of the mothers reported frequent ear infections as a health problem for the sibling.

Table 6

Length of Home Apnea Monitoring - Number and Percentage

Category	Number	Percentage (%)
Length of Time On Monitor	N = 22	100.00
2 weeks - 1 month	1	4.50
1 month 1 day - 2 months	4	18.20
2 months 1 day - 4 months	6	27.30
4 months 1 day - 6 months	4	18.20
6 months 1 day or longer	7	31.8
TOTAL	22	100.00

Sibling Classes. The overwhelming majority of the mothers (N = 19, 86%) reported that the sibling did not attend sibling classes to prepare for his/her new brother or sister. Only three mothers (14%) reported their two-to-five-year-old child had attended sibling classes.

Extraneous Variables. In addition to the sociodemographic variables, a number of other variables were considered as important for their relationship to the mothers' response on the SDIT. These include, in particular, variables that measure the mother's reported stress level, training, and group support.

Mothers' Stress Level. The mothers were asked to rate their stress level during their home monitor experience on a scale of 1 to 4, with 1 indicating "high stress" and 4 indicating "no stress." In Table 7 the reported stress level of the mother while caring for the home-monitored infant is displayed. The average stress level is moderate (2.0) with an SD of 1.0. The majority of mothers (N = 14, 70%) reported moderate to high stress. (See Table 7.)

Monitor Teaching Programs. The majority of the mothers (64%) reported that they had experienced a home monitor teaching program while eight mothers (30.4%) stated they had not attended such a program.

Parent Group Membership and Attendance. Eight of the mothers (32%) reported belonging to a parent support group. One mother (4.5%) stated she attended the group meetings

Table 7

Reported Stress Level of Mother - Number and Percentage

Category	Number	Percentage (%)
Reported Stress Level of Mother	N = 22	100.00
High Stress	8	36.40
Moderate Stress	6	27.30
Low Stress	6	27.30
No Stress	2	9.10
TOTAL	22	100.00

whenever meetings were scheduled. Six mothers (27%) attended the apnea support group meetings only occasionally.

Profile of the Mother, the Infant, and the Sibling

From the sociodemographic data obtained from the study (see Appendix E), a profile of the mother, infant, and sibling can be developed. The mean age of the mother is 27 years. The mothers were predominantly Caucasian (N = 22, 86%) with 86% (N = 19) married. The education level was varied with (50%) of the mothers partially or totally completing four years of college. A moderate-to-high stress level was reported by 14 of the mothers (64%). The average family income was between $20,000 and $30,000 a year. Thirteen of the families (59%) had two children living in the home, the home-monitored infant and the two-to-five-year-old sibling. The mean age of the monitored infant was five months, and the mean birth weight was 7.3 pounds. The mean age when the infant was placed on the home apnea monitor was between 11 and 20 days with the length of time on the monitor being between four and six months. The two most frequent reasons for home monitoring are observed apnea (N = 13, 89%) and abnormal sleep recording (N = 19, 86%). The majority of mothers (N = 14, 64%) report being part of a monitor teaching program.

The (two-to-five-year-old) sibling is generally reported to be healthy, and the majority (N = 19, 86%) have not attended sibling classes.

Reliability of Sibling Developmental Issues Tool (SDIT)

The SDIT was constructed to measure the degree to which mothers perceive changes in their siblings' behavior in relation to the apnea home monitor experience. However, when the SDIT subscales were subjected to a reliability analysis, a number of problems became apparent. Most of these are attributable to the small sample size. Whenever a study sample is small, missing values on scale items can cause severe problems with multivariate analysis of any kind. In this study, mothers were often unable to respond to a specific item because the behavior stated had not yet been observed in their two-to-five-year-old child. In such a case, the mother would indicate this in the "does not apply" response choice. However, for the reliability analysis to be feasible, only items with three or fewer missing values could be used. This drastically reduced the number of items on the original SDIT from 69 to 39 items.

The remaining 39 items were grouped into the subscales of the original instrument, now consisting of fewer items. The reliability analysis was performed on these seven subscales which led to the exclusion of an additional 13 items as they did not correlate well with the other items. (See Table 8.)

As Table 8 shows, the alpha coefficients for the subscales represent a moderate-to-high degree of internal consistency with the respective dimensions.

Table 8

Alpha Coefficients of the SDIT

Psychosocial

Sibling Interaction (Jealousy) (N = 20)	Regression (N = 18)	Aggression (N = 19)	Anxiety (Separ/ Strang) (N=13)
# of items 3	# of items 3	# of items 3	# of items 4
.84	.80	.64	.79

Cognitive

Exploratory (N = 19)	Memory/Language (N = 19)	Fantasy/Imagination (N = 18)
## of items 4	# of items 6	# of items 3
.85	.79	.74

N = Number of cases with valid responses on all subscale items

of items = Number of items included in each subscale

Finally, following the computation of reliability scores, the remaining items in the subscales were examined as to their theoretical relevance. It was important that the remaining items were related to one another and to the subconcepts to be measured. One scale--the sibling interaction scale which began as a broad concept--had to be narrowed in its meaning, as the remaining items seemed to measure the concept of jealousy. A single reliability coefficient for the psychosocial and cognitive areas could not be computed due to the lack of a sufficient number of cases with valid responses on all items. The subscales were retained on the basis of theoretical rationale; however, the subscales could not be defended on the basis of their psychometric properties. The following section will present the revised SDIT.

Instrument (SDIT) Revisions

The psychosocial sibling interaction scale now consists of three questions instead of the original 11 questions intended to measure this concept. This subscale now appears to measure jealousy behaviors rather than the broad concept of family interaction as follows:

5. Want attention?

12. Behave in a manner that indicates jealousy of infant?

14. Behave in a manner that indicates jealousy of time and concern for infant?

The regression subscale, originally to be measured by eight items on the SDIT, now consists of three questions following the reliability analysis. These three questions are:

2. Whine?

6. Want help with skills he/she can do?

9. Want to be held?

The aggression subscale also resulted in three questions reduced from the original 13 items:

13. Have temper tantrums or anger outbursts?

14. Act demanding or bossy?

18. Become verbally loud and aggressive when frustrated?

The anxiety scale intended to measure both stranger and separation anxiety with 11 questions, and only four questions remained following the reliability analysis:

1. Demonstrate discomfort when you leave for short periods of time?

10. Have difficulty going to sleep at night?

15. Act restless or nervous with strangers?

21. Want light on while sleeping?

The cognitive subscale questions were also reduced in number as follows. Exploratory behavior questions were reduced from seven to four questions. These are:

7. Explore new places and objects?

8. Like to figure out simple problems for him/herself?

16. Seem interested in and curious about his/her surroundings?

26. Have many questions when he/she experiences something unfamiliar?

The memory/language subscale was reduced from 10 items to six items as follows:

3. Use self-centered language?

4. Follow instructions given?

11. Use words to tell you about past objects, actions, or events?

17. Talk to family members?

22. Retain and recall something newly learned?

23. Imitate adult behavior?

The fantasy/imagination scale items were reduced from eight to three questions. The questions listed below remain in the context of the (SDIT) instrument:

19. Tell imaginative stories?

20. Entertain him/herself?

25. Play make-believe?

It appears obvious that the study instrument used to measure the maternal perception of specified sibling behaviors requires further revision for future research. These will be discussed in Chapter Six.

In Table 9, the correlations between subscales of the remaining 26 items of the SDIT are presented. (See Table 9.)

As shown in Table 9, the psychosocial scales correlate as follows:

Table 9

Pearson Product Correlations Between Subscales of the Revised SDIT

	Psychosocial Sibling Intervention (Jealousy)	Psychosocial Regression	Psychosocial Aggression	Psychosocial Separation/ Stranger Anxiety	Cognitive Memory/ Language	Cognitive Fantasy/ Imagination	Cognitive Exploratory
Psychosocial Sibling Intervention (Jealousy)		*.57	.23	*.67	-.30	-.16	.39
Psychosocial Regression			-.001	.38	*-.48	*-.45	*.41
Psychosocial Aggression				*.74	.11	*.45	*-.42
Psychosocial Separation/ Stranger Anxiety					-.35	-.002	.09
Cognitive Memory/ Language						*.78	*-.73
Cognitive Fantasy/ Imagination							*-.82
Cognitive Exploratory							

*significant scores at .05 level

(1) The sibling interaction scale (jealousy) correlates moderately with the regression scale (r = .57) and the anxiety scale (r = .67).

(2) The regression scale does not correlate highly with any of its remaining counterparts (i.e., aggression or anxiety).

(3) The aggression scale correlates moderately (r = .74) with the anxiety scale only.

There are correlations between the psychosocial and cognitive scales as well:

1. The regression scale correlates moderately negatively with the memory/language scale (r = -.48) and fantasy/imagination scale (r = -.45), as well as positively with the exploratory scale (r = .41).

2. The aggression scale correlates moderately with the fantasy/imagination (r = .45) and negatively with the exploratory scales (r = .41).

The correlations between the cognitive variables are displayed as follows:

1. The memory/language variable correlates moderately in a positive direction with the fantasy/imagination (r = .78) and negatively with the exploratory variable (r = .73).

2. The cognitive fantasy/imagination subscale correlates negatively (r = .82) with the exploratory subscale.

In summary, the psychosocial regression scale shows a higher correlation with the cognitive subscales than the psychosocial scale. The cognitive exploratory scales correlate with the psychosocial elements of the scale. However, high correlations do exist between the cognitive elements also.

Analysis Pertinent to Study Questions

In the following section, data that answers the major study questions will be presented. Each question will be addressed by the statistical procedures outlined in Chapter Four. For all correlations, the .05 level of significance will be used as well as comparison of means.

In Table 10, an overview of the mothers' mean scores on the SDIT subscales are presented (see Table 10). This table will be used to answer the research questions:

I. According to maternal perception, how is the psychosocial development of the two-to-five-year-old sibling affected by the home-monitored infant in the areas of sibling interaction (jealousy), regression, aggressive behaviors, and stranger/separation anxiety?

As can be noted in Table 10, the mean scores of all the psychosocial subscales are above the scale mean of 3.0 (which indicates no change), thus there seems to be a trend toward greater anxiety, regression, aggression, and sibling interaction difficulties.

II. According to maternal perception, how is the cognitive development of the two-to-five-year-old sibling

Table 10

Mean Scores and Standard Deviations of SDIT (Sub) Scales

Psychosocial	Mean Score (Range 1-5 Pts)	SD
Sibling Interaction (Jealousy)	3.98	.61
Regression	3.90	.75
Aggression	4.00	.61
Anxiety-- Separation Stranger	3.90	.61
Cognitive		
Exploratory	2.60	.67
Memory/Language	3.10	.53
Fantasy/Imagination	3.40	.53

affected by the home-monitored infant in the areas of exploratory behaviors, memory/language, and fantasy/ imagination?

In the stated cognitive areas, overall the mean scores indicate that exploratory, memory/language, and fantasy/ imagination behaviors did not change very much as perceived by the mothers (see Table 10).

The four research subquestions will be stated below with a description of the pertinent findings as follows:

1. **Is there a difference between the younger versus the older sibling in degree of impact as perceived by mother?** The mean subscales' scores will be presented in Table 11 by age groups, comparing Age Group I (age two years to three years six months, N = 12) to Age Group II (three years eight months to five years, N = 10). (See Table 11.)

In the four subscales measuring psychosocial development, the mean scores of the younger age group were consistently higher; however, only the regression subscale showed a significant difference between the mean scores ($p = <.03$) of the younger-versus-older age groups. The scales representing the three areas of cognitive development did not reveal any significant differences between the younger and older sibling as presented in Table 11.

In summary, the younger (age two to three years six months) sibling show significantly more regressive behaviors as perceived by the mother. Additionally, the younger siblings (age two years to three years six months) have

Table 11

Comparison of (Sub) Scales of STID Means and Levels of Significance by Age Groups

	PSYCHOSOCIAL				COGNITIVE		
	Sibling Interaction (Jealousy) N = 20	Regression N = 18	Aggression N = 19	Anxiety Separ/Stranger N = 13	Exploratory N = 19	Memory/Language N = 19	Fantasy/ Imagination N = 18
AGE GROUP I (2 yrs - 3 yrs 6 mos)	4.16	*4.16	4.08	4.0	2.47	3.11	3.37
AGE GROUP II (3 yrs 8 mos - 5 yrs)	3.70 P = .10	3.38 P = .03	4.00 P = .78	3.6 P = .43	2.75 P = .39	3.16 P = .84	3.40 P = .92

*significant at .05 level

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consistently higher psychosocial scores as reported by the mothers. This indicates increased stress behaviors in the younger versus the older (age three years eight months to four years) sibling during the infant home monitoring period as perceived by the mother. While the cognitive means were slightly higher for the older age group as compared to the younger age group, the difference was not significant. This result shows a tendency for the younger age group to display increased stress behaviors in the four psychosocial areas of development while the older age group may manifest changes in cognitive behaviors as reported by mother.

Correlations Among the Extraneous Variable and the SDIT

In this section some of the interrelationships found among the extraneous variables and the SDIT will be presented. These data will assist in answering the three remaining research questions:

2. Does the level of maternal stress affect her perception of sibling impact?

The Pearson r Correlations between mothers' reported stress level and the subscales are presented in Table 12. Three of the subscale scores--namely, psychosocial sibling interaction (jealousy), anxiety, and the cognitive exploratory subscales--correlated significantly with the mothers' stress level. Mothers who reported the monitor experience to be stressful for them also reported an increased frequency of

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Table 12

Correlations Using the Pearson r Between Mothers' Stress Scores and the (SDIT) Scale Scores

Pearson r Correlation Between Mothers' Report Stress And	Correlation Score	P Value	N
PSYCHOSOCIAL			
Sibling Interaction Score (Jealousy)	-.57	.004*	20
Regression	-.28	.124	18
Aggression	-.05	.411	19
Separation/ Stranger Anxiety	-.59	.016*	13
COGNITIVE			
Memory/ Language	.25	.15	19
Exploratory	-.52	.01*	19
Fantasy/ Imagination	.19	.22	18

*significant scores at .05 level

jealousy, separation and stranger anxiety, and exploring behaviors in their two-to-five-year-old child due to the monitor experience.

3. **Does the length of time on the monitor affect the sibling scores?**

The correlations between the length of time on the monitor and the developmental scores show two significant correlations in the cognitive exploratory subscale (-.55, p = <.05) and the cognitive fantasy/imagination subscale (.53, p = <.01). (See Table 13.)

A negative correlation exists between the exploratory behaviors and length of time the infant is on the monitor; with an increased length of time the infant is on the monitor there is a decrease in exploratory behaviors of the sibling as reported by the mothers. In the cognitive fantasy/ imagination area, there is a positive correlation (.53, p = <.01); with an increase in the time of infant monitoring, there is an increase in fantasy/imagination behaviors as reported by the 22 mothers.

4. **Does attendance in a parent apnea support group affect the sibling scores?**

The lack of a sufficient number of mothers who reported attending support group meetings (N = 7) prevented correlating this variable with the SDIT results. This research question remains unanswered.

Table 13

Correlations Between Length of Time on the Home Apnea Monitor and the Scale Scores

Scale Category (Length of Time on Monitor)	Correlation	P Value	N
PSYCHOSOCIAL			
Sibling Interaction (PFI)	-.128	.29	20
Regression (PR)	-.10	.34	18
Aggression (PA)	-.30	.10	19
Anxiety (PSSA)	.32	.13	13
COGNITIVE			
Exploratory (CE)	-.55*	.007	19
Memory/Language (CM)	.32	.08	19
Fantasy/ Imagination (CFI)	.53*	.011	18

*significant scores at .05 level

Other Findings

A one-way analysis of variance (ANOVA), explained in Chapter Four, was used to compare the means on the subscales for selected sociodemographic categories.

Several interesting findings are listed below:

1. Mothers with partial or complete high school education reported higher mean scores on the regressive subscale related to their two-to-five-year-old child than the partial or completed college education mothers ($p = <.05$).

2. Mothers who worked reported higher mean scores in the sibling interaction (jealousy) subscales than mothers who did not work ($p = <.03$).

3. Mothers who worked part-time ($N = 8$) reported significantly higher mean scores on the sibling interaction (jealousy) subscale ($p = <.02$), the regression subscale ($p = <.05$), and the cognitive exploratory subscale ($p = <.05$) than the mothers who work full time ($N = 3$).

4. Mothers who report their occupation to be clerical and unskilled/semi-skilled reported the higher mean scores on the psychosocial sibling interaction (jealousy) subscale ($p = <.003$). Clerical, skilled, and unskilled mothers reported no change on cognitive exploratory subscale, while mothers in professional positions reported a decrease in exploratory behaviors.

5. Mothers who had infants placed on a monitor between 0-10 days of age reported a lower mean score ($\bar{x} = 2.0$) related to cognitive exploratory behaviors of the sibling

than when infant had been placed on the home monitor at an older age, 11-50 days old) ($p = <.05$).

6. The mothers reported higher mean scores for the male sibling ($\bar{x} = 4.0$) than for the female sibling ($\bar{x} = 3.0$) in the psychosocial anxiety scale ($p = <.05$).

Summary

In Chapter Five the statistical analysis pertinent to the questions under study has been provided. As part of the analysis, the pilot study and the reliability coefficients of the study instruments were presented. The remaining instrument questions were displayed including the narrowed jealousy scale. In Chapter Six, a summary of the research results, recommendations, and conclusions will be presented.

CHAPTER SIX

Summary and Conclusions

Introduction

In Chapter Six the research results will be discussed. The descriptive statistics from this sample will be presented and compared to other research literature. Descriptive and inferential statistics will be utilized to answer the research questions. From the conclusions drawn, implications for nursing practice, education and research will be discussed using the conceptual framework of the study.

Sociodemographic Data

The sociodemographic information for the 22 mothers included age, race, marital status, education, work occupation, and spouse education and occupation. Additional variables included descriptions of the home-monitored infant and the two-to-five-year-old sibling.

Age, Race, and Marital Status of the Mother. The sample consisted of 22 mothers with a mean age of 27 years and a total age range of 19 to 35 years of age. The majority of the maternal population was Caucasian (N = 19, 86%) and married (N = 19, 86%). Only two mothers reported being single (9%). Naeye et al., (1976) (N = 1500) found the demographic profile of the SIDS mother to be young (35% below 19 years of age), black, single and unmarried. Three of the home monitor studies had subjects that were mainly Caucasian, married families (Black et al., 1978; Cain et al., 1980; Goetz, 1981). The discrepancy noted in the sample obtained

for the present studies could be due to the tool which required the subject to independently read, complete, and mail the questionnaires. The method of data collection may have contributed to the profile of the Caucasian, married female.

The subjects were a convenience sample of 22 mothers selected from eight sites. The setting was mainly rural Southwestern Michigan with one metropolitan area of approximately 150,000 population. Goetz (1981) reported that her subjects were voluntary and 12 potential lower-socioeconomic families did not return the questionnaires. This resulted in a high number of middle class families. However, those families who are monitoring infants in the home for apnea may have a different profile than the actual SIDS infant mother.

Education of Mothers. The majority of the mothers had a partial college education or had completed four-plus years of college (total 55%). Naeye (1976) reported the profile of the SIDS mother to be uneducated. Black et al., (1978) reported an average educational level of 14 years. Valdes-Dapena (1979) reported a lower mental capacity of mothers of SIDS infants. Goetz (1981) reported that (N = 15, 68.2%) of the study sample had completed high school. The mothers in this study had more years of education than the studies mentioned (Black et al., 1978; Goetz, 1981; Naeye (1976); Valdes-Dapena, 1979). The higher level of education of the mothers may also influence the findings of this study, in

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that these mothers could be more aware and knowledgeable of growth and development parameters.

Work Status Occupation of the Mothers. One-half (N = 11, 50%) of the subjects worked outside the home. Eight (72%) worked part-time while the remaining three (14%) worked full-time. Few of the 31 mothers in the Black et al., (1978) study worked outside the home. Of the 11 mothers who worked, 42% reported clerical positions, 25% were professional, and 17% were skilled workers, 8% semi-skilled, and 8% responded as "other." The income per household ranged from less than $10,000 a year to above $60,000 a year, with the average income of $20-30,000 a year. Beckwith's (1975) study of 425 infants found that despite SIDS being more prevalent in the underprivileged, there was no correlation to family's income, social position, or education. More mothers in this study were reported to be working outside the home (50%); however, the Black et al., study was published in 1978 and the increase in mothers working is a societal change which has increased over the last decade.

The study results in which the mothers reported higher jealousy scores in working versus nonworking mothers is readily explained. The sibling must cope, not only with the monitored infant but also with the absence of mother.

The mothers whose occupation was reported to be unskilled and semi-skilled also reported higher jealousy scores with no change in cognitive behaviors. This finding

may also be influenced by the knowledge level of growth and development and how cognizant mother is of child behaviors.

Family Composition, Spouse Educational Level and Occupation. A majority of the families (59%) had only two children living in the home. The remaining families (41%) had three to four children. Approximately one-half of the spouses (49.5%) were reported to have completed partial or all of a college education, which is similar to the mother's reported educational level. Interestingly, 64% of the spouses were reported to work in skilled or semiskilled or unskilled occupations, which would indicate a large lower class percentage. The remaining 30% were reported to be in professional positions.

Once again, the profile of poor social conditions (i.e., low income, unmarried mother, and lack of education) as reported by Naeye (1976) and Valdes-Dapena (1979) is incongruent with the profile of this study. Whereas, the profile of the white, middle class family, akin to the population of the three home monitor studies (Black et al., 1978; Cain et al., 1980; Goetz, 1981) is also similar to the sociodemographic data reported in this study. The findings of these four studies show a major sociodemographic difference between the monitored infant and the SIDS infant. The hypothetical extension of infant apnea to SIDS is probably unwarranted due to the current conflicting data. The relationship between the "near miss" infant and SIDS will not be known until further critical studies have been

performed (Merrit & Valdes-Dapena, 1984). If the "near miss" infant and the SIDS infant are assumed to be two separate entities, it would seem probable that the sociodemographics of the populations could also be different.

Age, Weight and Sex of Infant. The mean age of the infant was five months of age with a mean birth weight of seven pounds. The literature reviewed did not report an age or weight criterion for the "near miss" infant. However, Beckwith (1975) found age distribution to be the most consistent feature of SIDS cases with the peak incidence between two and four months of age and a rapid decline before six months of age. An increased risk of sudden infant death was discovered among low birth weight infants, which is consistently reported in the majority of SIDS studies (Beckwith, 1975). In studies by Black et al., (1978) and Kelly et al., (1978) the ratio of male infant to female infant was equal. This infant population consisted of 13 males (59%) and nine females (41%). This finding is also similar to the three cited monitor studies.

Age When Placed on Home Monitor. The mean age of the infant when placed on the apnea monitor was 11-20 days. Most (N = 20, 91%) of the infants had observed or recorded apnea spells from newborn to 40 days of age, as reported by the mother. It is difficult to interpret this finding because the researcher was attempting to obtain a sample of infants that were placed on the monitor later than the neonatal period so as to give the mother a point of comparison

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regarding the newborn versus the monitored infant. However, due to the difficulty obtaining an adequate sample size, the criteria were changed to include infants placed on the monitor between birth and six months of age. This population was placed on the monitor before the peak incidence of SIDS, which is an expected clinical practice.

Time on Home Monitor and Reasons for Home Monitoring. The average length of time the infant had been on the monitor was five-and-one-half months. All of the 22 infants were currently being monitored; therefore, the total length of home monitoring is unknown. By using only mothers who are currently experiencing the infant on a home apnea monitor, the third characteristic of perception--being action oriented in the present (King, 1981)--is addressed. It is thought that these criteria will assist in making the data more relevant because the problems identified are current ones. In the study by Black et al., (1978) the average time of monitor initiation was four weeks with an average duration of four months. The average length of monitor time in the Kelly et al., (1978) sample of 84 infants was also seven months.

Two reasons for monitoring were given in 64% of the cases. Observed apnea and/or bradycardia (N = 13, 59%) and/or an abnormal pneumogram (86%) were the most frequent reasons given. Only one mother reported prematurity (4.5%) in this population, although premature infants are at high risk for Sudden Infant Death. Three (14%) mothers reported a subsequent family history of SIDS as a reason for home

monitoring. Unfortunately, there is little literature that describes the population of infants on apnea home monitoring. The reports from studies by Black et al., (1978); Kelly et al., (1978); and Goetz (1981) were consistent with the sample of this research study. The home monitor studies categorized the infants into three groups: (1) those who had apnea or cyanosis at home or hospital including prematures; (2) those who had abnormal pneumograms including prematures; and (3) those families who had a subsequent SIDS infant. The majority of infants fell in the first two categories as they did in this study.

Other illness of infant. The majority of mothers (N = 20, 91%) reported that their infants had no other illnesses except the observed and/or recorded sleep apnea for which their children were being monitored. One aspect of SIDS and the "near miss" infant is the presumption of an apparently otherwise healthy baby. This finding is consistent with all other studies (American Academy of Pediatrics, 1983; Beckwith, 1975; Guntheroth, 1982; Merrith and Valdes-Dapena, 1984).

Monitor Teaching Program and Parent Group Attendance. The majority (64%) of parents reported that they had completed a home monitor teaching program. All of the parents would have had to receive some type of education concerning monitor and CPR teaching. However, the question was worded using the word "program," which denoted a more

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formal approach than what some of the parents probably experienced.

Only eight (32%) of the 22 mothers reported belonging to a parent group with only one parent reporting regular attendance. The sample was too small to perform the comparisons as planned. The lack of an adequate sample size was unexpected since the investigator had solicited two family support groups as data collection sites. This variable was to be correlated with mothers' reported stress and the sibling stress scores. Sample comparisons in other studies related to the monitor teaching program, and parent group attendance were not available for comparison.

Sibling Sex, Age and Health. Ten females (46%) and 12 males (55%) comprised the sibling group. The mean age was three years. A near median cut was performed to divide the siblings into two equal numbered groups. Age Group I consisted of 12 children ranging from two years to three years and six months. Age Group II consisted of 10 children ranging from three years and eight months to five years. Only three of the studies included children below five years of age (Gayton et al., 1977; LaVigne & Ryan, 1979; Vance et al., 1980). The majority of mothers (91%) reported the sibling to be healthy. The health of the sibling is important data to include as it would be more difficult to interpret behavior if the sibling were also chronically ill. Two of the mothers (9%) reported frequent ear infections as a

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health problem. The studies reviewed also reported the siblings to be in good health.

Sibling Classes. The majority of the mothers (N = 19, 86.3%) reported that the sibling did not attend any classes in preparation for the arrival of his/her new brother or sister. Correlations were computed between those siblings who had attended sibling classes and those who had not attended with no significant findings. It was theorized that the brothers/sisters who had attended sibling classes may have scores reported that indicated less adverse impact related to the infant/monitor. In the studies reviewed, there was no data available for comparison to this sample.

Summary of Sociodemographic Data

The profile of the mother in this study is Caucasian, married, and 27 years old. One-half of the mothers had two to four years of college. A moderate to high stress level was reported in relation to the infant home monitor experience. The family income was $20-30,000. The mean age of the infant was five months. The infant was placed on the monitor between 11-20 days for two major reasons: (1) Observed apnea and (2) an abnormal pneumogram. The majority of mothers reported being part of a monitor program. The two-to-five-year-old sibling who had not attended sibling classes was reported to be healthy.

Interpretation of the Major Research Findings

A discussion of the interpretation of the major research findings will occur in the next section. Since the sample

was limited in its size and convenience in nature, generalizations to a larger population cannot be made.

Question 1. According to maternal perceptions, how is the psychosocial development of the sibling affected by the home-monitored infant as measured by sibling interaction, regressive behavior, aggressive behavior, and separation, both stranger and separation?

The mean scores in the psychosocial areas had a range of 1-5 points with number 1 indicating the behavior being "much less than before the infant/ monitor;" number 3 being "same as before infant/ monitor;" and number 5 indicating "much more than before infant/monitor." The highest mean score reported by the mothers was in the psychosocial areas (see Table 10). The subscale depicting aggression had the highest mean score of 4.00 (N = 22) followed by the sibling interaction (jealousy) score of 3.91 (N = 22) and the regression and anxiety scores of 3.90 each (N = 22). The reported increases in these behaviors as reported by mother are an expected finding as the sibling also responds to the infant and the apnea home monitoring stressor.

The experience of the monitored infant is reported by the mothers to be a stressful experience. The increased sibling scores probably are related to the maternal stress as well as the siblings' own stress. In other words, highly stressed mothers may be more likely to perceive impact of the monitored infant on their other child even though the impact may not actually be present.

In one of the few studies that had included the younger sibling (three-to-five years) in their sample (age three-to-13 years), LaVigne and Ryan (1979) found the total sibling group (N = 203) to be more withdrawn than the control group, which consisted of well children. On overall sibling behavioral disorders, the siblings age three-to-six years had higher scores. The sibling groups also displayed more irritability behaviors. Siblings in the visible illness group had generally higher scores. No group differences were noted on measures of aggression.

Vance et al., (1980) included four- and five-year-olds in the study of siblings of children with nephrotic syndrome (ages four to nine years). Family, parent, and teacher interviews were part of the data collection, as well as self-reports by the siblings. Siblings of children with nephrotic syndrome were found to have a decrease in fighting, self-security, and confidence compared to the sibling of a well child (Vance et al., 1980). Gayton et al., (1977) studied the well siblings of 43 families who have a cystic fibrosis child. The age of the sibling ranged from five to 18 years of age. The test results for these siblings showed no significant difference in psychological functioning between sibling with cystic fibrosis children and siblings with well children, indicating that siblings of cystic fibrosis children did not demonstrate evidence of negative impact on psychological function (Gayton et al., 1977).

However, the difficulties in the comparison of these studies are many. Two of the studies (Vance et al., 1980; and Gayton et al., 1977) used standardized psychological testing of the well siblings. In LaVigne and Ryan's (1979) study, parent perceptions of the child's behavior through a standardized questionnaire was the method used for data collection. The youngest sibling age studied was three years of age. In addition, many of the study results were computed using a wide age range. For example, the LaVigne and Ryan (1979) sample ranged from three to 13 years; Vance et al., (1980) ranged from four to nine years; and Gayton et al., (1977) ranged from five to 18 years of age.

LaVigne and Ryan (1979) found no group differences between the experimental and control group related to aggression. In this study, the aggression score for siblings was the highest reported score (4.00). Aggressive behavior may be indicative of the family stress communicated to the young sibling resulting in a feeling of loss of control and frustration. The visible group scores as reported by LaVigne and Ryan (1979) were also higher. Interestingly, the apnea home monitor is a visible device which indicates that disease is present. Vance et al., (1980) found a decrease in "sibling fighting" while this study found an increase in aggressive behaviors. The sample included a younger age group (two to five years), which may partially account for the differences in this finding as the younger sibling may naturally express anger and frustration as aggression. This

is due to less well developed internal controls when compared to the older sibling. Also, the three remaining questions following the reliability studies which make up the aggression subscale are as follows:

1. Have temper tantrum or anger outbursts?
2. Act demanding or bossy?
3. Become verbally loud or aggressive?

These questions do not address the topic of sibling fighting. Additionally, there were only two children (59%) in a majority of the sample families, the home-monitored infant and the young sibling.

There are too few studies reviewed to compare the multitude of behaviors which the studies attempted to measure. The LaVigne and Ryan study (1979) found higher scores on overall sibling behavioral scores in the three-to-five-year age group as this study did in the two-to-five-year age group. Also, the varied study designs and methods make comparison difficult.

Question 2. According to maternal perception, how is the cognitive development of the two-to-five-year-old sibling affected by the home-monitored infant in the areas of explorative behaviors, memory/language, and fantasy/ imagination?

The mean scores in the three subscales associated with the cognitive domain indicated generally no behavioral change. There was a slight decline in perception of exploring behaviors as reported by the mothers. The scoring

was the same as explained in the psychosocial scales (see Table 10). This finding indicated that there was little difference in the siblings' behavior in the area of cognitive exploratory, memory/language, fantasy/imagination behaviors attributed to the infant monitor as perceived by the mother. The SDIT questionnaire was not adequately designed to assess intellectual changes as perceived by the mother.

Several authors (Carandang et al., 1979; Vance et al., 1980) indicated a decline in cognitive and school performance in the older school-age sibling of the chronically ill child. Gayton et al., (1977) found no difference in intellectual status between the mean test scores of the cystic fibrosis children and the well siblings. LaVigne and Ryan (1979) found no evidence of learning problems in the well sibling sample. The SDIT Tool reported only exploratory behaviors, memory/language, and fantasy/imagination as perceived by the mother. The intellectual level of the child was not tested via a standardized test as in the studies by Carandang (1979), Vance et al., (1980), and Gayton et al. (1977).

Question 1. Is there a difference in the younger versus the older sibling in the degree of impact as perceived by the mother?

The two sibling groups formed were to depict the younger sibling (Age Group I--two to three years, six months) and the older sibling (Age Group II--three years, eight months to five years). The mean scores of the younger age group were consistently higher in the psychosocial subscales indicating

a greater impact on the younger sibling as reported by the mothers (see Table 11). However, only the regression scale showed a significant ($p = <.03$) difference. The mean scores of the cognitive subscales for the younger sibling is consistently lower, suggesting a greater impact on the younger versus the older siblings. LaVigne and Ryan (1979) also found higher scores in the younger sibling age group. The younger sibling sample, however, was the three to six age range, which is more akin to sibling Age Group II (three years, eight months to five years) discussed in this study.

Family stress such as illness/death, inappropriate parenting, or marital discord can increase stress levels in children. Stress is greater for children whose parents have difficulty in coping with crises inside and outside the family (Honing, 1986). The ability to cope may be more effective among older children because they have an increased ability to think and cope. In addition, smaller children cannot move out into the community to seek supportive adults. The concepts selected for the SDIT instrument were those that might denote the expression of stress in the two-to-five-year-old child and scores were hypothesized to be higher in the younger child, which was substantiated by the study findings.

Mothers' Stress Level

Question 2. Does the reported stress level of the mother affect her perception of sibling impact?

The majority of mothers (N = 14, 70%) in this study reported a moderate-to-high stress level with the average stress level reported to be moderate. The mothers who reported a moderate-to-high stress level tended to report higher sibling scores on all the subscales.

Clearly a strong support system is needed for families who care for the home-monitored infant. It is obvious that the 22 sample mothers were in various stages of adaptation to home monitoring. In the usual course of action the family will attempt to adjust to the stressor with minimal change in the family's established pattern and structure (McCubbin & Patterson, 1983). When excessive demands are present and resources are depleted, the family begins to make changes in the existing structure in an effort to consolidate and bring the entire family into a coherent, organized and functioning unit (McCubbin & Patterson, 1983). However, the process of bonadaptation/maladaptation fluctuates on a continuum as the family attempts to achieve a new balance in response to the stress event. This major finding will give the nurse direction in the development of strategies to address the reported maternal stress.

There were the moderate correlations present between the mothers' stress and the sibling (jealousy) interaction ($r = -.57$), separation/stranger anxiety ($r = -.59$), and cognitive/explorative ($r = -.52$). The negative correlations are present because of the tool construction, which asked the mother to report her stress level as high = 1 and

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no stress = 4. This resulted in negative correlations; however, results indicate the higher the stress level of the mother the more impact she reports in the siblings (see Table 12).

The explanation of this correlation most likely could be a part of the family response system, in that mother who is experiencing stress is most likely to perceive and report stress in other family members. In addition, the young sibling is also sensing the mother's anxiety and is responding with his/her own stress behaviors. The lack of available data related to level of mother's stress and perceived sibling behavior limits the ability to make comparisons to other samples.

Question 3. Does the length of time on the monitor affect the sibling scores?

The length of time the infant is on the monitor has a moderate positive correlation with the cognitive fantasy/ imagination score ($r = .53$, $p = <.01$) and a negative correlation with the cognitive exploratory behaviors ($r = .55$, $p = <.007$). When the length of time on the monitor is increased, so is the fantasy/imagination score as reported by the mother. It appears that the child is possibly spending more time alone, thus coping by the use of his/her imagination. The exploratory behaviors of the sibling are decreased as the infant monitor time is increased as reported by the mother. With the increased time of infant monitoring, this finding may indicate that the child is exercising

strategic withdrawal in order to assist in his/her adaptation to the changing environment. Again, there is an absence of published research with which to compare these findings.

Question 4. Does attendance in a parent apnea support group affect the sibling scores?

It was speculated that the mothers who were attending a parent support group would have reported lower stress scores for themselves and their two-to-five-year-old child. Unfortunately, there was only one mother who regularly attended the parent support group, although seven mothers reported being a member. Statistics were not computed to answer this question due to lack of a sufficient sample.

Implications of the Research Findings to Nursing Practice and Education

The assessment phase of the nursing process requires data which will assist in the planning and implementation of health care delivered to the families experiencing a home-monitored infant. Sociodemographic data is important data to incorporate into this phase. The variables present in the Sociodemographic Questionnaire (see Appendix C) must be considered because they will influence the perception of the mother as well as assist in the identification of high-risk individuals (i.e., mother, infant, sibling) who may require more creative and intense interventions. From the literature, these high-risk factors may include: Cultural barriers, poverty, single parent, teenage mother, less than high school education, two or more children plus infant,

previous SIDS death in family, lack of support systems, increased stress behaviors, other illness of infant, or chronic illness in family.

In addition to the assessor role, the CNS begins the process of coordination through the identification of health needs. It is the CNS that demonstrates the expertise to coordinate the care delivered to this infant sibling and other family members by a team of health care professionals. An accurate profile of the client and family is essential to begin this health care interaction.

The need to aggregate data and promote individualization of assessments requires the CNS to communicate the importance of high quality nursing practice to the consumer, health team members, as well as the community as a whole. The numerous variables involved in the assessment of an individual and his/her environment are evident as the provider begins the complex step of patient and family assessment. Enthusiasm for the clinical nurse specialist role with demonstrated expertise will promote and enrich interventions that result in positive outcomes for the child rearing family.

Through the use of role-modeling, the CNS will demonstrate to the mothers how to include and communicate with the sibling. This intervention can be accomplished during the time scheduled with the infant and family in the primary care setting. The CNS will address the sibling directly and include him/her in the health care discussions, eliciting verbalization and interpreting both verbal and nonverbal

cues. This intervention will hopefully assist the parent to also include the sibling during family discussions and transitions.

Finally, the CNS will use the role of educator to impart information concerning the impact of chronic illness on the family system. The emphasis on the family must begin in both the practice and educational systems. The professional nurse must be educated to incorporate family theory as a framework for assessment.

M. Rogers' (1981) nursing theory with the Modified Family Stress Model by McCubbin and Patterson (1983) was used to develop the theoretical framework for this study, as explained in Chapter Two. Nursing science builds its foundation on Rogers' five basic assumptions concerning the complexity of the individual and the environment. The philosophical and creative opportunities that Rogers (1981) creates for the nursing profession in her theory encourages the advanced practice role of the CNS.

A nursing curriculum must be developed whose graduates will improve the health care of the population. Completion of a BSN program will hopefully become the entry practice level for the professional nurse. Undergraduate nursing education will lay a foundation of essential concepts such as primary care, growth and development of the individual and family, stress theory, loss and grief theory, as well as the effect of chronic illness on family systems. It is also

important that the lack of research literature related to effect of chronic illness on the sibling be addressed.

At the graduate level of nursing education, in-depth skills related to clinical practice are learned, such as assessment, communication, counseling, case management, and group dynamic skills. The master's degree level practitioner will also integrate the important components of primary care into advanced practice, those being: Accessible, accountable, affordable, continuous, comprehensive, and coordinated. The Clinical Nurse Specialist will have a sense of obligation to the profession to perform clinical research on an ongoing basis. Sibling response to chronic illness in the family will be one of the identified areas for such research.

Although only a small portion of this model was tested (i.e., mother's perception) the study data can be applied to the framework to develop pertinent nursing interventions related to the mother and young sibling. These interventions are primarily designed for the Family Clinical Nurse Specialist in advanced practice.

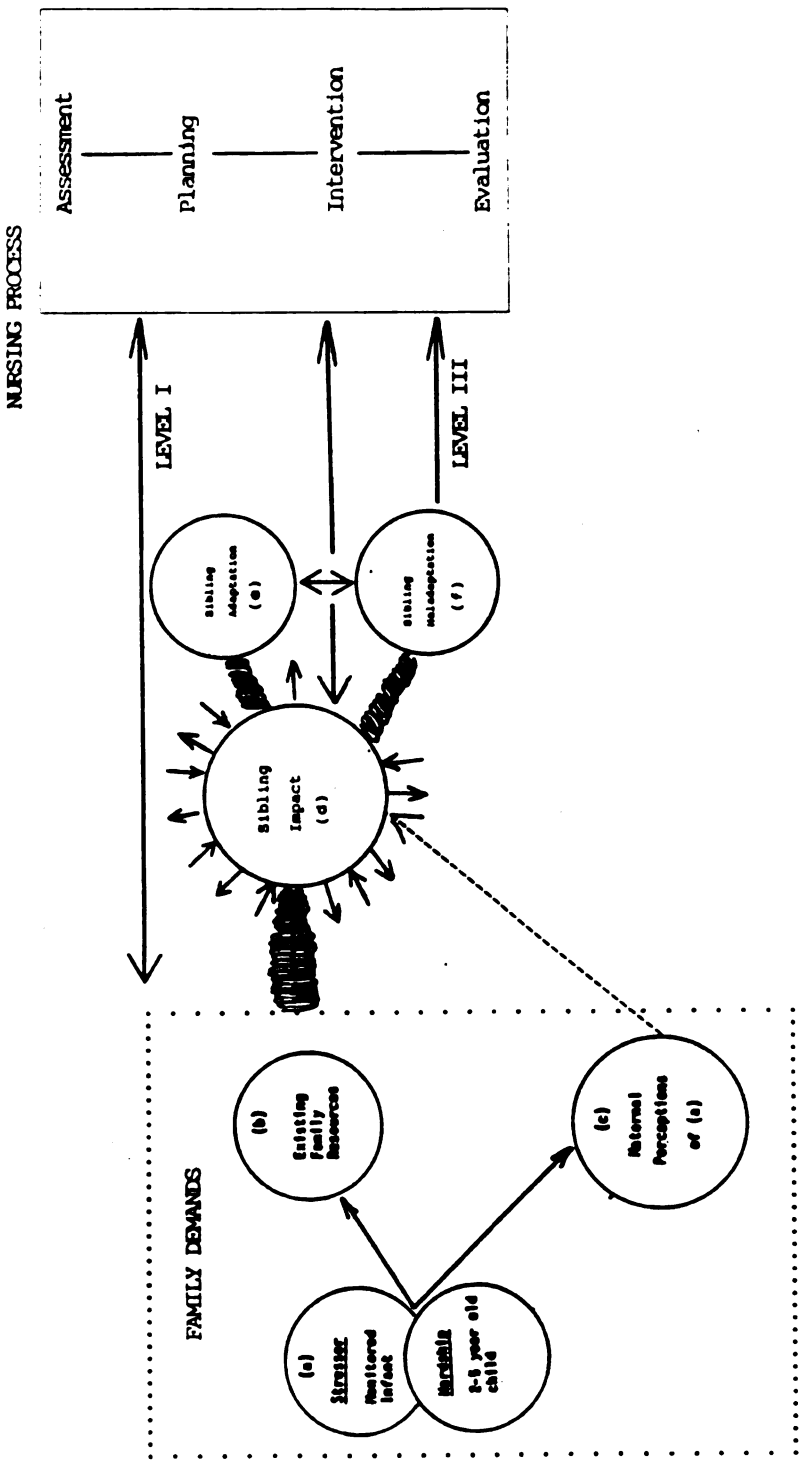
As discussed in the study results, the mothers perceived the two-to-five-year-old sibling behavior to be impacted slightly more in the psychosocial areas of aggression, sibling (jealousy) interaction, regression and anxiety than before the infant/monitor experience. These results indicate the need for the nurse to give anticipatory guidance to the mother and young brother or sister in addressing the health

care needs of these individuals in both the acute and primary care settings. The outcomes will hopefully result in normal development for both the individual and family. The conceptual framework for this study explained in Chapter Two (see Figures 3 and 4) is completed with interaction of the professional nurse (see Figure 5).

Teaching and counseling to promote health maintenance activities in a variety of settings is an important role for the nurse in advanced practice. In this model the time lines of nursing interventions are depicted by three levels. At Level I, nursing strategies will address the anticipatory guidance required to decrease maternal and sibling stress at the time of initial family preparation and education for home care. The sibling will be incorporated into the plan of care at this time.

The timeliness of nursing actions may decrease family stress and prevent sibling dysfunction with the use of specific strategies explained later in this chapter. At Level II of the model the family will be at home with the monitor and may require nursing intervention with the mother and child during the initial and adjustment phases as described by Barr (1979). Reported sibling maladaptation (Level III) will require more intense planning and implementation to relieve stress behaviors as well as assistance in the development of positive adaptive behaviors for sibling needs that were not addressed at the time of entry. The role

Figure 5. Conceptual Model



of the CNS as a change agent--using a deliberate approach to address maternal and sibling needs while preparing the family for its care giving responsibilities, setting time frames and goals for preventive health care--is an important aspect of the advanced practice role.

Evaluation of the environment and its effect upon the sibling and family, the family history and growth and developmental processes are part of this process. Nursing diagnosis and intervention is based upon a holistic view and does not emphasize parts as articulated in Rogers' nursing theory (1981). Intervention is aimed at working with the environment and with modifying life processes. In all instances, coordination of the individual activities with the environment is paramount so that adaptation can occur. Addressing parent and sibling coping will assist in the development of positive mental health. Outcomes must be measured to determine the strategy revisions necessary.

The role of educator is paramount in educating the mothers to manage their stress during this difficult period and to know the signs of stress in their two-to-five-year-old child. The CNS in the planner, educator, and counselor role can address healthy siblings' needs and offer parents useful strategies to help their two-to-five-year-old child to adapt to the altered family situation (Trahd, 1986). This may include a variety of nursing strategies that can be identified from the data and supporting literature.

1. Strategies to Decrease Maternal Stress

Assisting the family to cope with the home-monitored infant experience is one of the goals of the teaching program. The strategies will assist the parent(s) to: (a) realize that they have the internal resources to accurately identify problems and to seek creative solutions to them; (b) identify and use the external support system such as extended family, friends, apnea support group; (c) identify and use internal support systems such as the development of positive self-regard attitudes (Brammer and Abrego, 1981); (d) develop skills to reduce the accompanying stress such as self-relaxation, means to control over/under stimulation and self-rewards; and (e) develop skills for planning and achieving change such as listing options, weighing pros and cons, and making provisions for change (Brammer and Abrego, 1981).

2. Strategies to Reduce Sibling Stress

Assisting parents to: (a) communicate openly with the young child and offer time for questions and feeling expression; (b) give small amount of new information at a time; (c) keep some form of consistent household routine; (d) prepare the child for changes in family before they occur, whenever possible; (e) enhance child's self-esteem through encouragement, caring, focused attention and respect; (f) encourage the child to develop a special interest or talent; (g) use anticipatory guidance to avoid stress from sudden transition; (h) allow anger expression toward the

infant, find individual talk time, and encourage verbalization of feelings; (i) spend high quality time with young child; (j) attempt to maintain the same caregiver for child (i.e., extended family or child sitter); (k) acknowledge strengths and ability of sibling; (l) help child distinguish reality from fantasy; and (m) help child view the situation positively.

Other nursing interventions may also include: (a) scheduling 1:1 time with the sibling; (b) role modeling of interaction with siblings to family; (c) assisting parents to interpret sibling behaviors, questions/concerns; (d) assessing siblings periodically to determine their adaptation to infant home monitoring; and (e) reminding parents of importance of adequate rest, nutrition, and medical care for the sibling during this busy time in family life. In summary, each child must be assessed and individualized strategies planned in order to manage the multitude of behaviors that could be manifested during this stressful period.

Current nursing staff practicing in the home monitoring programs will require continuing education in not only the technical areas of care but sibling development and family needs as well. Many of the generic nursing programs are geared toward acute care nursing practice, rather than nursing in wellness, which assumes health prevention, promotion, and maintenance. Intervention focused on

prevention of sibling dysfunction will assist the family in its adaptation to home apnea monitoring.

The importance of a knowledge base that incorporates Rogers' (1981) concepts of wholeness, openness, change, and adaptation will promote positive outcomes for the individual and family. The offering of theory via seminars and inservices that focuses on chronic illness, home care, family and individual assessment, adaptation and growth and development of the family members is essential in the development of advanced graduate education programs and advanced nursing practice.

Finally, nurses must be encouraged to explore and understand their own perceptions. In this way, they will truly view the client/family's world and address needs through this therapeutic interaction.

Implications of the Research Findings to Nursing Research

Instrument Alteration. Several modifications are necessary on the sociodemographic questionnaire used in this study. The changes are due to the difficulties discovered in the interpretation of the subject responses. On the sociodemographic survey (see Appendix C), the following questions require greater clarity in either the question or the response menu:

Question #1. Remove current date from body of questionnaire.

Question #3. The response menu should be altered so that the ethnic backgrounds cover the most common cultures in the geographic area (i.e., delete #3 Indian).

Question #4. The response menu should be altered so that the marital status is mutually exclusive (i.e., eliminate #2-Single).

Question #8. "Homemaker" should be added to the response menu.

Question #19. The stem of the question should ask the length of time the infant was on the monitor with a fill-in-the-blank response.

Question #23. The response menu should renumber the stress level (i.e., high stress = 4, low stress = 1). In this manner, the correlation would be in a positive direction.

The original SDIT developed for the study was revised through the process explained in Chapter Five. Because of the high number of not applicable responses, only those questions with three or fewer missing variables were subjected to the reliability testing. Thirteen more items were omitted from the SDIT via computation of the alpha scores. The omission of these questions narrowed one of the concepts. The broad concept of sibling interaction was narrowed to measure jealousy. A discussion of the concepts and questions appears in Chapter Five.

In summary, the instrument that remains is smaller in size and more efficient to administer due to the decreased

time needed for completion (see Appendix D). The instrument will require further use with a larger sample of parents.

Sample. The small sample number created difficulty in correlating the demographic data with the SDIT. Due to the small numbers, correlations planned could not be completed. Finally, through the identification of an accurate client profile and potential risk factors, the nurse can create appropriate research designs. The study sample was difficult to obtain due to the study criteria. The need to obtain a sample of infants that were placed on the monitor between two weeks and six months of age decreased the sample number. After seeking data for a three-month period, the criteria was changed to include all infants placed on home monitors between newborn and six months of age (see Appendix B). Perhaps using a control group of newborns with two-to-five-year-old siblings would have allowed the researcher more control of the newborn variable.

In retrospect, an interviewer-administered design may have increased the sample size and assisted the researcher to obtain a more heterogenous sample because the mothers who could not read well could be interviewed to obtain their perceptions of sibling behavior. Furthermore, the timing of this study found southwestern Michigan going through several major transitions which directly impacted the sample procurement:

1. The new SIDS Research Center opened in December of 1986 with the center absorbing the large parent apnea support group.

2. Several monitor companies were also experiencing change. While some companies were gearing up for a large influx of patients (i.e., the monitor company affiliated with the SIDS Research Center), others were preparing for a decrease in infant home monitoring census. Staff from these companies were frequently relocating. This created a most unstable environment in which to collect data.

3. The supervisors that were managing the five monitor companies were usually respiratory therapists. It was at times difficult to seek cooperation in data collection as reorganization of the companies was naturally their priority.

Design. The optimal research design for studying the effect of home monitoring on two-to-five-year siblings as perceived by the mother would be an experimental design. Maternal per- ceptions of siblings with an infant (control group) would be compared to siblings with an infant at home on a monitor (experimental group). In this way the researcher could control the newborn variable. A longitudinal observational design would also yield more accurate results as adaptation to home monitoring is a process as described by Barr (1979) which occurs in three stages: initial, adjustment, and the time thereafter stage. Instrument administration could occur during these three stages and comparisons made.

Longitudinal studies would assist in the development of sound interventions to assist the mother and sibling in their adjustment to the crises of home monitoring. In summary, the SDIT could be administered at different times in the monitoring period to compare maternal perceptions over time. Research should also be conducted with fathers and older siblings to obtain information of their perceptions in order to address the needs of the entire family and to look at the interaction of these perceptions. The tool constructed by this researcher also requires changes in the scoring options to create more variability in the scoring mechanism.

In summary, further nursing research should be focused on continued assessment and description in order to gain understanding of the impact of the home-monitored infant on the family system. Through consultation, collaboration, role modeling, and education, the nurse in advanced practice will be influential in caring for the family preparing to assume responsibility for their home-monitored infant. Nursing research will provide the CNS with the knowledge base to fulfill this role.

Recommendations for Future Research

Implications for further nursing research may be concluded from this study as follows:

1. Conduct a similar study that is recommended only after revisions are made in the sociodemographic and Sibling Development Issues Tool as outlined earlier in this chapter.

2. Incorporate more monitor companies and parent support groups to obtain a larger sample is important.

3. Use a home interview format in order to obtain a more heterogenous sample. In this manner the sample may include those individuals who have difficulties with written questionnaires.

4. Use a control group consisting of well infant and two-to-five-year-old sibling.

5. Obtain maternal perceptions of a different chronic childhood disease such as cystic fibrosis. Further research using the SDIT or other chronic disease would provide comparison of maternal perception of sibling reaction. It could be that chronic illness is different from the temporary nature of apnea monitoring.

Expanded Research

1. The SDIT could be divided to accommodate more questions which relate to a limited age group. For example, Section One that relates to the two-to-three-year-old and Section Two has questions pertinent to four-to-five-year old development. The defined focus would allow the researcher more exploration related to the specified age group. In the SDIT, there were many missing variables as the tool (SDIT) attempted to cover a wide age range (two to five years), thus some questions were not applicable for a specific age and required the mother to respond as "does not apply."

2. Some of the moderating variables require further research such as length of time on monitor, mother's stress

level, and the impact of a support group. These components will also give further direction for nursing actions.

3. The perceptions of father as well as older siblings will also give direction to a family-centered approach to nursing practice.

4. Research which compares all age siblings' reaction to the home-monitored infant as perceived by mother and father would provide interesting information.

5. Comparison of maternal and paternal perceptions would also assist the nurse in the family plan of care.

6. An observational and/or report tool to directly measure sibling behavior would obtain results of actual sibling feelings and behaviors.

Experimental Research

Following the completion of the descriptive studies, research related to the effectiveness of various nursing interventions is essential to the continuation and further development of scientific nursing practice. For example, various interventions to decrease maternal stress could be tested as well as specific approaches to promote sibling coping. For the most part, research directed toward the improvement of sibling coping is not well documented.

Conclusion

The need for continued research in the area of sibling reaction to chronic illness cannot be overly emphasized. Investigators must not only focus on the difficult methodological issues that arise but also conduct experimental

research that evaluates various interventions to assist clients to cope with the stress of chronic illness.

Indeed, there were several methodological weaknesses present within this study. First was the inability to use a random sample technique, which limits the ability to generalize the findings outside of the actual study sample. Furthermore, the small sample size made it difficult to analyze the data in relation to the sociodemographic variables and the Sibling Developmental Issues Tool. Although there was a rather large pool of subjects for study, it was most difficult to obtain an adequate size sample as explained earlier in this chapter.

An interview-administered tool versus the self-administered tool might have enlarged the sample size in a more timely manner. The six-month period of time resulted in a sample number of 22. The interview-administered approach may have given the researcher more control over obtaining an adequate sample number.

Finally, future researchers must be encouraged to accept the challenge of conducting studies with families and siblings of chronically ill children. The use of longitudinal studies may capture more accurately the adaptation/maladaptation of the well sibling in relation to the chronically ill child, rather than episodic data collection. Unfortunately, there are difficulties involved in conducting longitudinal studies. Such studies are time consuming and expensive as well as burdened by attrition.

The nurse in advanced practice is being challenged to focus on prevention and wellness. Health care resources, including expertise and dollars, need to focus on identification of the high-risk individual and family. Effective actions proven to maintain wellness and promote individual and family growth require a priority position in the health care system.

The nursing management of the child-rearing family with a home apnea monitored infant is both complex and rewarding to the professional nurse. It is important that the family unit is considered when the plan of care is developed. M. Rogers' (1981) nursing theory provides the goal of creative change and growth to meet maximum health potential. The individual and family as an open dynamic system set the stage for the Family Clinical Nurse Specialist to maintain and promote health.

Appendices

Appendix A

Verification of Research Approval

MICHIGAN STATE UNIVERSITY

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

EAST LANSING • MICHIGAN • 48824-1046

June 17, 1986

TO: DIANE WHITE

FROM: HENRY E. BREDECK, CHAIRMAN, UCRIHS HEB/jp

SUBJECT: PROPOSAL ENTITLED, "MATERNAL PERCEPTIONS OF SIBLING (AGE 2-5 YEARS) REACTION TO A HOME MONITORED INFANT"

The above referenced proposal has been distributed for review to a subcommittee of UCRIHS and one of the reviewers made the following comments:

Reviewer — "Two changes need to be made:

1. Delete the reference to UCRIHS' approval in consent form.

2. Address the coding procedure in the consent form."

We would appreciate your early response to these comments so that we can complete our review of this project.

jms

cc: Dr. Barbara Given

MICHIGAN STATE UNIVERSITY

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

EAST LANSING • MICHIGAN • 48824-1046

July 8, 1986

Ms. Diane White
7122 Bronson Circle
Kalamazoo, Michigan 49008

Dear Ms. White:

Subject: Proposal Entitled, "Maternal Perceptions of Sibling (Age 2-5 Years) Reaction to a Home Monitored Infant"

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 July 7, 1986.

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 July 7, 1987.

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

BRONSON METHODIST HOSPITAL

May 12, 1987

To Whom it May Concern:

This letter is to confirm the approval of Nursing Research Proposal #863, Maternal Perceptions of Sibling (age two to five) Reaction to a Home-Monitored Infant by the Bronson Hospital Nursing Research Committee.

The study was reviewed at the January 19, 1987 meeting and the investigator, Diane White, was notified that she might proceed in implementing the proposal any time after that date.

Sincerely,

Mary Johnson-Dormady RN

Mary Johnson-Dormady, R.N.
Chair, Nursing Research Committee

mm

252 EAST LOVELL
KALAMAZOO, MICHIGAN 49007
616/383-7634

Appendix B

Letter of Introduction and Consent Forms

Dear Parent,

As a Michigan State University graduate nursing student, I have chosen to complete my master's thesis by conducting a research study on the developmental issues present for the young brother or sister (age 2-5 years) of monitored infants as perceived by mothers.

This letter is written to request your participation in this study. Mothers will each be requested to complete two questionnaires mailed to their homes. One questionnaire contains general information about your family, the infant, and the brother or sister. The second questionnaire contains 69 questions about your 2-5-year-old child. All responses will remain confidential.

Mothers are invited to participate in this study if the following criteria are met:

1. The mother lives in the home with the monitored infant.
2. The monitored infant is no older than 12 months of age.
3. This infant is the first child in the family to ever be on a monitor.
4. A sibling between the age of 2-5 years lives in the home with the infant on a monitor.
5. The mother is able to spend 30-40 minutes to complete the questionnaires.

If you meet the above criteria, I would appreciate your participation in the study. The decision you make will not affect your health care. If you choose to participate, you may withdraw at any time without penalty.

Please return the postcard which, when mailed, will indicate your willingness to take part in the study. Further information, including a consent form as well as the questionnaires, will be mailed to you promptly after receipt of permission to do so. I will also telephone you to see if you have any questions.

If you have any questions, please contact me at work (1-616-383-1396) or at home (1-616-344-7776).

Sincerely,

Diane White, R.N.
Clinical Nurse Specialist Candidate
Michigan State University

Dear Parent,

Thank you so very much for agreeing to be a part of this research study! Your assistance will help nurses and other health professionals in the development of improved programs for infant home monitoring programs.

Enclosed in this packet you will find two consent forms and two questionnaires. One consent form is for you to retain for your records, and one requires your signature and its return with the questionnaires. The first questionnaire contains general information about yourself and your family. The second questionnaire focuses on your child age 2-5 years and his/her reaction to the monitor experience. If you have more than one child in the 2-5-year age range, select only one child in this age group to keep in mind while filling out the survey. Please answer each question as honestly as you can without seeking assistance from spouse, family or friend. Remember that you will not be identified in the study.

I very much appreciate the time and effort you have expended to take part in this research. I will telephone you several days after the mailing of this packet to answer any questions you may have. Feel free to contact me with any questions you may have (383-1396/work or 344-7776/home). Thank you.

Diane White, R.N.
Clinical Nurse Specialist Candidate
Michigan State University

Script for Obtaining Informed Consent

Some studies have been conducted that are related to parents' adjustment to an infant on a home apnea monitor. Presently there are no studies available that determine the effect of the monitor on other young children in the family. Nurses are concerned because it is important for the home monitor programs to address the needs of the entire family, including the two-to-five-year-old child.

The studies related to parents of home-monitored infants show that this is indeed a stressful period for families. I am conducting a study to find out what developmental issues are present for siblings (age two-to-five years) with a monitored infant in the home. I would appreciate 30 to 40 minutes of your time to complete a questionnaire, which includes a general information section plus the Sibling Developmental Issues Tool.

If you participate in this study:

1) All information regarding your responses will be treated confidentially by the use of code numbers. Names will not appear on any of the questionnaires. The questionnaires will be destroyed after the study is completed.
2) You have the right to withdraw from the study at any time.
3) Participation or nonparticipation in this study will in no way affect the health care your family is receiving.
4) The investigator may release this study to nursing literature; however, you will not be identified by name.
5) You may request a summary of this study if you so desire.

If you have any questions at any time regarding this study, you may contact Diane White at work (616-383-5910) or home (616-344-7776).

Informed Consent

Diane White, R.N., is conducting a study to measure the impact of the home-monitored infant on the child's (age two-to-five years) development as perceived by the mother. While studies are present that describe the needs of parents during the monitor period, there are no studies available that address the brother/sister issues.

If I voluntarily consent to participate in the study, I understand that:

1) There will be a general information and the Sibling Developmental Issues questionnaires to complete.
2) This study will not affect the health care my family receives, now or in the future.
3) All information regarding my participation will be kept confidential by the use of code numbers. Names will not appear on any of the questionnaires. The questionnaires will be destroyed after the study is completed.
4) I can withdraw from the study at any time without any affect on the health care my family receives.
5) I may obtain a summary of this study if I so desire.

I acknowledge that:

1) I have been given an opportunity to ask questions about this study and they have been answered.
2) If I have further questions, I may contact Diane White, R.N., at (616) 383-5910 and (616) 344-7776.
3) Participation in this study will in no way affect the present or future health care my family receives.
4) The investigator has my permission to release the information gained from this study to nursing literature. I understand that I will not be identified and data will be presented in aggregate form only.
5) I have received a copy of this consent form.

_____ _____

Date Mother

Appendix C

Sociodemographic Questionnaire

Questionnaire #1
Socio-Demographic

The following questions include general information about yourself, your monitored infant, your 2-5 year old child, and your family. Please answer all the questions as best you can. There are no right or wrong answers. All information will be confidential!

---

1. Date _____

2. Age _____

3. Ethnic background: (Please mark an (X) in appropriate category)

___ Afro-American (Black) ___ Mexican American

___ Caucasian (White) ___ Oriental

___ Indian ___ Other

4. Marital Status: (Please mark an (X) in appropriate category)

___ Married ___ Divorced

___ Single ___ Widowed

___ Separated

5. Your educational level: (Please mark an (X) in highest grade completed)

___ Fewer than seven years of school (grades 1-6)

___ Junior High School (grades 7-9)

___ Partial High School (grades 10-11)

___ High School (completed 12th grade)

___ Partial College Education (2 years or less)

___ College Education (4 years)

___ Beyond 4 years of college

6. Are you presently working for pay outside the home? ___Yes ___No

7. If yes, are you working: ___Full-Time ___Part-Time

8. What is your current occupation? (Mark an (X) in one category)

___ Clerical
___ Professional
___ Executive
___ Skilled Worker
___ Semi-Skilled or Unskilled Worker
___ Currently Unemployed
___ Other (Please specify)_____

9. Spouse or significant other in home? ___Yes ___No

10. If yes, spouse or significant other's educational level: (Please mark an (X) in highest grade completed)

___ Fewer than seven years of school (grades 1-6)
___ Junior High School (grades 7-9)
___ Partial High School (grades 10-11)
___ High School (completed 12th grade)
___ Partial College Education (2 years or less)
___ College Education (4 years)
___ Beyond 4 years of College

11. If yes, spouse or significant other's current occupation: (Mark an (X) in one category)

___ Clerical
___ Professional
___ Executive
___ Skilled Worker
___ Semi-Skilled or Unskilled Worker
___ Currently Unemployed
___ Other (Please Specify) _____

12. What is your family's total annual income?

___ 0-9,999
___ 10,999-19,999
___ 20,000-29,999
___ 30,000-39,999
___ 40,000-49,999
___ 50,000-59,999
___ 60,000-Above

13. How many children do you have living at home? _____

14. What are the ages and number of the children living in the home?

[Place the number of children in appropriate age column(s)]

___ Newborn to 1 year
___ 1 year 1 day to 3 years
___ 3 years 1 day to 6 years
___ 6 years 1 day to 9 years
___ 9 years 1 day to 12 years
___ 12 years 1 day to 15 years
___ 15 years 1 day to 18 years

The following questions describe general information about your infant and the apnea monitor. Please answer all questions to the best of your ability. There are no right or wrong answers. All information will be kept confidential!

---

15. Birth date of monitored infant: _____

16. Birth weight of infant: _____

17. Sex of infant: ___ Male ___ Female

18. When was your child placed on home monitoring?

___ 0 - 10 days
___ 11 - 20 days
___ 21 - 30 days
___ 31 - 40 days
___ 41 - 50 days
___ 51 - 60 days
___ 61 - 70 days
___ 71 - 80 days

19. Approximately how long has your infant been on the monitor?

___ 0-6 days
___ 1 week to 2 weeks
___ 2 weeks 1 day to 1 month
___ 1 month 1 day to 2 months
___ 2 months 1 day to 4 months
___ 4 months 1 day to 6 months
___ 6 months 1 day or longer

20. Why was your infant placed on a monitor? (Check all that apply)

___ Observed apnea spell and/or bradycardia (low pulse) spell
___ Abnormal pneumogram
___ Premature infant
___ Previous sudden infant death in family
___ Other (Please Specify) _____

21. Does your infant have any other illness or congenital problems?

___Yes ___No

22. If yes, what is the illness or congenital problem? _____

_____

23. How would you rate your stress level associated with the monitor experience? (Mark an (X) in one category)

___ High Stress
___ Moderate Stress
___ Low Stress
___ No Stress

24. Were you involved in a monitor teaching program? ___Yes ___No

25. Do you belong to a parent group of monitored infants? ___Yes ___No

26. If yes, how often does the parent group meet?

___ Once a month
___ Twice a month
___ Once every other month
___ 2-3 times a year
___ Never

27. If yes, how often do you attend the parent group?

___ Whenever it meets

___ Occasionally

___ Never

The following questions include general information about your child (age 2-5 years). If you have more than one child in this age category, select only one to keep in mind while answering these questions. Please answer all the questions to the best of your ability. All information will be kept confidential!

---

28. Birth date of child: _____

29. Sex of 2-5 year old child: ___ Male ___ Female

30. Does your child age 2-5 years have any major health problems?

___ Yes ___ No

31. If yes, what is the major health problem? (Mark an (X) in appropriate category)

___ Asthma/Cystic Fibrosis
___ Frequent Ear Infections
___ Seizures
___ Mental Retardation
___ Neuromuscular Disorder
___ Kidney Disease
___ Cancer
___ Heart Disease
___ Other (Please Specify)_____
_____

32. Did your child (age 2-5 years) attend any sibling classes in preparation for the newborn infant? ___Yes ___No

33. If you have more than one child in the 2-5 year old age range, please state the reasons you selected this particular child: _____

_____

_____

Thank you for your time! Please place the completed questionnaires in the accressed envelope and return to the researcher.

Appendix D

Sibling Developmental Issues Tool (SDIT) [69 items]

and

Revised Sibling Developmental Issues Tool [26 items]

Sibling Developmental Issues Tool

Does your (2-5 yr) child?	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
1. Demonstrate discomfort when you leave for short periods of time?						
2. Whine?						
3. Use self-centered language (i.e., "I" and "me")?						
4. Follow instructions given?						
5. Want attention?						
6. Want help with skills he/she can do?						
7. Explore new places and/or objects (i.e., look at and touch)?						
8. Like to figure out simple problems for him/herself (i.e., trial-and-error)?						
9. Want to be held?						
10. Have difficulty going to sleep at night						
11. Use words to tell you about objects, actions or events in the past?						
12. Behave in a manner that indicates jealousy of infant?						
13. Have temper tantrums or anger outbursts?						
14. Act demanding or bossy?						

Sibling Developmental Issues Tool

	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
Does your (2-5 yr) child?						
15 Cease talking when upset?						
16 Use self-centered language (i.e., "I" and "me")?						
17 Follow instructions given?						
18 Become easily upset or frustrated?						
19 Want attention?						
20 Act restless or nervous with nonparent relatives?						
21 Want help with skills he/she can do?						
22 Act restless or nervous with immediate family?						
23 Try to strike out at infant physically?						
24 Refuse to share toys and/or belongings?						
25 Explore new places and/or objects (i.e., look at and touch)?						
26 Like to figure out simple problems for him/herself (i.e., trial-and-error)?						
27 Try to strike out at parents physically?						

Sibling Developmental Issues Tool

	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
Does your (2-5 yr) child?						
28 Want to be held?						
29 Daydream?						
30 Use fantasy to explain cause/effect of illness?						
31 Speak rapidly and/or stutter?						
32 Have various physical complaints (i.e., headache, stomachache)?						
33 Refrain from initiating family activities?						
34 Have difficulty going to sleep at night?						
35 Have fear of familiar objects?						
36 Have difficulty with concentration and attention?						
37 Use words to tell you about objects, actions or events in the past?						
38 Stay away from infant?						
39 Smash toys or other objects?						
40 Behave in a manner that indicates jealousy of infant?						
41 Have temper tantrums or anger outbursts?						

Sibling Developmental Issues Tool

Does your (2-5 yr) child?	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
42 Act demanding or bossy?						
43 Have nightmares?						
44 Use gestures to communicate wants and needs rather than words?						
45 Try to strike out at parents verbally?						
46 Act restless or nervous with strangers?						
47 Seem interested in and curious about his/her surroundings?						
48 Have daytime toileting accidents?						
49 Want comfort object such as a blanket or stuffed animal?						
50 Refuse to look at you and other family members?						
51. Refuse to join in family activities when invited to do so?						
52 Crawl in bed with you at night?						
53 Imitate some past event (i.e., a party)?						
54 Have imaginary playmate?						
55 Talk to family members?						

Sibling Developmental Issues Tool

	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
Does your (2-5 yr) child?						
56 Act overly active?						
57 Try to strike out at other siblings verbally?						
58 Become verbally loud and aggressive when frustrated?						
59 Tell imaginative stories?						
60 Entertain him/herself?						
61 Tease or annoy infant?						
62 Want light on while sleeping?						
63 Retain and recall something newly learned?						
64 Imitate adult behavior						
65 Use comfort behaviors such as thumbsucking or rocking?						
66 Behave in a manner that indicates jealousy of your time with and concern for infant?						
67 Indicates he/she has caused illness or family stress?						
58 Play make-believe?						
59 Have many questions when he/she experiences something unfamiliar?						

Thank you for your time. Please place completed questionnaire in addressed envelope and return to researcher.

QUESTIONNAIRE #2
SIBLING DEVELOPMENTAL ISSUES TOOL (Revised)

Directions: A number of statements which may apply to your 2-5-year old child's behavior during the baby's home monitor period are given below.

Read each statement and then mark an (X) in the box to the right of the statement that best describes your 2-5-year-old child's behavior. If you have not observed the behavior mentioned in the statement, mark an (X) in the "does not apply" column. If you have more than one child in the 2-5-year-old range, choose only one child to keep in mind while answering the questions which follow. There are no right or wrong answers. Remember, give the answer which you feel describes your child's behavior.

Continued . . .

Sibling Developmental Issues Tool

Does your (2-5 yr) child?	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
1. Demonstrate discomfort when you leave for short periods of time?						
2. Whine?						
3. Use self-centered language (i.e., "I" and "me")?						
4. Follow instructions given?						
5. Want attention?						
6. Want help with skills he/she can do?						
7. Explore new places and/or objects (i.e., look at and touch)?						
8. Like to figure out simple problems for him/herself (i.e., trial-and-error)?						
9. Want to be held?						
10. Have difficulty going to sleep at night						
11. Use words to tell you about objects, actions or events in the past?						
12. Behave in a manner that indicates jealousy of infant?						
13. Have temper tantrums or anger outbursts?						
14. Act demanding or bossy?						

Sibling Developmental Issues Tool

Does your (2-5 yr) child?	Does Not Apply 0	Much Less Than Before Infant/ Monitor 1	Slightly Less Than Before Infant/ Monitor 2	Same As Before Infant/ Monitor 3	Slightly More Than Before Infant/ Monitor 4	Much More Than Before Infant/ Monitor 5
15. Act restless or nervous with strangers?						
16. Seem interested in and curious about his/her surroundings?						
17. Talk to family members?						
18. Become verbally loud and aggressive when frustrated?						
19. Tell imaginative stories?						
20. Entertain him/herself?						
21. Want light on while sleeping?						
22. Retain and recall something newly learned?						
23. Imitate adult behavior?						
24. Behave in a manner that indicates jealousy of your time with and concern for infant?						
25. Play make-believe?						
26. Have many questions when he/she experiences something unfamiliar?						

Thank you for your time. Please place completed questionnaire in addressed envelope and return to researcher.

List of References

List of References

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