ABSTRACT

Sharon Isenhour Sarvey. NEONATAL NURSES SELECTION OF APPROPRIATE INTERVENTION IN RESPONSE TO PRETERM INFANT BEHAVIORS (Under the direction of Emilie D. Henning)

The purpose of this study was to determine whether neonatal intensive care nurses use synactive theory as the basis for nursing interventions for preterm infants, given researcher-identified assessments of behavioral cues.

A sample of 28.4 percent or 97 of 341 registered nurses in seven neonatal intensive care units completed a questionnaire designed to measure appropriate nursing interventions in response to given preterm infant behaviors. Hypotheses were proposed that nurses who had (a) more education or (b) more experience would score higher in identifying appropriate interventions based on synactive theory in response to given preterm infant behaviors.

Mean scores were calculated for those participants who had more or less education and more or less experience. More education versus less education was defined as baccalaureate/higher degree nursing preparation versus associate degree/diploma preparation. More experience versus less experience was defined as more than 3 years

neonatal nursing experience or less than or equal to 3 years, respectively. Statistical analysis demonstrated no significant difference in mean scores for either of the above comparisons at the .05 level. Therefore, neither of the hypotheses proposed were supported.

Further research is needed in this area. Because of the newness of the theory, this practice model may not be well known, studied or utilized for preterm infant care. Continuing education in this area should be developed and nurses provided with opportunities to access the information. Finally, the instruments utilized to study this question should be redesigned for greater validity and reliability.

NEONATAL NURSES SELECTION OF APPROPRIATE INTERVENTION IN RESPONSE TO PRETERM INFANT BEHAVIORS

A Thesis

Presented to

The School of Nursing

East Carolina University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science in Nursing

by

Sharon Isenhour Sarvey

December, 1988

NEONATAL NURSES SELECTION OF APPROPRIATE INTERVENTION IN RESPONSE TO PRETERM INFANT BEHAVIORS

by
Sharon Isenhour Sarvey

APPROVED BY:

DIRECTOR OF THESIS
Emilie D. Henning, R.N., Ed.D.

COMMITTEE MEMBER
Dorothy L. Merrow, R.N., M.S.

COMMITTEE MEMBER
Maryellen McSweeney, Ph.D.

COMMITTEE MEMBER
Charles W. Snow, Ph.D.

ASSISTANT DEAN
GRADUATE STUDIES
SCHOOL OF NURSING
Theresa P. Lawler, R.N., Ed.D.

DEAN, GRADUATE SCHOOL
Joseph G. Boyette, Ph.D.

ACKNOWLEDGMENTS

Special thanks to Dr. Emilie Henning, Ms. Dorothy Merrow, Dr. Maryellen McSweeney and Dr. Charles Snow for their assistance to me as I completed this thesis. Their support, guidance and constructive suggestions have made the completion of this thesis possible.

Extra special thanks to Dr. Henning for directing this thesis project. Her untiring efforts can never be adequately commended.

Table of Contents

List of Tables

CHAPTER I

Introduction

Annually, some 200,000 to 250,000 infants born in the United States will, for some reason, require neonatal intensive care. Hospital stays will average 14-45 days, contingent on gestational age and condition acuity (Gottfried, 1985). A walk through any neonatal unit will demonstrate the preponderance of premature infants in the neonatal care population.

While great strides have occurred in medical technology related to the care of premature infants over the past 80 years, the foci of such care--thermoregulation, feeding and prevention of infection--remain the same. However, the technology available to deliver the care is vastly improved. Advances seem to occur daily. Consequently, nurses caring for these special infants must constantly attempt to keep pace with changing technology.

Experience has demonstrated to the nurse entering the world of neonatal intensive care a need for extreme, rapid technological competence. Overbed warmer function and infant temperature must be monitored to avoid the complications of hypo or hyperthermia. Cardiorespiratory monitors must be observed for changes that could indicate cardiopulmonary compromise. Intravenous fluid pumps which deliver life sustaining nutrients must be regulated. Laboratory

specimens must be drawn, and their results interpreted. Ventilators must be closely watched for mechanical failure. Finally, the infants must be examined, prodded, listened to, turned, and massaged with emollients. The list of care-giving activities becomes endless; all of which occur in a brightly lit, constantly noisy, incessantly active, small, closed-in environment crowded with numerous persons and machines. Rapid orientation of the nurse must occur to specialized equipment, the general environment, and physiologic as well as psychologic needs of the special neonate -- especially the preterm neonate incapable of independently adapting to extrauterine life.

Concerns arose from the observation of such hustle, bustle environments. Experts in child development found these technologically oriented units are sensory depriving in the preterm infant (Leib, et al., 1980; Cornell and Gottfried, 1976; Chapman, 1978; Rausch, 1981; Williams et al., 1986). As a result of these observations, programs were established and implemented to provide the desired stimuli to infants. Recent review of these programs and neonatal unit environments has demonstrated concerns of a different nature. Overstimulation has been demonstrated rather than understimulation with infants receiving various inappropriate stimuli. Experts have suggested that neonatal care must include individualized developmental intervention, rather than preplanned regimens, and nurses should be the

providers of individualized developmental care (Cole, 1985; Cole & Frappler, 1986; Gorski, 1985; Blackburn, 1983).

Nurses, however, may not be cognitively prepared to provide this care. Neonatal intensive care unit orientation is, typically, technical in nature; the focus being physiologic care. Emphasis is placed on rapid orientation to increase nursing care hours available for more intensely ill infants. As a consequence, neonatal nurses care for babies who are more acutely ill as their experience increases and skills advance. Because of this sequence of events, neonatal intensive nursing care delivery lacks individualized developmental assessment and intervention. One method of implementing this concept of individualized developmental assessment and intervention in the care of preterm infants would be through incorporation of Synactive Theory into neonatal patient care delivery. The purpose, therefore, of this study is to determine, through a survey, whether neonatal intensive care nurses use individualized developmental assessment and interventions as embodied in synactive theory as a basis for nursing interventions for preterm infants, given researcher-identified assessments of preterm infant behavior.

CHAPTER II

Review of Literature

In an attempt to focus on whether there are inadequate behavioral assessments and developmental interventions used for preterm infants by neonatal intensive care nurses, a review of the literature was undertaken. Focus was on the neonatal intensive care environment, infant stimulation, and the evolution of developmental intervention.

Early caregivers for preterm infants, lacking the advantages of modern neonatal technology, focused their energies on the premature infant's inherent compromises: thermoregulation, feeding, and potential for infection (Hodgeman, 1985). Much of today's neonatal care, with the benefit of modern technology, is focused on the same basic care. However, modern technology has provided health providers with the ability to care for the acute cardiopulmonary and metabolic problems of prematurity, dramatically improving the survival rate of sick or premature infants in the United States. To illustrate, in 1972 at Children's Hospital of San Francisco, there was an overall survival rate of 48 percent for infants whose birthweights were under 1500 grams; this included no survival for infants less than 750 grams. By 1981, the overall survival rate had risen to 81 percent with 53 percent of infants under 750 grams

surviving (Peabody and Lewis, 1985). Concurrent with the marked advances in health care technology has been an evolution in care models facilitating behavioral development of the preterm infant. Early investigators of the premature infant's intensive care environment advanced concerns of an environment that is sensory depriving for the newborns (Leib et al., 1980). As a consequence, numerous studies have been undertaken to evaluate various supplemental stimulation programs in neonatal intensive care units (Leib et al., 1980; Chapman, 1978; Williams et al., 1986; Rausch, 1981; Cornell and Gottfried, 1976). Findings have generally demonstrated improved outcomes for supplementally stimulated infants. However, study group sizes have been small and long term effects have not been measured (Harrison, 1985). More recently, with the information provided by numerous studies of the environment of the neonatal intensive care unit, many questions have arisen regarding whether infants in these units are sensory deprived or overloaded by environmental stimuli (Gottfried, 1985; Gaiter, 1985; Linn et al., 1985; Parmelee, 1985; Gottfried et al., 1984; Hyde and McCown, 1986).

The premature infant sustains a rapid transfer from the safe, secure, muted environment of intrauterine life to the brightly lit, noisy and often painful environment of the neonatal intensive care unit. The continuing growth and development of the fragile, premature infant is then subject

to much more than the health care technology required to sustain life after the rigors of premature birth, but also to the auditory, visual, tactile, and kinesthetic stimuli of the neonatal intensive care unit.

The concept of infant stimulation developed from research that suggested that infants in special care nurseries were consistently deprived of adequate visual, auditory, tactile, kinesthetic, and social stimuli because of interventions focused on physiologic immaturity (Cornell & Gottfried, 1976). Field et al. (1986) found significant increases in weight gain (47% greater) in 20 preterm neonates who underwent a program of tactile-kinesthetic stimulation over a period of 10 days as compared to those who did not receive special interventions. They also found the treated group to be more active and aware during sleep/wake observations and the treated group displayed more mature motor and state behavior (Field et al., 1986).

Leib and associates studied 28 infants who by Dubowitz assessment were found to be appropriate for gestational age with birth weights of 1200 to 1800 grams. Of these 28 infants, a control group of 14 was designated first to prevent sample contamination. The control group received routine nursery care. The treated group received pre-planned, enrichment interventions during feeding intervals. Visual and tactile stimuli were provided initially and later visual, tactile, kinesthetic, and auditory stimuli were

provided. At six months past the expected date of (maternal) confinement, the treatment group was found to demonstrate significantly higher developmental levels than control group infants as measured by Bayley Scale of Infant Development (Leib et al., 1980). Studies such as these and others have been based on the supposition that should more stimuli be provided, there should be improved behavioral and intellectual outcomes and more rapid development of the infant (Rausch, 1981; Williams et al., 1986; Kramer et al., 1975; Solkoffe et al., 1969).

This research has led to the development and implementation of aggressive sensory stimulation programs in neonatal intensive care units. These programs insist that black and white visual patterns, waterbeds, and classical music should be a part of routine nursery care - much the same as vital signs and feedings. Proponents of these programs found enhanced growth and development of infants treated according to planned supplemental stimulation (Chaze & Ludington-Hoe, 1984; Kramer and Pierpont, 1976; Neal, 1977).

Various researchers, however, have become concerned with stimuli of a different nature: environmental stimuli in neonatal intensive care units. Gottfried has suggested that global descriptions or hypotheses that suggest that infants in special care units were sensory deprived are not accurate. Infants were exposed to many kinds of stimulation

(including light, sound, tactile, vestibular - kinesthetic, and social) that varied considerably from one unit to the next. In his study of neonatal intensive care units (NICUs) and neonatal convalescent care units (NCCUs), Gottfried found infants exposed to constant fluorescent lights where illumination varied minimally and was monotonous throughout the 24 hours. Furthermore, incubators were acoustically unprotected, where high noise levels and unclear speech sounds were audible. Finally, infants were handled in the NICU an average of 57 times per day, with some as many as 92 times; the preponderance of which were classified as non-social i.e., the interactions were clinical as opposed to interactive. If social contacts were provided, it was during routine care, and caregivers often neglected to attempt to soothe crying infants during contact. This lack of responsiveness to infants' cries may serve to delay the development of contingencies between infants' behaviors and social environmental reactions (Gottfried, 1985).

Lawson, Daum, and Turkewitz reported these concerns in 1977. Their study of the environment of a neonatal intensive care unit revealed that "acoustic stimuli were audible in over 95% of observations, infants were handled more than 10% of the time they were observed, and illumination levels were always sufficiently high to permit easy visibility" (Lawson, Daum, Turkewitz, 1977). As a consequence of environmental conditions, it seems that the stimuli infants

are subjected to are inappropriate in nature rather than insufficient in quantity. Gorski supported these concerns. He found that "virtually all the health problems faced by prematurely born neonates stem from difficulties adapting to extrauterine life," and is concerned with the compensatory stimulation programs. He found that while the study findings were "provocative, they must be accepted with caution." He again suggested that infants in neonatal intensive care units are subject to inappropriate stimulation rather than overstimulation (Gorski, 1985). Cole further stated, the preterm infant is not an "isolated deprived organism," but a fairly competent infant capable of processing sensory stimulation when it is presented contingently in a sensitive, supportive environment. The behavior observed in the neonatal intensive care unit/special care unit environment is probably "a self induced sensory-deprivation model utilized by an overstimulated preterm infant, behavior that takes its toll in terms of cost, energy, and cognitive development." (Cole, 1985).

More recent literature described a different mechanism for achieving the same goal: optimum development of the premature infant. Als, in 1982, presented the Synactive Theory of Development based substantially on Brazelton's earlier works on normal newborn development. She presented a formulation of development that identifies five subsystems

of functioning in continuous contiguity and interaction: the autonomic, motor, state-organizational, attentional-interactive, and self regulatory-balancing systems. The organism negotiates the continuous differentiation of these systems in continuous interaction with the environment. Assessment of the organism's functioning therefore lies in the identification of the currently salient and emerging developmental task and its relative support by or disruption of the other subsystems in their balance or modulation. Signals of stress and signals of self-regulation can be detected at each system level in the identification of the organism's current degree of smooth, well regulated functioning. This kind of assessment of the infant's current level of organization seems important for preventive and supportive structuring of the environment and for the identification of an infant's individual progression (Als, 1982). Intrinsic to this theory are four principles of development:

1) The organism is in continuous interaction with the environment;
2) There are five subsystems of behavioral maturation which emerge sequentially;
3) Behavior in any subsystem affects the expression and quite possibly the development of other subsystems;
4) The organism continually strives to balance approach and avoidance behaviors in response to stimuli (Linton, 1986).

To facilitate the utilization of synactive development theory in neonatal care, a new tool has been developed based

on a "partially reconceptualized" model of the Brazelton Neonatal Behavioral Assessment Scale. The Assessment of Preterm Infant Behavior Scale (APIB) assists nurses to understand and document preterm infant behavior. The primary difference between the Brazelton Neonatal Behavioral Assessment Scale and the Assessment of Preterm Infant Behavior Scale is that the behaviors evaluated in the latter are closely monitored within the five specific subsystems of development: autonomic, motor, state, attentional-interactive, and self-regulatory (Cole and Frappler, 1985). Cole and Frappler discussed the value of this mechanism to provide data for determination of individualized developmental interventions.

The efficacy of the model using the APIB has recently been demonstrated. Als, et. al. (1986) used this specially developed observation method to collect behavioral data from preterm infants determined to be at risk for bronchopulmonary dysplasia. Eight control and eight experimental infants were selected for study based on criteria including: weight at birth (<1250 grams); gestational age (<28 weeks gestation); mechanical ventilation with oxygen concentrations of 60% or greater; singleton birth; absence of chromosomal or other genetic abnormalities; absence of major congenital infections; and absence of major maternal illness.

The study, conducted in two phases (control phase

followed by experimental) involved observations of each infant's behavior at day 10, 20, 30 of life and at 36 and 40 weeks postconception depending on discharge from the NICU. Post discharge follow-up assessments were conducted as 1, 3, 6 and 9 months after the estimated date of (maternal) confinement. Based on the assumption that the behavior an infant displays is his/her primary mechanism for communication, the infants were observed during caregiving activities. Various behaviors were thought to be indicative of stress, while others were indicative of self-regulatory efforts and maintenance. Observations were made by two trained independent observers who had an interrater reliability of greater than 85%.

For the control group standard nursery care was provided. For the experimental group, the behaviors observed were interpreted as either stress or self-regulatory. The behavioral data were then utilized in development of strategies for reduction of stress and promotion of self-regulatory behaviors. These strategies then were utilized in each infant's individualized developmental care plan.

The effectiveness of the individualized behaviorally based caregiving modifications was assessed in terms of medical outcome during hospitalization and post-discharge developmental outcomes. Experimental group infants had greater weight gain, less ventilator and oxygen days, more

rapid accomplishment of bottle feedings, shorter hospital stays and earlier discharges than control group infants. These results supported the hypothesis that preterm infants benefit medically as well as developmentally from individualized behavioral care in the neonatal intensive care unit (Als, 1986).

A theoretical model (synactive theory) and assessment tool (Assessment of Preterm Infant Behavior Scale) have been presented that enable the researcher to investigate individualized behavior assessments and developmental strategies in the neonatal intensive care unit. Nurses in the neonatal intensive care unit provided the mechanism for intervention. Their unique abilities and intensive caregiving enabled them to identify subtle differences in infant behavior. Maloni et al. demonstrated this in their research to validate neonatal nurses' identification of infant behavior. Normal term infants (by a pediatrician's assessment) were utilized in the study and nurses were questioned regarding concerns they had about particular infants in the nursery. The Brazelton Neonatal Behavioral Assessment Scale was utilized to evaluate suspect infants and matched normal infants. While the nurses were not specifically trained to identify particular behaviors, they were able to identify abnormal or suspect behaviors. Nursing assessments were validated by further diagnostic evaluations. This study supported observation as one of the

nurses' major functions (Maloni et al., 1986). Nurses, then, with these unique abilities to identify differences in behavior, would be the most appropriate persons to assess behaviors of the premature infant that indicate readiness for or stress from developmental intervention.

Further, nurses delivering care to preterm infants are held professionally accountable for specialized developmental assessment and intervention. In Nurse Providers of Neonatal Care: Guidelines for Educational Development and Practice, goals for neonatal nursing include ensuring "maximal growth and development of the fetus, newborn and the family." Application of the biopsychosocial concepts described in synactive theory would most certainly be reasonable considering established neonatal nursing goals. However, there is, as of this date, no research documenting the knowledge or implementation of individualized behavior assessment and intervention by nurses in the neonatal intensive care unit.

Conceptual Framework:

Recent literature regarding neonatal care has focused on both medical and developmental aspects. Gorski (1985), in his work, has determined the premature neonate to be one of the clearest models for appreciation of the linkage between physiologic functioning, caregiving experiences, and social contexts as he or she adapts to extrauterine life.

While dramatic progress in medical care has been made over the last decade, concerns have arisen about the appropriate integration of physiologic care and developmental care in the intensive care nursery. Many questions have been generated as to the validity of planned, routine, recipe-like infant stimulation programs. Focus is changing from interventions of this nature to the delivery of individualized care with an emphasis on the interactive processes Gorski has described.

Synactive theory provides a base from which to investigate these concerns. Published by Als in 1982, Synactive Theory provides a model to understand and assess the individual infant. The focus is on the interactive aspects of various subsystems within the organism and negotiation of the emerging developmental processes while simultaneously seeking functional competence.

The synactive model conceptualizes infant development as an interactive process between the infant, its subsystems and the environment. "We have termed this view of development synactive, since at each stage in development and each moment of functioning, the various subsystems of functioning are existing side by side, often truly interactive, but often in a relative holding pattern, as if providing a steady substratum for one of the system's differentiation processes" (Als, 1982). The systems discussed include the autonomic, the motor, the state organizational, the

attention-interaction, and the self-regulatory-balancing systems. Als cites these systems as readily observable without technical instrumentation. The autonomic system is observable via respiratory observations, color changes, and visceral cues such as bowel movements, gagging, hiccoughing, cardiac rates, etc. The motor system is observable in posturing, tone and movement. The state organizational system is observable in type and level of consciousness from sleep to arousal and transitional mechanisms. The attention and interaction system is observable in alerting ability and utilization of this state to assimilate cognitive and social/emotional information, responding in turn, and modifying environmental inputs. Finally, the self-regulatory balancing system is observable by the strategies utilized to maintain a stable, relaxed state of subsystem integration or return to such a state, and what environmental facilitation is necessary should the system's abilities be exhausted.

Based on observations of subsystem synaction, parameters were formulated by Als (1982) for assessment of individual infant functioning:

1. the infant's currently emerging developmental agenda and a situation to test the degree of ascendancy of this agendum;
2. the infant's current level of and smooth subsystem balance and smooth integrated subsystem functioning, regardless of the agendum identified as in ascendancy;
3. the threshold of disorganization indicated in

behaviors of defense and avoidance, at varying subsystem levels of functioning as the developmental agendum in ascendancy is tested;
4. the degree of relative modulation and regulation of the various subsystems in accomplishing the new task;
5. the degree of differentiation and effectiveness in rebalancing the subsystems in accomplishment of the task;
6. the degree of environmental structuring and support necessary to bring about optimal implementation of the new task; and
7. the degree of environmental structure and support necessary to bring about return to a smooth, well-integrated, baseline functioning (Als, 1982).

Thought to be appropriate throughout the life span, new tasks are negotiated, based on previous subsystem accomplishment, at each developmental stage.

The preterm infant provides an example of synactive development. Thrust into the extrauterine environment, the preterm infant is not an infant functioning appropriately for his/her stage of development. The infant is in a vastly different environment poorly matched to his/her unique needs. Instead of the maternal physiologic and environmental support, medical technology focuses on and attempts to support autonomic functioning while the other subsystems, dependent on environmental adaptation are "largely left to their own devices." (Als, 1982).

It becomes apparent, then, with this understanding of synactive development, that physiologic support alone is inadequate in preterm infant care. Awareness must be of not only physiologic parameters, but also behavioral cues as the

infant advances his repertoire of physiologic and developmental activities. One must be cautious, however, not to over advance on one system to the neglect of others as they are dynamically interactive.

The nurse in her role as primary care provider in the neonatal intensive care nursery is uniquely able to assess and intervene in the support, growth and development of the preterm infant as he/she adapts to extrauterine life.

The nurse as a facilitator of man's adaptation to various stressors in his intrinsic or extrinsic environment has been addressed extensively by Sister Callista Roy. (Riehl & Roy, 1980). Nurse and patient interact to achieve health related goals. A scientific approach based on this conceptual model enables the nurse to consistently identify and implement effective intervention to that end. (Jacocko & Snowden, 1986).

Roy's model utilizes the four essential concepts of nursing: person, environment, nursing, and health.

> Nursing views <u>persons</u> as holistic and developing beings with the processes for thinking, feeling, reflecting, choosing. Human behavior has pattern and meaning. Persons respond to and act upon everything that is within and around them. The term <u>environment</u> is used to describe the world within and around the person. <u>Nursing</u> acts to enhance the interaction of the person with his environment. The goal is to promote growth and meaningful life for the individual in harmony with his or her social and physical environment. In this way, nursing promotes health. <u>Health</u>, then is a function of human and environmental patterns that enhance one another and that express

full life potential for the person. (Andrews & Roy, 1986).

Roy's model views the recipient of nursing care as an adaptive system with a unique interdependence of its parts. Adaptation is defined as the capacity of the person to adjust effectively to change within the environment and in turn impact upon the environment. Adaptation level is a function of the effects of particular stimuli impacting on the system: focal, contextual and residual (Andrews & Roy, 1986).

Focal Stimuli: internal or external stimuli immediately confronting the person.
Contextual Stimuli: all other internal or external stimuli evident in the situation.
Residual Stimuli: stimuli that may be affecting behavior but whose effects are not validated.

Finally, adaptive responses are those that promote system integrity as related to the goals of adaptation which include survival and development (Andrews & Roy, 1986). The converse of adaptation, ineffective response, does not promote system integrity or further development.

Roy identified two subsystems which impact on the systems' ability to adapt. The regulator subsystem responds to stimuli automatically through neural, chemical and endocrine coping mechanisms. The cognator subsystem responds to stimuli through four cognitive-emotive channels, i.e, perception/information processing, learning, judgment, and

emotion. These two subsystems are manifested in the four adaptive modes of the model: physiologic, self-concept, role function and interdependence. Each adaptive mode activates coping mechanisms which produce adaptive or ineffective behavior. While frequently viewed as independent, it must be remembered the modes within the system are dynamically inter-related. (Andrews & Roy, 1986).

Nursing acts, therefore, to enhance the interaction of the person with the environment to promote adaptation. Nursing activities include the assessment of stimuli and behaviors that influence adaptation and management of appropriate interventions to that end. Thus nursing promotes health: the ultimate goal (Andrews & Roy, 1986).

Roy's adaptation model provides a solid base from which the neonatal nurse may provide individualized developmental care, while practicing within a biopsychosocial framework. The nurse is able to assess the impact of extrauterine life in the NICU on the preterm infant and has the resources available to manipulate the environment to facilitate adaptive responses. She/he also is able to identify those behaviors indicative of biopsychosocial stability, growth and interactional readiness as demonstrated by the infants' particular behavioral cues. She/he is also able to identify ineffective responses - that is, those behaviors indicative of instability or lack of readiness for advancement developmentally. Therefore, the progressive biopsychosocial

developmental model of synactive theory (Als) in conjunction with the adaptation model (Roy) provide the conceptual framework for this study.

Problem Statement

To determine the degree to which selected neonatal intensive care nurses identify nursing interventions based on synactive theory and researcher-given assessments of behavioral cues.

Research Objective

To determine the degree to which neonatal intensive care nurses will select appropriate interventions based on synactive theory for the care of preterm infants, given researcher-identified assessments of behavioral cues.

Hypothesis I

Neonatal intensive care nurses with **more** education will score higher in identifying interventions based on synactive theory for the care of preterm infants than will those nurses with **less** education.

Hypothesis II

Neonatal intensive care nurses with **more** experience will score higher in identifying interventions based on synactive theory for the care of preterm infants than will nurses with **less** experience.

Definition of Terms

Preterm infant: any infant born, regardless of reason, prior to 37 weeks of gestation, with no known congenital anomalies.

Neonatal intensive care nurses: registered nurses currently employed in a neonatal intensive care unit who (a) have completed the orientation program of the particular unit in which they work; and (b) deliver care to sick or preterm infants.

Neonatal intensive care unit: facility to manage the most complex neonatal disorders (Gottfried & Gaiter, 1985).

Synaction: the process occurring such that in each stage of development and during each moment of functioning the various subsystems of functioning are existing side by side, often truly interactive, but often in a relative holding pattern, as if providing a steady substratum for one of the system's differentiation processes (Als, 1982).

Adaptation: the capacity of the person to adjust effectively to change in the environment (Andrews & Roy, 1986).

Stimuli: that which provides a response (Andrews & Roy, 1986).

Environment: all conditions, circumstances and influences surrounding and affecting the development and behavior of the person (Andrews & Roy, 1986).

CHAPTER III

Research Design

A descriptive correlation methodology was utilized for this study. The design included two instruments for collecting data. A questionnaire designed to elicit selection of nursing interventions in response to given behavioral assessments was administered to nurses in selected neonatal intensive care units. A demographic questionnaire was also administered to acquire such information about the participants which might impact on their performance.

Population and Sample

The population investigated includes registered nurses functioning as staff nurses in neonatal intensive care units located in a particular southeastern state in the United States. The neonatal intensive care units were designated as Level III nurseries. Of the ten designated units available, seven were utilized as data collection sites. The three sites not used were omitted because of various institutional constraints.

The sample of intensive care nursery nurses who participated ultimately included nurses from all of the seven nurseries included as data collection sites. There were a total of 341 nurses available to participate. Of these 341, a total of 97 participants completed the

questionnaire resulting in a participation rate of 28.4 percent.

Instrument Development

After determination that a questionnaire to obtain the information required did not exist, the task of developing a questionnaire was undertaken.

Utilizing the Assessment of Preterm Infant Behavior Scale, described by Cole and Frappler, and implemented by Als and associates in a recent study as a framework (1986), ten vignettes describing particular preterm infant behaviors were designed. Specific behaviors were identified and stated. The vignettes and behavior identifications were compiled in a questionnaire form requesting response to intervention options provided.

Additionally, a demographic questionnaire was created to elicit specific information pertinent to the study. Finally, the questionnaire was completed with a cover letter which briefly discussed the purpose of the study, supplied researcher credentials and stated the anonymity of the participants in the study (Appendix A).

Upon approval of this study by the East Carolina University Committee for Protection of Human Subjects, the questionnaire was reviewed by three nursing experts in the field of neonatal nursing for (a) readability; (b) content validity and (c) establishment of agreement on correct answers. The questionnaire, in total, further underwent

review by graduate students in perinatal nursing for content readability. After revision, the questionnaire was pilot-tested in a conveniently located Level II nursery. After this pilot-testing was completed, the data were analysed and two items were removed from the original ten forced-choice items because of incorrect response on one and correct response by all on the other. Thus, an eight item questionnaire with the demographics component and cover letter were utilized for the final data collection.

Data Collection

Concurrent with the review of the questionnaire by nursing experts, the researcher contacted nurse administrators of institutions housing neonatal intensive care units. The objective of this contact was to inquire as to: (a) unit size (number of beds); (b) numbers of registered nurse staff members; (c) availability of the neonatal intensive care unit as a data collection site; and (d) willingness of staff nurses to participate. Logistics for distribution of the questionnaire were addressed. Initial contact was made by telephone with a written follow-up letter confirming intent and study design (Appendix C). Telephone contact was utilized to arrange actual questionnaire distribution by the researcher. After institutional and unit management approval, the questionnaire was delivered to the selected neonatal intensive care units and distributed to the individual

nurses by the researcher at prearranged, mutually acceptable times. The rationale for distribution by the researcher was: (a) to increase subject response numbers; and (b) to decrease the possibility of sample contamination. Surveys collected were coded to identify institutions in order to facilitate monitoring of institutional response rate. The questionnaire was accompanied by a cover letter which emphasized that participation was voluntary, responses were anonymous and that completion of the questionnaire implied consent on the part of the participant. (Appendix A) This information was reinforced by the researcher during distribution of the questionnaire. The completed questionnaire was returned in a sealed envelope directly to the researcher or placed in a secure depository on the unit.

Data Analysis

The distributed and collected questionnaires were counted and compared to the number of staff nurses available in each NICU. The forced-choice responses to the survey tool were added to provide one score. Data were coded for computer analysis, and internal consistency reliability of the scale was determined. Means and standard deviations were computed for the eight-item scale to determine the extent to which appropriate responses were selected by participants.

Frequency and percentage distributions were computed on the forced-choice items to characterize respondents. Means

from the eight-item scale were compared with demographic data to evaluate the effect of experience and education on participant responses. T-test analyses were performed on each of the groups to measure differences between mean scores based on (a) education and (b) experience. An analysis of variance was applied to measure the difference in scores based on institution of employment. Statistical significance was established at the .05 level.

CHAPTER IV

Research Findings

Sample Characteristics

The sample, as previously stated, was acquired from the population of registered nurses employed as staff nurses in neonatal intensive care units (NICU) in a southeastern state. Nurses in seven of the ten Level III units participated. Of the 341 potential participants in these seven Level III nurseries, 97 participated in the study. Participation rates per unit ranged from 18.6 to 65 percent. (Table 1).

TABLE 1

Nurse Participation Rate by Institution

Institution	Population	Sample	Percent
1	70	13	18.6
2	26	17	65
3	25	9	36
4	70	24	34
5	26	9	34.6
6	70	13	18.6
7	56	12	21.5
Total	341	97	28.4

Not included in the sample were an additional four participants who returned blank questionnaires. No indication was given for non-participation.

Educational levels were investigated. Respondents had educational preparation varying from diploma to doctoral level, with associate degree preparation in nursing being the most common, 39.2 percent (See Table 2 below).

TABLE 2

Educational Preparation of Respondents by Number and Percentages

	No.	Percent
Diploma	14	14.4
Associate Degree/Nursing	38	39.2
Baccalaureate Degree/Nursing	33	34.0
Baccalaureate Degree/Non-Nursing	4	4.1
Master of Science/Nursing	3	3.1
Master of Arts	1	1.0
Doctorate/Nursing	1	1.0
No Response	3	3.1
Total	97	100.0

The number of continuing education experiences for each individual participant varied from no experience with the topics specified to experience with all five of the topics specified: infant stimulation, developmental interventions, growth and development, early childhood intervention and infant behavior. Of the respondents, 28.9 percent reported no continuing education in the topics specified (Table 3).

TABLE 3

Number of Continuing Education Experiences per Respondent

Number of Experiences	Total Respondents	Percent
1	16	16.5
2	16	16.5
3	14	14.4
4	12	12.4
5	11	11.3
0	28	28.9

Of the topics listed on the questionnaire, 52.6 percent of the respondents reported attending continuing education programs on infant behavior. Developmental intervention programs and early childhood intervention programs had been

attended by 44.3 and 43.3 percent of the respondents respectively. Finally, infant stimulation programs had been attended by 38.1 percent of the respondents and 15.5 percent had participated in infant growth and development programs. (Table 4).

TABLE 4

Nurses Report of Specific Continuing Education Programs Attended

Continuing Education Program	Nurses Reporting Attendance	Percent
Infant Stimulation	37	38.1
Developmental Interventions	43	44.3
Infant Growth & Development	15	15.5
Early Childhood Intervention	42	43.3
Infant Behavior	51	52.6

Education preparation was also determined according to accomplishment of specialty certification. Of the 97 respondents, 6.2 percent were certified in a particular specialty while almost 90 percent reported no specialty

certification (Table 5).

TABLE 5

Specialty Certification Reported by Respondent

Certification	Number	Percent
Pediatric	1	1.0
Neonatal Nurse Clinician	1	1.0
High Risk Neonatal	3	3.1
Maternal-Child	1	1.0
Not Specified	4	4.1
Not Certified	87	89.4

Respondents were assessed as to amount of experience both in nursing and neonatal intensive care nursing. Years of nursing experience ranged from less than one to more than ten years with the greatest number of respondents having more than ten years of nursing experience (Table 6).

TABLE 6

Years of Nursing Experience

Years	Number	Percent
<1 year	5	5.2
1-3 years	11	11.3
3-7 years	19	19.6
7-10 years	28	28.9
>10 years	31	32.0
No response	3	3.1

Years of neonatal intensive care nursing experience ranged from less than one to more than ten years with the greatest number of respondents having 7 to 10 years of experience in neonatal intensive care nursing (Table 7).

TABLE 7

Years of Neonatal Nursing Experience

Years	Number	Percent
<1 year	10	10.3
1-3 years	16	16.5
3-7 years	24	24.7
7-10 years	27	27.8
>10 years	18	18.6
No response	2	2.1

Preterm Infant Intervention Questionnaire Outcomes

The eight item forced-choice questionnaire was analyzed on an item-by-item basis. Each item was assessed for correctness. (See Table 8).

Item 1 questioned the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic and motoric instability. Of the respondents 74 or 76.3 percent indicated the correct answer.

Item 2 questioned the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic instability but attempting motoric regulation by position change. Of the respondents 97 or 100

percent indicated the correct answer.

Item 3 requested the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic stability and interactive stress. Of the respondents, 35 or 36.1 percent indicated the correct answer. The data showed this to be a more difficult item and the only item where more than 50 percent of the respondents gave an incorrect response.

Item 4 requested the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic instability. Of the respondents, 89 or 91.8 percent indicated a correct answer.

Item 5 requested the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic stability, interactiveness and self-regulation. Of the respondents, 79 or 81.4 percent indicated the correct answer.

Item 6 requested the respondents' intervention with regard to a preterm infant displaying behaviors consistent with physiologic and state stability. Of the respondents, 80 or 82.5 percent indicated the correct answer.

Item 7 requested the respondents' intervention with regard to a preterm infant displaying behaviors indicative of interactive stress resulting in physiologic stress. Of the respondents, 90 or 92.8 percent indicated the correct answer.

Item 8 requested the respondents' intervention with regard to a preterm infant displaying behaviors indicative of physiologic instability. Of the respondents, 76 or 78.2 percent indicated the correct answer. One respondent did not answer this question.

TABLE 8

Responses of Nurses on Preterm Infant Intervention Questionnaire by Item

Item	Number Correct (N)	Percent
1	74	76.5
2	97	100.0
3	35	36.1
4	89	91.8
5	79	81.4
6	80	82.5
7	90	92.8
8	76	78.2

The mean score for the eight-item questionnaire was determined to be 6.4 correct responses with the range being from two to eight correct responses. Of the respondents,

93.9 percent had more than four correct answers. Sixteen respondents or 16.5 percent of the sample had all answers correct (Table 9).

TABLE 9

Total Correct Responses per Respondent on Preterm Infant Intervention Questionnaire by Item

Number Correct	Respondents	Percent
1	0	0
2	1	1.0
3	2	2.1
4	3	3.1
5	12	12.4
6	31	32.0
7	32	33.0
8	16	16.5

Internal Consistency Reliability

The internal consistency reliability was determined for the eight-item questionnaire. Coefficient alpha reliability for the scale is .35. Further analysis showed there would be minimal statistical impact with the deletion of any particular item.

Group Comparisons

The total score for the eight-item questionnaire was compared to each of two demographic categories to test the hypotheses as stated.

Educational preparation was defined by education category. The Diploma/ADN category included nurses who indicated that their educational preparation was at the diploma or associate degree level. The Baccalaureate/Higher degree category included nurses who indicated that their educational preparation was at the baccalaureate level or above. Of the 94 respondents who indicated their educational level, 52 or 55.3 percent were classified as Diploma/ADN and 42 or 44.7 percent were classified as Baccalaureate/Higher degree. Diploma/ADN respondents had a mean score of 6.37 correct answers. Baccalaureate/Higher degree respondents had a mean score of 6.36 correct answers (Table 10). Statistical analysis demonstrated no statistically significant difference between the scores of the two groups. Thus, Hypothesis I was not supported as nurses with more education did not score higher than nurses with less education. $t\ (92 = 0.03)$, $P = .974$.

TABLE 10

Mean Score of Respondents by Education

Education	Number	$\bar{X}$	S.D.
Diploma/ADN	52 (55.3%)	6.37	1.121
Baccalaureate/Higher	42 (44.7%)	6.36	1.358

Experience in neonatal intensive care nursing was defined by years. Of the 97 respondents, 26 or 26.8 percent were classified as less than or equal to 3 years and 69 or 71.1 percent were classified as more than 3 years. Less than or equal to 3 years respondents had a mean score of 6.54 correct answers. More than 3 years respondents had a mean score of 6.30 correct answers (Table 11). Statistical analysis again demonstrated no statistically significant difference between the scores of the two groups. Therefore, Hypothesis II was also not supported as nurses with more experience did not score higher than nurses with less experience. $t\ (93 = 0.83)$, $P = .408$.

TABLE 11

Mean Score of Respondents by Experience

Experience	Number	$\bar{X}$	S.D.
≤3 years	26 (26.8%)	6.54	1.363
>3 years	69 (71.1%)	6.30	1.67

Additionally, mean scores of respondents were classified according to whether the neonatal intensive care unit in which they were employed had a program of planned developmental interventions in use. Of the 95 respondents to this inquiry, 44 or 46.3 percent indicated "no" while 51 or 53.7 percent indicated "yes." The mean score for the "no" respondents was 6.36 correct answers. The mean score for the "yes" respondents was 6.37 correct answers (Table 12). T-test analysis showed no statistically significant difference in the scores with respect to whether the institution in which the respondents were employed had a program of planned developmental interventions. $t\ (93 = -0.04)$, $P = .972$.

TABLE 12

Mean Score of Respondents Based on Institutional Program of Planned Developmental Interventions

Planned Program	Number	$\overline{X}$	S.D.
No	44 (46.3%)	6.36	1.222
Yes	51 (53.7%)	6.37	1.232

Finally, the respondents were categorized by institution of employment. Institution was defined by numerical identification. There were 97 respondents at seven institutions. Mean scores ranged from 5.9 to 6.7 correct answers. While this analysis was not required based on the hypotheses, the results were of interest (Table 13). Analysis of variance demonstrated no statistically significant difference between the scores of the respondents given their various institutions of employment. $f(6,90) = .6328$, $P = .70$.

TABLE 13

Mean Respondent Scores by Institution

Institution	Number	$\overline{X}$	S.D.
1	13 (13.4%)	6.23	1.09
2	17 (17.5%)	6.64	1.27
3	10 (10.3%)	5.90	1.85
4	24 (24.7%)	6.20	1.18
5	8 (8.2%)	6.50	.93
6	13 (13.4%)	6.46	1.20
7	12 (12.4%)	6.67	.89
Total	97 (100%)	6.37	1.21

Chapter V

Summary, Conclusion, Implications and Recommendations

The research involved in this study sought to investigate nurses' responses to preterm infant behavior in the neonatal intensive care unit. Nurses, provided with vignettes of situations and behavioral assessments, were asked to indicate which intervention was most appropriate in a four-item, forced-choice response. Hypotheses were proposed.

Hypothesis I suggested that nurses with **more education**, as defined by accomplishment of at least a baccalaureate degree in nursing or another field, would score higher than nurses with **less education** as defined by accomplishment of a diploma or associate degree in nursing. Hypothesis I was not supported as there was no statistically significant difference in mean scores.

Hypothesis II suggested that nurses with **more experience** defined as more than three years of experience in neonatal intensive care would score higher than nurses with **less experience,** as defined by three years or less experience in neonatal intensive care. Hypothesis II was not supported as there was no statistically significant difference in mean scores.

Limitations of the Study

Several limitations of this study have been identified and will be discussed.

First, the study attempted to measure nurses' ability to select appropriate interventions for preterm infant behavior based on synactive theory given researcher-developed assessments of specific preterm infant behaviors. While the questionnaire was based on Als' Synactive Theory, adapted from tables of cues found in her publications, reviewed by experts in the field, and pilot-tested, it was found not to be internally reliable for measurement of the data desired.

Second, the researcher sought to acquire data from nurses in all neonatal intensive care units in the defined state. Seven of the ten neonatal intensive care units were accessed. Access to the other three units and their staff members' participation may have had impact on the statistical outcomes of the study.

The actual logistics of data collection also presented a limitation. Nurses work varying rotations with odd hours and rotating days off. This significantly complicated data collection because of unavailability of participants. Attempts were made to coordinate questionnaire presentation at a time concurrent with staff meetings. Because of researcher constraints, this did not prove feasible. Attempts were then made to present the questionnaires to

potential respondents via their mail boxes, (available at all institutions). The questionnaires were left, and a depository for completed questionnaires provided. A specific time for pick-up was posted. The respondency rate was less than 30 percent demonstrating this not to be the best method for data collection. Further, the units utilized for data collection were as much as 400 miles apart. Time and travel were a limitation. Appointments were made by the researcher by telephone for questionnaire delivery and the same appointments kept. One unit, however, did not know the researcher was coming and several did not know the objectives. It is believed had individuals in the NICUs where surveys were distributed been better informed regarding the nature of the study and the objectives, respondent rates would have been better. In one unit where the objectives and introductory letter were posted for staff review, there was a 65 percent response rate.

Finally, the concept of developmental intervention from Synactive Theory is new. Data are just being published supporting the theory and model (Als et al., 1986). With the work constraints placed on nurses in this time of shortage, e.g., limited time off available for continuing education, many nurses may not have been exposed to the concept, theory or model.

Conclusions and Implications

The outcomes of the data analysis did not support the stated hypotheses and the questionnaire did not prove reliable with this sample. The newness of Synactive Theory may have had impact on the study outcomes in that the particular nurses who participated may not have yet been exposed to this new knowledge. While the high percentage of correct answers to all but question number 3 suggests there is knowledge, the knowledge may not be that of Synactive theory.

Regardless of education or experience, there were no significant differences in numbers of correct responses from respondents in this study. In view of the fact that first, all respondents participated voluntarily and second that voluntary participation may have influenced the outcomes, the results suggest several things. With regard to experience, nurses do not seem to demonstrate any greater ability to respond to questions about preterm infant behavior as they gain years of experience. One supposes this could come from the frequently practiced philosophy of not changing something that works. New nurses who come into a unit are oriented and precepted by experienced nurses. Assignments are made and infants cared for. Strategies for care are utilized, regardless of their theoretical foundation. If effective, they are not changed.

The practice of not changing something that works may also be true as related to education. Nurses come to a neonatal intensive care unit and are oriented and precepted in the unit in much the same way, regardless of educational preparation. They learn various strategies for patient care and discover their efficacy. Unless they are taught otherwise, they continue to utilize the same strategies. Hence, a cycle forms. Nurses come to a unit, learn traditional strategies and do not change.

This cycle has implications for both nursing education and administration.

Nurses, especially those employed in an area of high-technology and frequent change, should have available to them opportunities for continuing education. Release time should be provided. Funds should be made available. In lieu of this, unit based continuing education should be provided through video-recordings, computer-assisted-instruction and discussion of pertinent, current literature. Rewards should be provided for accomplishment of continuing education objectives. Particular focus should be directed toward the "more experienced" neonatal intensive care nurses. They are the persons from whom the less experienced seek guidance. Provision of opportunities for their continuing education, professional growth and development could help promote a general unit philosophy of continuing education, professional growth and development resulting in

care based on new scientific knowledge.

Nursing administration can assist in this process most especially through insistence that funds be provided to this end. In this time of cost containment, a program to implement such a program may be cost effective. Als et al. (1986) demonstrated, for example, that infants treated in the manner described had overall shorter hospital stays. Shorter hospital stays most certainly reduce health care costs for families. Nurses providing patient care based on this model may not only provide better patient care, but also reduce costs for the institution at the same time.

Recommendations

It is recommended regarding this particular study that the questionnaire be re-designed for assessing knowledge of Synactive Theory. The questionnaire, as it is, does appear to measure nurses knowledge in preterm infant care. It does not, however, demonstrate measurement of Synactive knowledge related to interventions in response to preterm infant behavior. A future format that included an actual test of knowledge as well as measurement of appropriate interventions would be one option to that end. The re-designed format after evaluation and piloting may prove more reliable and may better measure the knowledge it was designed to measure.

It is also recommended that the distribution of the questionnaire be made directly to the potential respondents.

This may promote greater response rates.

Further it is recommended that future studies may have greater value if the sample is (a) larger; (b) from a wider geographic area; and (c) randomly selected for several reasons. First, the study as it is may bear the impact of response bias because of individual and institutional non-participation. Should participants be randomly selected, individually and/or institutionally, this potention statistical error may be avoided. Second, because of the limited geographic area of data collection, the results are not generalizable. Should the participants come from a wider geographic area, the outcomes would have potential for greater generalization. Finally, the stability of the results may be in question because of the small sample size. Should the sample size be larger, the results may demonstrate greater stability.

BIBLIOGRAPHY

Als, H. (1984). Manual for the Naturalistic Observation of Newborn Behavior (Preterm and Full term Infants). Boston: The Children's Hospital.

Als, H. (1982). Toward a synactive theory of development: promise for the assessment and support of infant individuality. Infant Mental Health Journal, 3(4), 229-243.

Als, H. et al (1986). Individualized behavioral and environmental care for the very low birthweight preterm infant at risk for bronchopulmonary dysplasia: neonatal intensive care unit and developmental outcome. Pediatrics, 78(6), 1123-1132.

Als, H., Lester, B.M. & Brazelton, T.B. (1979). Dynamics of the behavioral organization of the premature infant: a theoretical perspective. In T.M. Fields (Ed.) Infants Born at Risk (pp. 173-192). New York: Medical & Scientific.

Andrews, H.A. & Roy, C. (1986). Essentials of the Roy Adaptation Model. Morwalk: Appleton-Century-Crofts.

Barnard, K.E., & Bee, H.L. (1983). The impact of temporally patterned stimulation on the development of preterm infants. Child Development, 54, 1156-1167.

Blackburn, S. (1982). The neonatal ICU: A high risk environment. American Journal of Nursing, 32(11), 1708-1712.

Blackburn, S. (1983). Fostering behavioral development of high risk infants. Journal of Obstetric, Gynecologic and Neonatal Nursing, 12, (3 Supplement) 765-865.

Blackburn, S.T. & Barnard, K.E. (1985). Analysis of caregiving events relating to pretern infants in the special care unit. In A.W. Gottfried & J.L. Gaiter (Eds.) Infant Stress Under Intensive Care (pp 113-129). Baltimore: University Park Press.

Brazelton, T.B. (1973). The neonatal behavioral assessment scale. Clinics in Developmental Medicine, 50. London, William Heinemann.

Brazelton, T.B. & Lester, B. (1984). New Approaches to Developmental Screening of Infants. Elsevier: Biomedical Printing.

Campbell, L.A. (1985). The very low birth weight infant: sensory experience and development. Topics in Clinical Nursing, 6(4), 19-33.

Chapman, J.S. (1978). The effect of preterm infant's decreasing mortality on their future morbidity: preliminary examination of longterm outcomes of stimulation programs for preterm infants. Nursing Papers, 10(2), 31-54.

Chaze, B.A. & Ludington - Hoe, S. (1984). Sensory stimulation in the NICU. American Journal of Nursing, 84 (1), 68-71.

Cole, J.G. (1985). Infant stimulation re-examined: an environmental and behavioral-based approach. Neonatal Network, April, 24-31.

Cole, J.G. & Frappler, P.A. (1985). Infant stimulation reassessed: a new approach to providing care for the preterm infant. Journal of Obstetric, Gynecologic and Neonatal Nursing, 14(6).

Cornell, E.H. & Gottfried, A.W. (1976). Intervention with premature human infants. Child Development, 47, 32-39.

Duldt, B.W. & Griffin K. (1985). Theoretical Perspectives of Nursing. Boston: Little, Brown, and Company.

Field, T.M. et al. (1986). Tactile/kinesthetic stimulation effects on preterm neonates. Pediatrics, 77(5), 654-658.

Gaiter, J.L. (1985). The behavior and caregiving experiences of full-term and preterm newborns. In A.W. Gottfried & J.L. Gaiter (Eds.), Infant Stress Under Intensive Care (pp. 55-81). Baltimore: University Park Press.

Gorski, P.A. (1985). Behavioral and environmental care: new frontiers in neonatal nursing. Neonatal Network, April, 8-11.

Gorski, P.A., Davidson, M.E. & Brazelton, T.B. (1979). Stages of behavioral organization in the high-risk neonate: theoretical clinical consideration. Seminars in Perinatology, 3(1), 61-73.

Gottfried, A.W. (1985). Environment of newborn infants in special care units. In A.W. Gottfried & J.L. Gaiter (Eds.), Infant Stress Under Intensive Care (pp. 23-54). Baltimore: University Park Press.

Gottfried, A.W., Hodgeman, J.E. & Brown, K.W. (1984). How intensive is newborn intensive care? an environmental analysis. Pediatrics, 74(2), 292-294.

Harrison, L. (1985). Effects of early supplemental stimulation programs for premature infants: review of the literature. Maternal-Child Nursing Journal, 14(2), 69-90.

Hodgeman, J.E. (1985). Introduction. In A.W. Gottfried & J.L. Gaiter (Eds.), Infant Stress Under Intensive Care (pp. 1-6). Baltimore: University Park Press.

Hyde, B.B. & McCown, D.E. (1986). Classical conditioning in neonatal intensive care nurseries. Pediatric Nursing, 12 (1), 11-13, 63.

Jacocko, M.T. & Snowden, L.A. (1986). The Roy Adaptation in Nursing Practice in Andrews, H.A. & Roy, C., Essentials of the Roy Adaptation Model, Norwalk: Appleton-Century-Crofts.

Klaus, M. & Kennell, J. (1982). Interventions in the premature nursery: impact on development. Pediatric Clinics of North America, 29(5), 1263-1273.

Kramer, L.I. & Pierpont. (1976). Rocking waterbeds and auditory stimuli to enhance growth of preterm infants. Journal of Pediatrics, 88, 297-299.

Lawson, K., Daum, C. & Turkewitz, G. (1977). Environmental characteristics of a neonatal intensive care unit. Child Development, 48, 1633-1639.

Leib, S., Benfield, G. & Guidubladi, D. (1980). Effects of early intervention and stimulation on the preterm infant. Pediatrics, 66(1), 83-90.

Linn, P.L., Horowitz, F.D. & Fox, H.A. (1985). Stimulation in the NICU: is more necessarily better? Clinical Perinatology, 12(2), 407-422.

Linton, P.T. (1986). Behavioral development of the preterm infant. Perinatology - Neonatology, July/August, 27-33.

Maloni, J., Stegman, C.E., Taylor, P.M. & Brownell, C.A. (1986). Validation of infant behavior identified by neonatal nurses. Nursing Research, 35(3), 133-138.

Masi, W. (1979). Supplemental stimulation of the premature infant. In T.M. Fields (Ed.) Infants Born at Risk (pp. 367-387). New York: SP Medical & Scientific.

Murphy, T.F., Nichter, C.A. & Liden, C.B. (1982). Developmental outcome of the high-risk infant: a review of methodological issues. Seminars in Perinatology, 6 (4), 353-364.

Neal, M.V. (1977). Vestibular stimulation and development of the small premature infant. Community Nursing Research, 8, 291-302.

Nurse Providers of Neonatal Care: Guidelines for Educational Development and Practice. NAACOG Publication. (no date).

Oehler, J.M. (1985). Examining the issue of tactile stimulation for preterm infants. Neonatal Network, December: 25-33.

Parmelee, A.H. (1985). Sensory stimulation in the nursery: how much and when? Developmented and Behavioral Pediatrics, 6(5), 242-243.

Peabody, J.L. & Lewis, K. (1985). Consequences of newborn intensive care. In A.W. Gottfried & J.L. Gaiter (Eds.), Infant Stress Under Intensive Care (pp. 199-226). Baltimore: University Park Press.

Rausch, P.B. (1985). Effects of tactile and kinesthetic stimulation on premature infants. Journal of Obstetric, Gynecologic, and Neonatal Nursing, 10(1), 34-37.

Riehl, J.P. & Roy, C. (1980). Conceptual Models for Nursing Practice. New York: Appleton-Century-Crofts.

Rose, S.A. (1983). Behavioral and psychophysiological sequelae of preterm birth: the neonatal period. In T. Field & A. Sostek (Eds.) Infants Born at Risk (pp. 45-65). New York: Grune & Stratton.

Solkoff, N., Yaffe, S. & Weintraub, D. (1969). Effects of handling on subsequent development of premature infants. Developmental Psychology 1: 765-768.

VandenBerg, K.A. (1985). Revising the traditional model: an individualized approach to developmental interventions in the intensive care nursery. Neonatal Network, April, 32-38.

Williams, P.D., Williams, A.R. & Dial, M.N. (1986). Children at risk perinatal events, developmental delays and the efforts of a developmental stimulation program. International Journal of Nursing Studies, 23(1), 21-38.

APPENDIX A

Cover Letter

Dear Colleague:

I am a Master's Degree candidate at East Carolina University in Parent-Child Nursing. As a result of my own personal experience in neonatal intensive care and clinical experience during this program, I have become interested in preterm infant behavioral cues and how neonatal intensive care nurses use these cues in the care of preterm infants. Since you are a practicing neonatal nurse, I am particularly interested in your individual responses. I would appreciate your not discussing this with your co-workers until the survey is completed. The information obtained from this survey will be useful to managers, educators and practitioners as they continue to provide the best care possible to preterm infants.

Please take a few minutes of your time to complete the following survey. Participation is completely voluntary and all responses will be anonymous. Your consent to participate will be implied by your completion of the survey. If you choose not to participate, please return the survey tool to me uncompleted.

Thank you very much for your assistance.

Sincerely,

Sharon I. Sarvey, RN, BSN

Preterm Infant Intervention Questionnaire

The following vignettes include behaviors you might observe while caring for preterm infants in the neonatal intensive care unit. Please read the vignette, the behavioral assessment that is given and the listing of possible interventions. Circle the letter corresponding to the intervention you would choose to implement first in response to the behavioral assessment.

1. A preterm infant of 28 weeks gestation displays tachycardia, mottling and weight loss. He requires ventilator as well as physiologic support. He has respiratory distress. At intervals he flails his arms and legs, extending them vertically. He has episodes of trunkal and extremity flaccidity.

   This infant's behavior indicates physiologic and motoric instability.

   Which would you do first? (Circle only one).

   a. leave him alone.

   b. put sharply contrasting figures in his visual range.

   c. put a sheepskin under him.

   d. position him on his side supporting his back and extremities with blanket rolls.

2. The infant you are caring for is two weeks old recovering from prematurity at 29 weeks. She receives 23% oxygen by oxyhood, nasoduodenal feedings and remains in an isolette. She has hyperactive and hypertonic episodes. She can frequently be found tucked in a fetal position at the foot of her isolette soundly sleeping.

   This infant's behavior indicates motoric instability. The infant attempts to motor regulate, by position change, to facilitate regulation.

   Which would you do first? (Circle only one).

   a. tap on her isolette while she is active and reposition her frequently.

   b. play tapes of her mother's voice constantly, keep her bed flat while she is prone.

c. support her position with blanket rolls, play soothing tapes of mom's voice at intervals.

d. sit her up in an infant seat and play music constantly.

3. The infant you are caring for is four weeks old, having been delivered at 28 weeks gestation. He remains in an isolette and is tolerating intermittent gavage feedings. He accepts a pacifier readily. When you rock him and talk to him out of the isolette during feeds he splays his fingers, gags and occasionally spits up.

   This infant's behavior indicates physiologic stability and interactive stress.

   Which would you do <u>first</u>? (Circle only one).

   a. try him on nipple feedings.

   b. restrict his use of the pacifier.

   c. burp him frequently, even during the gavage feeding.

   d. rock him gently or talk to him during feedings.

4. The preterm infant you care for has developed necrotizing entercolotis. She is tachycardia, hypotensive receiving ventilator support and antibiotics. She has a nasogastric tube to suction and abdominal surgery is anticipated. She has bouts of bradycardia, followed by mottling and pallor during care.

   This infant's behavior indicates physiologic instability.

   Which would you do <u>first</u>? (Circle only one).

   a. keep familiar objects around, play tapes of her mother's voice constantly.

   b. <u>cluster</u> caregiving, allow long intervals for rest between <u>groups</u> of interventions.

   c. carry out <u>one intervention</u> at a time, e.g., feedings, vital signs, and suctioning, etc.

   d. place her in an isolette.

5. The infant you are caring for is eight weeks old recovering from prematurity at 30 weeks gestation. He is nearly ready for discharge. He tolerates his intermittent nipple feedings. During his morning care you noticed he "cooed" and maintained eye contact when you were talking to him and follows you with his eyes during care. However, he became inconsolable when he was returned to his bassinet finally crying himself to sleep.

   This infant's behavior indicates physiologic stability, interactive readiness, and regulatory ability.

   Which would you do <u>first</u>? (Circle only one).

   a. change his position.

   b. place note on bassinet for him not to be picked up during feedings.

   c. place taped music near his bassinet and place black and white designs on the sides of his bassinet.

   d. allow time for him to cry.

6. The baby you are caring for is six weeks old, recovering from prematurity at 31 weeks gestation. Her recovery included treatment for respiratory distress as well as neonatal sepsis. She is nipple feeding on demand and gaining weight. She wakes for feeding every 3-4 hours, cries robustly, is displeased by diaper changing and kicking vigorously.

   This infant's behavior indicates physiologic and state stability.

   Which would you do <u>first</u>? (Circle only one).

   a. wake her every three hours to feed.

   b. change her diapers after she is fed.

   c. place several rattles in her bassinet to play with when she wakes.

   d. continue caregiving as described.

7. The infant you are caring for had been gaining weight on nipple feedings in the isolette. Now in the bassinet he

is losing weight and has short sleep period, punctuated by prolonged periods of fussiness and crying. Thermo-regulation is not a problem and the baby is physically stable. The bassinet is in the center of the nursery for frequent comforting.

This infant's behavior indicates interactive stress resulting in physiologic stress.

Which would you do first? (Circle only one).

a. place the baby in a swing at intervals.

b. relocate his bassinet to a low traffic area and reduce stimuli.

c. place him back in an isolette.

d. play a musical toy or tape.

8. The 36 weeks gestation infant you care for suffers from persistent fetal circulation. The caregiving she requires produces tachycardia, hypotension and hypoxemia. She resists mechanical ventilation and receives pavulon to reduce her resistance.

This infant's behavior indicates physiologic instability.

Which would you do first? (Circle only one).

a. place infant on a water bed and play tapes of music.

b. place black and white checkered objects in visual range.

c. reduce caregiving activities to minimum and pace individual interventions allowing rest periods between each individual intervention.

d. reduce caregiving activities to minimum and cluster groups of interventions allowing lengthy rest periods between groups of interventions.

Demographic Tool

It would be helpful to have some information about you and the unit you work on. Please circle the most appropriate response to the following questions.

1. How many years have you been an RN?

   a. < 1 year
   b. 1-3
   c. 4-7
   d. 7-10
   e. > 10 years

2. How many years experience do you have in neonatal intensive care?

   a. < 1 year
   b. 1-3
   c. 4-7
   d. 7-10
   e. > 10 years

3. What is your highest level of educational preparation?

   a. Diploma
   b. ADN
   c. BSN
   d. BA
   e. MSN
   f. MA
   g. Other _____

4. Do you have any specialty certification?

   a. Yes
   b. No

   If yes, what certification and by whom are you certified? _____

5. Have you ever attended a continuing education program on (circle all that apply)

   a. infant stimulation
   b. developmental interventions
   c. infant growth and development
   d. early childhood intervention
   e. infant behavior

6. Does the unit you work in have a planned program of any of the above for use with your babies?

   a. Yes b. No

APPENDIX B

KEY: Preterm Infant Intervention Questionnaire

1. Appropriate intervention: d
   Rationale:
   Support extremities, reducing effort to do so by baby. Reduce environmental stimuli to promote rest and avoid the further stress of baby's attempt to respond.

2. Appropriate intervention: c
   Rationale:
   Provide boundaries to reduce infant's effort to seek same, because she can obtain state regulation gradually. Introduce interactive stimulus with tapes of mom's voice.

3. Appropriate intervention: d
   Rationale:
   Limit interaction to only one additional stimulus at a time. He displays intolerance to simultaneous stimuli.

4. Appropriate intervention: b
   Rationale:
   Cluster caregiving to reduce impact of caregiving. Decreased tactile intervention promotes rest. Fatigue reduction can promote physiologic stabilization and recovery.

5. Appropriate intervention: c
   Rationale:
   The infant demonstrates readiness for interaction and is attempting to interact with caregiver. He also is attempting to regulate his environment and caregiving to meet his needs when exhausted. Increasing the number and variety of stimuli to him will promote social growth and development.

6. Appropriate intervention: d
   Rationale:
   Her behavior and care are appropriate. At 37 weeks post-conceptual age, she is not ready or physically able to play with toys provided.

7. Appropriate intervention: b
   Rationale:
   Reduce his environmental stimuli by placing him in low traffic area, there are less arbitrary tactile encounters. Covering his bassinet will lower light and facilitate state regulation, reducing energy output and promoting weight gain.

8. Appropriate intervention: d
   Rationale:
   Avoid all but essential caregiving activities, and cluster care to reduce interaction allowing for recovery/rest periods after caregiving. This should reduce resistance to ventilation, promoting (in combination with chemical/drug therapy) pulmonary recovery and physiologic stabilization.

APPENDIX C

Letter to Nursing Administrators at Selected Institutions

Dear _____,

As a graduate student in Parent-Child nursing at East Carolina University, I am conducting a study of neonatal nurses responses' to preterm infant behavior in neonatal intensive/intermediate care nurseries under the direction of Dr. Emilie Henning.

In order to complete this study it is necessary for me to collect data from registered nurses in neonatal intensive/intermediate care nurseries. I am requesting your cooperation in gaining participation of the neonatal intensive care registered nurses employed in the nursery at your institution. Each participant will be asked to complete a questionnaire. The questionnaire will include eight vignettes each describing a particular preterm infant's behavior. Forced choice responses will be requested. Two more vignettes will follow that will request written responses. The questionnaire will close with a request for demographic information. I regret I cannot include a copy of the questionnaire for your review. It has not yet been copyrighted and dissemination of the material included could adversely affect the results. Completion time will be approximately 15-20 minutes. Distribution of the questionnaire will be accomplished at a mutually agreeable time. I will bring copies to the unit(s) and remain to collect those completed at that time. I will also provide a sealed container for those not immediately completed and return for them the next day.

Anonymity will be maintained for all participants and institutions. There will be no patient contact involved. In order to have the most accurate data possible, I hope to survey all the intensive care nurseries in North Carolina. A copy of the abstract of the completed study will be available to all nurseries in participating institutions.

It is my hope that you will see the benefits of such a study and encourage your staff to participate. Please complete the following response form and return it in the enclosed self addressed stamped envelope by April 7, 1988.

Thank you so much.

Sincerely,

Institution Consent Form

1 do/do not give consent for Sharon Sarvey to distribute a questionnaire investigating nurses' responses to preterm infant behavior to registered nurses in the neonatal intensive/intermediate care nursery(ies) at this institution.

Signed _____

Title _____

Institution _____

Number of registered nurses employed in neonatal intensive/intermediate care nursery(ies) _____.

Person to contact to make an appointment for distribution of survey forms:

_____

_____

APPENDIX D

Letter to Graduate Students

Dear Graduate Student:

As a graduate student in Parent-Child Nursing at East Carolina University, I am completing a study investigating nurses responses to preterm infant behavior. In order for me to complete this task, it is necessary for me to collect data from neonatal intensive care nurses. The data I wish to obtain includes nurses identification of preterm infant behavior and how this is used to identify appropriate interventions for care to preterm infants.

I am requesting that you review and complete the survey I have created and plan to use for data collection. Please review the tool for clarity and accuracy. Make any comments you wish directly on the tool and provide responses as indicated. In the upper right hand corner, please indicate the length of time required to respond to the tool. When completed, return the tool in the self addressed, stamped envelope.

Thank you so much for your assistance. Please be candid in your responses.

Sincerely,

Sharon I. Sarvey, RN, BSN