
D. Supporting Early Postpartum Attachment

• Select a Birthing Environment that Clearly Supports the Infant-Parent Attachment Process

D.1. This environment offers respect for the interdependence of the infant-mother unit, supporting immediate and uninterrupted contact with mother and infant remaining together 24 hours a day (rooming in).

Prodromidis, M., Field, T., Arendt, R., Singer, L., Yando, P., & Bendell, D. (1995). Mothers touching newborns: A comparison of rooming-in versus minimal contact. *Birth*, 22(4), 196-200.

Premise: Providing postpartum rooming-in increases the amount of maternal-child contact. The extended interaction leads to intimate touching and helps to foster the maternal child affection.

Research Hypothesis: Mothers who delivered in the hospital that provided early and extended infant contact in a rooming-in setting would have more positive mother-infant interactions than mothers who delivered at a facility that offered early, but minimal, contact.

Subjects: A total of 31 unmarried first-time mothers who were between the ages of 16-22 years. Predominantly African American with low socioeconomic status. Experienced uncomplicated pregnancy and delivered healthy full-term infants.

Study Design: Fifteen mothers roomed in with their infant while 16 only had minimal contact. The two groups were equal in regards to substance use and in factors such as prenatal and postpartum plan of care. Both groups bottle-fed their infants. Mothers entered the study during hospitalization. The mothers were told that they were being observed interacting with their infants. Mothers were observed for 15 minutes after a morning feeding, approximately 18 hours after delivery. The observer monitored 13 items such as holding, talking, touching, and attentiveness and completed a Maternal Touching Checklist.

Findings: Rooming-in mothers looked at and talked more to their infants. They talked less with others, watched less television, and spent less time on the phone. Rooming-in mothers also demonstrated more intimate touching behavior such as palming, as opposed to the minimal contact group that lightly touched their infant. Rooming-in mothers touched more intimate areas of the infant such as the face and head when compared to the minimal contact group.

Results indicate that more intimate touching by the rooming-in mothers suggests that they have developed a more familiar and comfortable relationship with their infant than the mothers with limited contact. No differences in holding, cradling, and rocking behavior were observed between the two groups.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Gomes-Pedro, J., Bento de Almeida, J., Silveira da Costa, C., & Barbosa, A. (1984). Influence of early mother-infant contact on dyadic behaviour during the first month of life. *Developmental Medicine & Child Neurology*, 26(5), 657-664.

Premise: To study the behavior of infants by using the Brazelton Neonatal Behavior Assessment Scale (BNBAS) between two similar groups of women. To determine whether or not early contact between infants and mothers in the first few hours postpartum affects attachment.

Research Question: Does early contact have an additional effect on the mother's affectionate behavior and on the infant's performance on the BNBAS?

Background: The focus of this study was in regard to additional and early contact between the mother and infant. Half of the group followed the usual hospital routine of separation for clinical observation and tasks; half of the group was provided early contact following birth. Both groups had permanent rooming-in beginning at 6 hours postpartum.

Subjects: A total of 60 primiparous women, with selection criteria of intention to breastfeed: white, Portuguese nationality, ages 18 to 35 years, living with baby's father for at least one year, low/medium social class, uncomplicated pregnancy, 38 to 42 weeks pregnancy, and labor not lasting more than 24 hours. All had identical labor analgesics (50-mg. pethidine, 100-mg. promethazine), vaginal delivery, minimum Apgar score of 8 at one minute, 10 at five minutes, and infant weight between 10th and 90th percentile. Sex distribution of infants was equal (although this was only coincidental). The group was separated randomly in half.

Study Design: Direct observation (15 minutes) of mothers and infants during feeding on the first day in the hospital, third day in the hospital, and the 28th day at home.

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Findings: Scores were similar (using the Mann-Whitney test) for the first day in the hospital during feeding for both groups. Significantly higher interactive processes were found on the third and 28th days for the mother-infant group that was provided early contact. Mothers in the experimental group had a greater tendency to soothe their infants when they cried. On the 28th day observations, the mothers in the experimental group scored significantly higher in the affectionate behavior dimension as well. No differences were found between the experimental and control groups with regard to infants' behavior directly observed during feeding.

Research reviewed by Inga McDonald, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

de Chateau, P., & Wiberg, B. (1984). Long-term effect on mother-infant behaviour of extra contact during the first hour postpartum. III. Follow-up at one year. *Scandinavian Journal of Social Medicine*, 12(2), 91-103.

Premise: Extra skin-to-skin contact in the first hour postpartum is linked to positive growth and development of the infant and the mother-infant bond.

Research Question: Does a link exist between extra contact of the mother and infant in the first postpartum hour and the growth and development of the infant and the mother-infant bond?

Background: Close, uninterrupted contact between mother and infant in the first hour postpartum was found to increase the development and growth of the infant, as well as the mother-infant bond

Subjects: A total of 42 mother-infant pairs. All mothers were primiparous women, aged 20 to 29 years. Their length of pregnancy was 38 to 42 weeks. None of the mothers had a history of previous abortion or miscarriage. None were taking medication apart from supplementation with iron and vitamins during pregnancy. Each experienced normal weight gain, normal blood pressure and Hb percentage, and no proteinuria. Each spontaneously started labor, with the duration of labor no more than 24 hours. Each was given no more than 200 mg. pethidine (or equivalent) 1-6 hours before parturition.

Study Design: Prospective longitudinal study with follow-up at one year. At the one-year study evaluation, nine mother-infant pairs were lost to different factors such as relocation, not willing to come, or employer not allowing a day off.

Findings: At one year, mothers who were provided extra contact with their infants postpartum displayed more empathy toward their infants and expressed more body posture (holding infant closely to body). Mothers with male children had overall greater responses. No significant differences existed between groups in psychomotor development; however, a trend did exist in that the P+ group was ahead in four of the five parts of the psychomotor testing.

Research reviewed by Inga McDonald, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Richard, L., & Alade, M. O. (1990). Effect of delivery room routines on success of first breastfeed. *The Lancet*, 336, 1105-1107.

Premise: That delivery ward routines affect the success of first breastfeed.

Research Hypothesis: Development of correct or incorrect breastfeeding technique depends on delivery ward routine.

Subjects: A total of 80 mothers were asked to participate; 72 mothers consented. All women had uncomplicated pregnancies, spontaneous deliveries, and a minimum of 9 or 10 on 5-minute Apgar. All infants had normal birth weights.

Study Design: Direct observation of infants and mothers in the first two hours postpartum during feeding. Successful sucking was classified as infant opening mouth wide, with its tongue under the areola, and milk being expressed from the breast with deep sucks.

Findings: Contact between mother and infant should be uninterrupted during the first hour after birth or until the first breastfeed has been accomplished. The use of drugs, such as pethidine, should be restricted. This is supported by the information gained in regard to infants' inability or lack of sucking at the breast in the first hour postpartum among women who received pethidine during labor.

Research reviewed by Inga McDonald, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Cannon, R. B. (1977). The development of maternal touch during early mother-infant interaction. *Journal of Gynecological Nursing*, March/April, 28-33.

Premise: Clothing the infant slows the speed with which the mother develops intimate maternal touch.

Research Questions: During the first 18 hours of life, will mothers of undressed infants progress through stages of maternal touch faster than mothers of dressed infants? Will

multipara mothers progress through stages of maternal touch faster than primipara mothers will?

Background: Early tactile touch enters into the infant's patterns of learning.

Subjects: The infants were from uncomplicated labors, first or second infant, and were at least 38 weeks gestation and without apparent complications or abnormalities. Twenty-four mothers and infants were chosen according to the criteria for the study.

Study Design: The data was gathered with a video camera mounted on a tripod and used to record a 12-minute interaction. The camera was set up before the infant was brought into the room, then the infant and mother were video taped for 12 minutes without interruption.

Findings: Four stages of maternal touch were defined: a) Mother uses one-finger touch to infant's face and extremities; b) mother uses fingertips to touch baby's trunk; c) mother touches the infant with her hand, including the palm; d) mother holds infant "en face" (infant against mother's body, establishing eye contact). All mothers, except one, reached stage 1 during the first minute. The exception reached the first stage during the third minute. Stages 2, 3, and 4 were reached significantly faster with undressed infants than dressed infants. No significant differences were noted between multiparas and primiparas.

Research reviewed by Kay Liska, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Norr, K., Roberts, J., & Freese, U. (1989). Early postpartum rooming-in and maternal attachment behaviors in a group of medically indigent primiparas. *Journal of Nurse-Midwifery*, 30(2), 85-91.

Premise: Rooming in promotes maternal-child attachment earlier than in mothers not provided rooming-in opportunities.

Research Hypothesis: Mothers who experienced rooming-in will have higher maternal attachment scores during monitored newborn feedings than a control group who gave birth prior to the availability of rooming-in, and a control group who requested but did not receive the rooming-in facilities.

Background: The conceptual framework is based on Bowlby's integrated theory of attachment and separation.

Subjects: A total of 80 rooming-in mothers, 35 mothers who wanted to room-in but did not, 72 women subjects who gave birth prerooming-in. All were first-time mothers and medically indigent women. All had vaginal deliveries

of term infants, uncomplicated labor and deliveries, and uncomplicated postpartum course.

Study Design: Mothers entered study during hospitalization. Rooming-in infants remained with mothers all day. All other infants were taken to mother's room every four hours for approximately 45 minutes for feedings. The study was explained to mothers and consent was obtained. Mothers were primarily observed during the 9 a.m. feeding on the second or third postpartum day for the first 15 of 30 consecutive minutes. Maternal-infant attachment was measured by a Maternal Attachment Behavior Scale, which monitored for affection, proximity, caretaking, and attention.

Findings: Using analysis variance, rooming-in mothers scored higher on maternal attachment test than the prerooming-in group and higher than the group of mothers that wanted to room-in and could not. Rooming-in scores, 88.9 (\pm 20.6); wanted-to-room-in, 80.2 (\pm 19.9); prerooming-in, 82.2 (\pm 21.0). Results indicate that rooming-in helps first-time mothers form early attachments to their newborns. All mothers, and especially mothers at risk for parenting/attachment issues, including low-income and adolescent mothers, can benefit from a rooming-in environment.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Schroeder, M. (1977). Is the immediate postpartum period crucial to the mother-child relationship? A pilot study comparing primiparas with rooming-in and those in a maternity ward. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, May/June, 37-40.

Premise: The greater amount of contact between mother and child provided in facilities that offer rooming-in leads to a closer mother-child relationship measured by feeling and thought toward the infant and in the mother's ability to competently care for the infant.

Research Hypothesis: The greater the period of contact between mother and infant during the postpartum period, the less time is required for development of an affectional mother-child relationship.

Subjects: A total of 20 mothers: 10 rooming-in and 10 in a maternity ward. All of the participants were first-time mothers, married, and interviewed on the second day postpartum.

Study Design: Occurred over an 8-week period on Tuesdays and Thursdays. Mothers selected from census book approximately 48 hours postdelivery. Charts were reviewed

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and staff was consulted. Patients were informed about the study and permission was obtained. A single person conducted private interviews using open-ended questionnaires. The questionnaire covered topics such as mothers' thoughts, feelings, and beliefs about pregnancy and delivery, preference of rooming-in, experience with children, and concerns about caring for a newborn infant.

Findings: Socioeconomic variables were equally distributed between the two groups. Nine out of 10 mothers on the maternity ward were concerned about basic infant care after discharge. One mother in the rooming-in unit was concerned about discharge and infant care. Rooming-in mothers were more interested in long-term concerns such as a sick child. All 10 rooming-in mothers believed they would not feel as close to their infant if they were on the maternity ward. Five of the maternity ward mothers believed they would feel closer if they had experienced rooming-in. Contact hours rooming: 14. Maternity ward contact hours: 2. Mothers who received the benefits of more contact hours with their infant provided in a rooming-in unit felt closer to their infants and demonstrated a greater level of competence and confidence in newborn care activities.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Christensson, K., Cabera, T., Christensson, E., Uvnas-Moberg, K., & Winberg, J. (1995). Separation distress call in the human neonate in the absence of maternal body contact. *Acta Paediatrica*, 84, 468-473.

Premise: The postnatal cry may be a human counterpart to the separation distress call, as observed in many mammalian species upon separation.

Research Question: Do infants have the ability to recognize their being physically separated from their mother?

Background: Mammals elicit distress signals when separated from maternal contact and continue until comfort support is elicited. Human neonates express a similar distress signal by crying.

Subjects: A total of 44 full-term, healthy infants without visible malformations. Their mothers experienced an uneventful pregnancy and uncomplicated vaginal delivery.

Study Design: In a randomized trial, the newborn's cry was registered during the first 90 minutes after birth. Fourteen infants were kept on a cot, 15 infants received skin-to-skin contact with the mother, and 15 were placed on a cot for

the first half then switched to maternal contact for the second half. All periods were tape-recorded.

Findings: Human infants recognize physical separation from their mothers and start to cry. Crying stops at reunion. The most appropriate position of the healthy, full-term newborn baby after birth is in close contact with the mother.

Research reviewed by Melissa Vaughan, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

D.2. This environment offers respect for the significance of the father's or partner's role in supporting the mother and connecting with the child during the birth and postpartum period.

Ferketich, S. L., & Mercer, R. T. (1995). Predictors of role competence for experienced and inexperienced fathers. *Nursing Research*, 44(2), 89-95.

Premise: In adopting or restructuring behaviors for a new role, new behaviors must be learned along with changes in responsibilities, goals, identity, and feelings about one's self in general.

Research Questions: How can men who lack the intimate stimuli that the mother experiences develop their father identity? Are there differences between experienced and inexperienced fathers in the transition to the paternal role?

Background: Beneficial mother-child effects occur when the father's participation in child care increases. The sensitivity of the mother with the child also increases.

Subjects: The fathers were recruited during the 24th-34th week of their partner's pregnancy. The study included 79 experienced fathers and 93 inexperienced fathers.

Study Design: The parents' perceptions of their abilities to meet the situational demand of parenting were measured by the Parenting Sense of Competence Scale. Rosenberg's scale was used to measure the extent of self-acceptance. Sense of mastery and control of one's self was measured by a 7-item scale. Partner relationship was measured with Locke and Wallace's Marital Adjustment Test. Family functioning was measured by the Feetman Family Functioning Instrument. Anxiety was measured by a State Anxiety Scale. Support was measured by an Inventory of Socially Supportive Behaviors.

Findings: The experienced fathers demonstrated a significantly higher mean paternal role competence in the first week postpartum than the inexperienced fathers did. No significant differences were reported at 1, 4, or 8 months

postpartum; however, the fathers' competence sign was higher at 4 and 8 months postpartum. Having a sense of control over their lives and a satisfactory function in their new family within the broader social context were aspects that were more critical to first-time fathers than experienced fathers. Having already dealt with other infants, the experienced fathers felt confident in the father role; however, their predictor of competence was the partner relationship. Among the inexperienced fathers, 24% reported depression, which impacted their perception of competence. By considering the fathers' goals and feelings and helping them negotiate the social systems to participate in childbearing activities, fathers can be assisted in assuming their new role.

Research reviewed by Cynthia M. Turner, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Anderson, A. M. (1996). The father-infant relationship: Becoming connected. *The Journal of the Society of Pediatric Nurses*, 1(2), 83-92.

Premise: Fathers benefit from direction, opportunities, and support to develop a relationship with their infants.

Research Questions: What are first-time fathers' perceptions of their father-infant relationship, their fathering self, and their infant? How do fathers' perceptions of their father-infant relationship, their fathering self, and their infant influence the initial development of the father-infant relationship?

Background: How fathers perceive and comprehend their parenting role, their fathering relationship, and their infants may influence the nature of the father-infant relationship.

Subjects: The study included 14 first-time fathers.

Study Design: An open, exploratory, semi-structured interview using open-ended questions with detailed, elaborate probes and supportive feedback statements. Data were analyzed using the comparative method for this grounded theory study.

Findings: The data were developed and linked into three major categories: a) making a commitment, b) becoming connected, and c) making room for the baby. The fathers experienced a willingness to commit to develop, nurture, protect, and provide for the infant. Fathers were able to become connected to the infants once the fathers were able to receive positive feedback from the infants. Fathers reported that they adjusted their lifestyles in order to be physically and emotionally available to their infants.

Research reviewed by Rita Cooper, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Chandler, S., & Field P. A. (1997). Becoming a father: First-time fathers' experience of labor and delivery. *Journal of Nurse-Midwifery*, 42(1), 22-24.

Premise: Professionals need to support the couple, not just the mother during the prenatal period. They also need to view the father as part of the couple.

Research Questions: What are the fathers' expectations while their partners labor and give birth? What are the fathers' experiences while their partners labor and give birth?

Background: The fathers' presence at the birth of a child increases his interest in the child.

Subjects: In all, 14 fathers participated in this study. Eight primary informants were white with ages ranging from 30-42 years. They had been married 2-5 years. Six secondary informants ranged in ages from 26-37 years. They had been married 1.5-5 years.

Study Design: With snowball sampling and community contacts, the informants were obtained through newspaper advertisements.

Findings: Even though this study was meant to focus on the experiences of the fathers, it became evident early in the interviews that the fathers saw themselves as part of the laboring couple. However, they believed the staff did not view them as full partners. During labor and birth, the fathers experienced hidden fears (over not being viewed as full partners), excitement, relief, the belief that labor is work, and a shift in focus from the mother to the baby. All of the fathers noticed that the health care professional viewed his purpose at childbirth as offering support to his partner through her labor and delivery.

Research reviewed by Cynthia M. Turner, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Nichols, M. R. (1993). Paternal perspectives of the childbirth experience. *Maternal-Child Nursing Journal*, 21(3), 99-107.

Premise: Paternal participation during childbirth has a positive influence on the maternal perception of childbirth.

Research Questions: 1) What are fathers' feelings about being with their partner during her labor? 2) What were fathers' feelings about their experience of being present when their child was born? 3) What three things do fathers think they did that were most helpful to their partner during labor and delivery?

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Background: Joint participation during the childbirth by both the husband and the wife results in a more positive birth experience.

Subjects: A total of 44 first-time fathers with ages ranging from 19-45 years (mean age, 26 years). All of these fathers were married and living with their spouse. Some had attended prenatal classes and some had not. The sample was obtained from a military population and the majority was Caucasian.

Study Design: Three open-ended questions (see above) were presented to the fathers. The fathers sent the data through the mail and they used preprinted, coded questionnaires to ensure confidentiality.

Findings: The father's helpfulness was the most useful paternal behavior to the spouse. Even though the fathers had a less active role during their spouse's delivery, their involvement during labor required more interactive participation. The nurses put most of their focus on the infant and the child, not on the father. The labor process is stressful for both the prepared and unprepared fathers. The fathers who had attended prenatal classes believed they needed more support (both physically and psychologically) and more communication. They also experienced more negative feelings than the fathers who did not attend classes (61% vs. 39%). All fathers may not wish to be labor coaches, a topic that needs to be discussed in prenatal classes.

Research reviewed by Cynthia M. Turner, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Bloom, K. (1998). Perceived relationship with the father of the baby and maternal attachment in adolescents. *Journal of Obstetric, Gynecologic & Neonatal Nurses*, 27, 420-430.

Premise: Support from the significant other positively affects bonding with the fetus on the part of the teen mother.

Research Question: Do adolescent mothers bond better prenatally and postnatally if they have support from the father of their baby?

Background: A satisfying relationship with the father of her baby leads a young mother to develop and experience more attachment to her child.

Subjects: Seventy-nine teenagers between the ages of 12 and 19 years participated in this study.

Study Design: After consent was granted, questionnaires were given to the participants. The participants were polled at four stages during their pregnancy and early postpartum time. Tools used in this research study were Avant's Mater-

nal Attachment Assessment Strategy, the Father of the Baby Scale, and the Maternal Fetal Attachment Scale.

Findings: The study found that most of the mothers reported feeling close to the father of their baby, in some cases despite the fact that the father had not even seen the newborn. Mothers that reported a close relationship with the father of their newborn appeared to keep their newborn infant near to them during times of observation.

Research reviewed by Caren M. Bennett-Bray, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

D.3. This environment offers support for mothers and families—including those with premature newborn or sick infants—to touch, hold, breastfeed, and care for their babies to the extent compatible with their condition.

Ludington, S. M., Anderson, G. C., & Hollingsead, A. (1999). Birth-related fatigue in 34- to 36-week preterm neonates: Rapid recovery with very early kangaroo (skin-to-skin) care. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 28, 94-103.

Premise: Kangaroo care assists preterm infants to recover from birth-related fatigue.

Background: Very early kangaroo care in Kathmandu, Nepal, and Zimbabwe, Africa, was found favorable in terms of morbidity and mortality.

Subjects: Infants who were between 30 and 36 weeks gestation were studied. These neonates had 5-minute Apgar scores of 6 or greater, no cyanosis of the head, no apparent genetic malformation, and approval of the attending neonatologist. Five neonates were 36 weeks gestation and one was 34 weeks gestation.

Study Design: Two nurse researchers were assigned to each mother-neonate dyad. The infants were allowed to breastfeed and rest with the mother uninterrupted. The dyad was monitored for 6 hours, noting heart rate, respiratory rate, oxygen saturation, and temperature.

Findings: The researchers found that 34- to 36-week preterm infants recover from birth related fatigue as demonstrated by physiologic and behavioral responses when placed skin-to-skin on their mother's chest sooner than those infants taken to the neonatal intensive care unit immediately after birth. The infants that had temperatures return to normal, heart rate, respiratory rate, and oxygen saturation also remained normal. These infants were discharged

home in 48 hours, fully breastfeeding. This study suggested that kangaroo care can reduce birth-related fatigue safely in neonates 34 to 36 weeks gestation who appeared healthy at birth.

Research reviewed by Kay Liska, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Yogman, M. W., Kindlon, D., & Earls, F. (1995). Father involvement and cognitive/behavioral outcomes of preterm infants. *Journal of American Academy Child and Adolescent Psychiatry*, 34(1), 58-66.

Premise: Father involvement enhances cognitive development in African-American, low-birth-weight preterm infants.

Research Question: Does father involvement have an independent effect on the intellectual and behavioral outcomes of low-birth-weight preterm infants?

Background: Fathers play an important, direct role in the development of full-term infants.

Subjects: The study included 985 low-birth-weight preterm infants.

Study Design: Mothers and infants entered this eight-site trial while still in the hospital. The information was also obtained from the maternal figure at pediatric follow-ups at 40 weeks postconceptional age and 4, 8, 12, 18, 24, 30, and 36 months of age. A randomly assigned intervention group received an educational curriculum, family support, and pediatric follow-up. The other group only received pediatric follow-up and referral to community services. The data was collected on a) demographic and perinatal characteristics of fathers and the families, b) the father's presence in the home, c) paternal involvement in play and care giving, d) maternal satisfaction with paternal involvement, and e) child cognitive and behavioral outcomes. The information was obtained through maternal interviews.

Findings: Approximately 75% of the fathers played with their baby every day. In 41.4% of the families, the father figure was always present in the home. Race, income, and age were related to the level of father involvement. IQ and behavioral problems were unrelated to family income, Neonatal Health Index, father's age, treatment group status, and the level of father involvement. A higher level of father involvement was associated with higher IQ in the African-American population of this study. Behavior problems at these ages were not shown to be related to father involvement.

Research reviewed by Rita Cooper, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Scharer, K. & Brooks, G. (1994). Mothers of chronically ill neonates and primary nurses in the NICU: Transfer of care. *Neonatal Network*, 13(5), 37-46.

Premise: The simultaneous perspectives of care among parents and nurses in regard to NICU infants with chronic illness are important.

Research Question: What is the relationship between mothers and nurses during chronically ill neonates' stay in the hospital, and how does that relationship influence mothers' parenting of infants in the hospital?

Background: A relationship involves two persons, each contributing from their own unique backgrounds, values, cultures, and experiences. Transfer of care consists of the gradual shifting of responsibility. The mother's task is to care for her neonate while the infant becomes stable enough for her to assume care. The nurse's task is to care for the infant, teach the mother the required care, and then relinquish that care. A gradual trend has emerged to have parents provide increasingly familiar aspects of their infant's care in the NICU. The expectation of complex-care infants being discharged has created opportunities and conflicts for both parents and nurses as roles and values must be evaluated and renegotiated.

Subjects: Ten mothers of chronically ill NICU babies (GA 24-40 weeks) expected to stay in NICU ≥ 6 weeks; nine primary nurses. Subjects were from the NICU of an urban children's hospital and the NICU of a suburban medical center. Mothers and nurses were diverse in age, ethnic background, race, and health status. Two mothers had previous NICU experience. All the mothers delivered earlier than expected.

Study Design: Twenty-two interviews were completed with mothers and nurses. Grounded theory methodology was used to explore the developing relationship between infant's primary nurse and mother. Two semistructured interviews were conducted—one for the nurses and one for the parents—to examine both perspectives at the same time. Interviews were conducted during the infant's hospitalization; a second interview obtained if the duration of the hospital stay permitted. Interviews were conducted in private, lasted approximately one hour, and were recorded on audiotape.

Findings: Revealed four stages of transferring care: nurse providing care, nurse and mother sharing normal care, nurse and mother sharing normal care and technical care, and the parent providing care. With encouragement from the nurses, mothers began to share in normal infant care. Nurses used the time with parents to support and teach them, especially technical care that might be needed at

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infant's discharge. Factors that may influence transfer of care included the status of the infant, the mother's physical status, level of support from others, and the nurse's expectations of the parents. When common goals, respect, and trust were established, issues could be negotiated and the relationship became a true working alliance.

Research reviewed by Anna A. Weston, RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Nyqvist, K., & Ewald, U. (1997). Successful breastfeeding in spite of early mother-baby separation for neonatal care. *Midwifery*, 13(1), 24-31.

Premise: With support, separation of the newborn and the mother for a maximum of six days need not significantly affect breastfeeding.

Research Question: To what extent does the separation of mother and baby in the first few days of life act as a barrier to breastfeeding?

Background: Mother and baby separation should be avoided if at all possible; but in the event that separation is inevitable, breastfeeding should not be dismissed.

Variables: Maternal education.

Study Design: Past medical records were reviewed and telephone interviews were conducted with the mothers to determine successful breastfeeding. Successful breastfeeding was defined as partial or exclusive breastfeeding. Partial breastfeeding was not defined.

Subjects: Participants came from a Swedish community where breastfeeding rates are high. The study included 148 mother-baby pairs in a separated group and 3,516 in a comparison group.

Findings: No significant differences existed between groups. More than 70% of the babies in both groups were breastfed exclusively after two months, and more than 50% were breastfed exclusively after four months. Separation of up to six days between mother and newborn as a result of a medical condition need not result in unsuccessful breastfeeding.

Research reviewed by Ruthie Forehand, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Blaymore-Bier, J., Ferguson, A. E., Morales, Y., Liebling, J. A., Archer, D., Oh, W., & Vohr, B. R. (1996). Comparisons of skin-to-skin contact with standard contact in low-birth-weight infants who are breastfed. *Archives of Pediatrics & Adolescent Medicine*, 150(12), 1265-1269.

Premise: Skin-to-skin contact on low-birth-weight infants improves their functioning and their likelihood of sustaining breastfeeding.

Research Question: Does skin-to-skin contact benefit low-birth-weight infants and encourage them to breastfeed longer?

Background: The idea that skin-to-skin contact promotes bonding and further improves the results of breastfeeding in low-birth-weight infants is widely accepted and practiced in many parts of this country.

Variables: Consisted of the small number of subjects: 50 infants. All infants weighed less than 1500 g., and all mothers tested negative for drug screen and serology. Out of 3,643 infants born, the selection of 50 were then randomly placed into two groups: the skin-to-skin (SSC) or standard contact (SC) group. This was achieved by having the mothers blindly hand pick the instructions of placement of the infant from a bin of papers with the SSC or SC designation.

Study Design: The groups of 21 mothers with 25 infants selected for the SSC group and the group of 20 mothers with 25 infants for the SC group. Observation of 176 mother-infant SSC sessions and 137 mother-infant SC sessions were recorded. The unpaired t-test was used to compare base-line characteristics of both groups. Physiological data measured compared with analysis of variance with repeated measures.

Findings: The researchers concluded that low-birth-weight infants benefit from skin-to-skin contact by fewer incidences of a drop in oxygen saturation levels. Mothers are more likely to continue breastfeeding after one month of discharge. This option is also cost effective, as well as easy to implement.

Research reviewed by Robin Gilman, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Sullivan, J. R. (1999). Development of father-infant attachment in fathers of preterm infants. *Neonatal Network*, 18(7), 33-39.

Premise: Fathers are able to start the attachment process to preterm infants once the fathers are allowed to hold their infants, which is often delayed as a result of medical care.

Research Question: Do the many factors involved with intensive medical care in preterm infants affect the father-infant attachment process and alter the father's feelings and perceptions?

Background: An infant's development in language, cognition, motor skills, and health is affected by the parent-

infant relationship and the parent's ability to provide an adequate care-giving environment with encouragement and love.

Subjects: Participants included 27 fathers of preterm infants.

Study Design: Two instruments were used. An adapted version of Broussard and Hartner's Neonatal Perception Inventory (NPI) was used to assess the father's perception of his own baby in comparison with an average full-term baby. Levy-Shiff and colleagues' Parental Feelings Questionnaire (PFQ) was translated from Hebrew into English and administered as well. This assessed parents' feelings and concern for their baby. These instruments were administered at 48 hours after birth, one week, and again at 5 months of age.

Findings: The fathers reported that their feelings of love were related to the time they first held their babies. These feelings of love were not related to their presence at the birth or the relief that the birth was over, according to the fathers' reports. The NPI revealed a decrease in the father's view of perceived difficulty, compared to the average baby, between one week of age and one month of age. The father's view of perceived difficulty increased as compared to the average baby between one month of age and five months of age. The PFQ revealed a decrease in the fathers' disappointment with the infant from the first week to the fifth month of life.

Research reviewed by Rita Cooper, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Bialoskurski, M., Cox, C. L., & Hayes, J. A. (1999). The nature of attachment in a neonatal intensive care unit. *Journal of Perinatal and Neonatal Nursing*, 13(1), 66-77.

Premise: The concept of attachment has been inadequately defined. Prematurity and separation at birth can affect the attachment process.

Research Question: How does isolation of the infant from the parents affect the attachment process?

Background: Attachment is a complex, multifactorial, individualized process that requires physical contact and early interaction. A loving relationship is necessary to promote emotional well-being of the infant and parents. Hospitalization can interrupt this process of attachment.

Subjects: A total of 25 mothers were interviewed before their infants were discharged from the NICU. Some mothers had previous experience with the NICU and some did not. The informants were of diverse ethnic and cultural back-

grounds. They were 18 years and older, English-speaking, not visibly distressed, and willing to give informed consent for an interview.

Study Design: The study is descriptive and attempts to describe how prematurity and separation at birth can affect the attachment process. Leninger's ethnonursing research methodology was utilized, incorporating observation of care, participation of care, and reflection. This research method involves four phases of data collection: primary observation and active listening, primary observation with limited participation, primary participation with continued observation, and primary reflection and reconfirmation of findings with informants.

Findings: Immediate attachment was more likely to occur if the mother was able to see the infant directly after birth. Attachment was strengthened when physical contact occurred between mother and infant. Delayed attachment may occur in the NICU environment. Factors that may influence this attachment included the physical appearance of the infant, the premature infant's disorganized interaction behavior, and the mothers' coping mechanisms to prevent grief. Other factors may include the mother's poor maternal health at the time of and after delivery, lack of social support, presence of other dependent children, drug dependency, financial issues, and the break up of the relationship with her partner. Nurses may facilitate attachment and increase physical and psychological contact by encouraging mothers to stroke the infant.

Research reviewed by Anna A. Weston, RNC, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

D.5. This environment offers support for successful breastfeeding by responding to the baby's cues to nurse and by giving no artificial teats, pacifiers, food, or drink other than breast milk, unless medically indicated.

Aarts, C., Hornell, A., Kylberg, E., Hofvander, Y., & Gebre-Medhin, M. (1999). Breastfeeding patterns in relation to thumb sucking and pacifier use. *Pediatrics*, 104 (4), e50.

Premise: More frequent use of pacifiers has been associated with a shorter total period of breastfeeding among the infants of mothers who are highly motivated to breastfeed.

Research Question: Do pacifier use and thumb sucking influence breastfeeding patterns in exclusively breastfed infants?

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Background: Nonnutritive sucking habits have been studied extensively. Several studies have shown that pacifier use and thumb sucking have a negative effect on the duration of breastfeeding.

Subjects: A total of 506 mother-infant pairs recruited from Uppsala, Sweden, between May 1989 and December 1992.

Study Design: A descriptive study with a longitudinal prospective design. The mother-infant pairs were followed from the first week after delivery until the mothers' second menstruation postpartum or a new pregnancy.

Findings: Pacifier use was associated with suboptimum breastfeeding patterns and affected the duration of exclusive breastfeeding and the total breastfeeding duration. Thumb sucking was not shown to be a factor in breastfeeding patterns.

Research reviewed by Judy Mirmelstein, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Wright, A., Rice, S., & Wells, S. (1996). Changing hospital practices to increase the duration of breastfeeding. *Pediatrics*, 97(5), 669-675.

Premise: Breastfeeding duration and exclusive breastfeeding are negatively associated with pacifier use, formula feeding, and receiving formula samples or coupons.

Research Question: Will changing hospital practices increase the duration of breastfeeding?

Background: Efforts to support breastfeeding were developed by instituting a list of 10 research-supported practices, the Ten Steps to Successful Breastfeeding. Changing hospital practices could have a significant impact on breastfeeding patterns.

Subjects: In 1990, 192 mothers participated in the first half of the study. In 1993, after the implementation of policy changes to support breastfeeding, 392 mothers participated shortly after giving birth and 192 mothers participated four months later.

Study Design: The baseline study included interviews with women who gave birth in 1990 at a maternity ward. The study period in 1993 took place after the Ten Steps to Successful Breastfeeding were implemented. This included a reevaluation of how the ten steps policy affected initiation and duration of breastfeeding.

Findings: As a result of the policy changes, more mothers nursed their babies and more mothers received assistance with breastfeeding. Breastfeeding duration was positively

associated with no pacifiers. Pacifiers were associated with shorter breastfeeding duration.

Research reviewed by Judy Mirmelstein, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

D.6. This environment offers assistance for mothers to establish breastfeeding support groups and referrals of new mothers to them.

Coreil, J., Bryant, C., Westover, B., & Bailey, D. (1995). Health professionals and breastfeeding counseling: Client and providers views. *Journal of Human Lactation*, 11(4), 265-271.

Premise: A gap exists between the promotion and actual support of breastfeeding women.

Research Hypothesis: Many health care providers are unsupportive of breastfeeding mothers, while others are misinformed or inadequately prepared to assist with breastfeeding.

Background: Provisions of sympathetic, informed counseling can make a difference in successful breastfeeding.

Subjects: Study participants were public health department clients, Anglo-American and African-American women, and economically disadvantaged. The study also included health department staff, perinatal hospital staff, lactation consultants, and nutritionists from the same geographical area.

Study Design: Client subjects were divided into 35 focus groups ranging in size from four to 10 persons. Discussions were conducted with group members. The groups were separated according to age, parity, geographic residence, and infant feeding method. Six focus groups were formed with the health care personnel. Twenty-two in-depth interviews were performed with members of the health care staff. Some topics for discussion included beliefs and attitudes about breastfeeding, influencing factors, expectations of and perceived problems with counselors, and recommendations for improvement. Focus groups and interviews were recorded verbatim, they were coded and sorted with computer programs. Thematic categories were developed according to results.

Findings: Although results varied, data collected from both the clients and the providers reinforced earlier research findings. Clients believed there was a lack of preparation for what to expect during the entire lactation process. They also received contradicting information from different

health care workers. Providers felt that lack of time contributed to the poor teaching outcomes. Many admitted to being unfamiliar with proper technique or exact physiology. A general consensus concurred that a gap exists in the support services offered between hospital discharge and the first postpartum visit, one to two weeks after discharge.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

McNatt, M., & Freston, S. (1992). Social support and lactation outcomes in postpartum women. *Journal of Human Lactation*, 8(2), 73-77.

Premise: Support density is an important factor in breastfeeding success.

Research Questions: How does the amount of perceived support relate to a woman's feelings of breastfeeding success? Are certain types of support more related to a woman's feelings of success? Is the makeup of a woman's support network structure related to her lactation outcomes?

Subjects: A convenience sample of 45 first-time mothers giving birth at a small community in southeastern Connecticut. All communicated in English and expressed a desire to breastfeed. All participants had to have normal vaginal deliveries and the birth of one term infant with 5-minute Apgar scores of 7 or greater. The selected women were informed about the study and invited to participate between 24 and 72 hours postbirth.

Study Design: Subjects were divided into two groups, depending on their response to questions regarding breastfeeding satisfaction. Informed consent was obtained. Questionnaires were mailed to the participants four to six weeks after discharge. Thirty-eight out of 45 participants returned the questionnaires, which included thoughts and feelings regarding breastfeeding. The subjects were also asked to identify their support networks. Demographic and social variables were similar between the two groups.

Findings: Results indicated that women who were satisfied with their breastfeeding experience had double the number of informational support providers compared to women who were dissatisfied. It was also found that, as women increased their informational network, the number of people providing emotional support also increased. No difference was identified between perceived support and lactation outcomes, possibly due to factors such as research design and sample selection. Researchers suggested that women

should select or be directed to appropriated and qualified support networks to enhance lactation satisfaction.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Wright, A., Rice, S., & Wells S. (1996). Changing hospital practice to increase duration of breastfeeding. *Pediatrics*, 97(5), 669-675.

Premise: Adopting the Baby-Friendly Hospital Initiative (BFHI) in Tuscon, AZ, had a positive effect on breastfeeding outcomes.

Research Synopsis: Current health care practices undermine mothers' attempts to breastfeed exclusively and impact their long-term breastfeeding success. Research was developed to assess the impact of hospital practices on duration of breastfeeding for mothers in a university teaching hospital after changes were made in accordance with the recommended Ten Steps to Successful Breastfeeding.

Background: The potential lifelong benefits of breastfeeding infants make breastfeeding the optimal feeding method.

Study Design: Variables included health care practices including, but not limited to, breastfeeding guidance from staff, rooming-in, formula supplementation, and referring mothers to support groups. Confounding variables included breastfeeding plans, native language, and maternal education. Research entailed a study of existing practices and outcomes before and after adoption of BFHI. An initial baseline study was conducted in 1990 through an interview process with a limited questionnaire. During a one-month period, 192 of 325 women that gave birth were questioned prior to their discharge from the hospital. The evaluation after BFHI was conducted in 1993. It included a questionnaire similar to the baseline study with additional questions related to the new policies and procedures. Out of 720 mothers that gave birth over a two-month period, 392 were interviewed during their hospital stay. A follow-up telephone interview was conducted on breastfeeding mothers when their infants were 4 months old.

Findings: Among the findings, more women were offered help with breastfeeding by hospital staff (81.9% in 1993 vs. 61.3% ($p < 0.00001$) in 1990). As a result of the new policy implementation, 38.4% of mothers in 1993 were referred to breastfeeding support groups prior to discharge. Multivariate analysis indicated the duration of breastfeeding at one and four months was also found to be associated with the implementation of multiple practices.

Research reviewed by Suzanne Winder, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

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D.8. This environment offers respect for infants by telling them what is happening in their environment and what is going to be happening to them.

Moon, C., Lever, T. G., & Fifer, W. P. (1992). Canonical and noncanonical syllable discrimination by 2-day-old infants. *Journal of Child Language*, 19(1), 1-17.

Premise: Using sucking as a marker to determine speech perception between canonical and noncanonical syllables.

Research Question: Can newborn infants distinguish between syllables that are either consonant-vowel-consonant (CVC, or canonical) or consonant only (CCC, or noncanonical)?

Background: Speech is more salient to newborns than other sounds. Newborns alter their sucking patterns to singing voices but not to instrumental music. They are specifically responsive to their mother's voice. The CVC presented was *pat* or *tap*. The CCC presented was *pst* or *tsp*.

Subjects: Four groups of 10 infants between 27 and 81 hours postbirth.

Study Design: Infants were in two experimental groups and two control groups. They were stimulated by the monotone, taped voice of a male who presented *pat* and *pat* as a pair (canonical) or *pst* and *tsp* as a pair (noncanonical). If the infants initiated a sucking burst at the word *pat* or *pst*, they initiated a recording of their mother's voice. If the infants sucked at *tap* or *tsp*, they initiated silence.

Findings: When given *pat* and *tap*, infants more often activated their mother's voice. When given *pst* and *tsp* infants more often activated silence. In all tests, the infants did discriminate sounds. It is noted that many languages use noncanonical sounds (such as *pst*) to gain attention.

Research reviewed by Sherry Dailey, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Bijeljic-Babic, R., Bertocini, J., & Mehler, J. (1993). How do 4-day-old infants categorize multisyllabic utterances? *Developmental Psychology*, 29(4), 711-721.

Premise: Newborns can conceptually structure complex speech inputs.

Research Question: Can 4-day-old infants discriminate multisyllabic utterances on the basis of the number of syllables?

Background: Like adults, infants organize thought patterns according to syllables and segments in speech. They signal their attention to or preference for sounds by imitating sucking on a nonnutritive nipple.

Subjects: A total of 86 infants during third to fourth day postdelivery.

Study Design: Infants were randomly assigned to one of two preshift stimulus conditions and one of two experimental conditions. Responses were measured by sucking criterion. An adjustable mechanical arm holds the pacifier. A female speaker recorded the syllables and sequences for 150 items.

Findings: The results indicated that the infants noticed a difference between the two consonant-vowel and the three consonant-vowel syllables and that the discrimination was not merely on the basis of the overall duration. The sucking rates in the experimental group increased while the control group had no difference in the sucking rate. Thus, infants are actively processing the speech they hear.

Research reviewed by Sherry Dailey, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Sansavini, A., Bertocini, J., & Giovanelli, G. (1997). Newborns discriminate the rhythm of multisyllabic stressed words. *Developmental Psychology*, 33(1), 3-11.

Research Question: Can infants determine different stress patterns in multisyllabic, accented words?

Background: Infants use prosodic (rhythm) cues to identify words in speech because they cannot rely on syntax.

Subjects: A total of 66 newborns between 48 and 72 hours old.

Study Design: The infants were stimulated by words recorded in a female's voice. The tape was 1,100 ms., with 450 ms. of silence between the stimuli. Responses were measured by a high amplitude sucking procedure. The test lasted 9 minutes.

Findings: Newborns were shown by their suckling bursts to discriminate the accented patterns of both disyllabic and trisyllabic words.

Research reviewed by Sherry Dailey, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

D.9. This environment offers protection from overstimulation (bright lights or loud noises) or trauma to the infant (separation from mother, taking blood specimens, or infant circumcision).

Stevens, B., Johnston, C., & Grunan, R., (1995). Issues of assessment of pain and discomfort in neonates. *Journal of Obstetric, Gynecologic and Neonatal Nursing*, 24(9), 849-855.

Premise: Infant pain is important to understand.

Research Hypothesis: Pain in the infant is not assessed adequately or accurately.

Background: One longstanding misconception about infant pain is that infant pain is not remembered and therefore not significant.

Subjects: Infants from various studies were included in this article.

Review Topics: This is a review article on infant pain. The article summarizes research on infant response by physiologic/autonomic indicators such as heart rate, respiration rate, vagal tone, oxygen saturation, blood pressure, palmar sweating, transcutaneous saturation levels, PO₂ levels, intracranial pressure, and cortisol levels. The article also discusses behavioral indicators such as facial expressions, crying, and body movements. The article explores pain transmission mechanisms and the infant's ability for memory of pain.

Findings: After reviewing 54 studies, the article's findings were that:

- Infants have the anatomic and functional capacity for mounting a response to noxious stimulus and pain perception at birth;
- Infants are capable of remembering pain as shown by the fact that alterations in sleep, feeding patterns, and maternal-infant interactions persist long after the noxious stimuli have ended;
- Full-term infants display gross motor withdrawal from painful stimuli, whereas ill or preterm infants may respond by becoming limp and flaccid;
- Preterm infants have less capacity for recovery after acute procedure-induced pain than do healthy infants; and
- Professionals can reduce infant pain through skilled execution of procedures and developing guidelines for effective administration of analgesics.

This article concluded that pain assessment is difficult for caregivers and parents. Good assessment of infant pain is a step in maintaining infants in a comfortable, pain-free environment. The frequency of painful procedures should be carefully ordered and delivered in order to better manage infant pain.

Research reviewed by Kay Liska, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Vickers, C., Ohlsson, A., Lacy J. B., & Horsley, A. (2000). Massage for promoting growth and development of preterm and/or low birth-weight infants. *The Cochrane Library*, 13-19.

Premise: Infants born preterm and cared for within the newborn intensive care unit setting are thought to be subjected to a excessive amounts of noise and light and not enough tactile stimuli. The ideal environment for infants born preterm is theorized to resemble as closely as possible the uterine environment from which these infants emerged early—that is, warm, dim with muffled sound, and the provision of constant support for flexion of the infant's extremities and trunk.

Research Question: Is tactile stimuli beneficial for preterm infants?

Background: A massage or other gentle tactile stimuli might be more rewarding or therapeutic for infants born preterm; if so, one would expect to see some evidence of such benefit, such as an increase in weight or improved behavioral state organization.

Subjects: The study included infants <37 weeks or with a weight at birth of <2500 g.

Study Design: Infants were placed in the prone position and stroked for one-minute periods (12 strokes at approximately 5 seconds per stroking motion) over different parts of the body: a) from the infant's head and face and neck, b) from the neck across the shoulders, c) from the back to the waist, and d) from the thigh to the foot to the thigh on both legs and from the shoulder to the hand to the shoulder on both arms. This was used with other form of stimuli.

Findings: Massage therapy provision was related to improved weight gain. Massage also resulted in a reduced length of stay, by an average of 4.6 days. The massage intervention also had a slight, positive effect on the incidence of postnatal complications and weight at 4 to 6 months of corrected age.

Research reviewed by Annette Stevenson, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Als, H., Lawhon, G., Duffy, F. H., McAnulty, G. B., Gibes-Grossman, R., & Blickman, J. (1994). Individualized developmental care for the very low-birth-weight preterm infant: Medical and neuro-functional effects. *Journal of the American Medical Association*, 272(11), 853-858.

Premise: Newborn Intensive Care Units (NICU) environment changes that reduce stress for the very low-birth-weight infants impact positively on outcomes for those who need mechanical ventilation and are at increased risk for

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bronchopulmonary dysplasia (BPD), intraventricular hemorrhage (IVH), and retinopathy of prematurity (ROP). Individualized developmentally focused intensive care is geared toward infants using their own ability to regulate their functioning.

Research Question: Does individualized developmental care in the NICU for low-birth-weight infants improve medical status and neurodevelopment?

Background: Premature infants with low birth weight and on mechanical ventilation are at increased risk for BPD, IVH, ROP. Consequently, long-term conditions such as pulmonary, neurological, cognitive, behavioral, and emotional compromise can result in increase costs for medical treatment. NICUs are typically noisy, very well lit, and busy with multiple procedures performed on each infant on an ongoing basis. This activity level appears to have adverse effects on preterm infants' maturing brains. Specifically, it may inhibit developing neuronal pathways. The environment and care practices in the NICU also appear to contribute to the development of chronic lung disease in preterm infants.

Subjects: Thirty-eight preterm infants who met the following criteria were included in this study. They were inborn, had a birth weight less than 1250 g., had no known congenital abnormalities, were born before 30 weeks gestation, and were placed on a mechanical ventilator within 3 hours of birth for a duration greater than 24 hours. After inclusion in the study, each infant was randomly assigned to the control or experimental group.

Study Design: This study employed a prospective randomized clinical trial design. The NICU was staffed with specially educated nurses in the administration of individualized developmental care. The control group received the traditional protocol-based primary nursing care. Medical and demographic background variables were assessed. The infants were monitored for two minutes on 91 behaviors. Assessment of medical factors was done with double-blind review of chest roentgenograms, IVH by double-blind review of cranial ultrasound scans, and retinopathy of prematurity by the NICU pediatric ophthalmologist. Medical and developmental assessments were made at two weeks and nine months after the estimated date of confinement (EDC). Developmental factors were assessed using the Assessment of Preterm Infants' Behavior (APIB). At nine months, the Bayley Scales of Infant Development, the Kangaroo Box Paradigm, and a 15-minute video documenting infant behavior were used as outcome measures.

Findings: Eight of the 12 medical outcome variables revealed significant differences between groups. IVH was found to be more common in the control group. The experimental group had a reduction in lung and brain morbidity. Infants from the experimental group, when assessed at two weeks after EDC using the ABIP scale, demonstrated increased autonomic and motor system functioning compared to control group infants. At nine months post EDC, the experimental group displayed a higher Mental Development Index, and Psychomotor Development Index than the control infants. These initially ill, premature infants demonstrated improved medical and behavioral outcomes as a result of the individualized developmental framework instituted in their care.

Research reviewed by Brenda Friend, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Mouradian, L., & Als, H. (1994). The influence of neonatal intensive care unit caregiving practices on motor functioning of preterm infants. *The American Journal of Occupational Therapy, 48*(6), 527-533.

Premise: Studies show that low-birth-weight, preterm infants are positively influenced when the individualized developmental care approach is adopted as the standard of care in the Newborn Intensive Care Unit (NICU).

Research Questions: What is the relationship between infants cared for in the NICU before the intervention of developmental care approach and those cared for after its inception? Can infants in the NICU and not involved in the study realize increased motor functioning from the changes in nursing practice?

Background: Healthy, low-birth-weight preterm infants' motor system functioning is heightened to that of a full-term infant under the conceptual model of specific individualized care in the NICU. The approach of care given was adopted from the synactive theory of development and is responsible for the improved motor functioning.

Subjects: Forty preterm infants, all healthy and less than 34 weeks gestational age at birth.

Study Design: Part of this study was taken from a retrospective, descriptive analysis of data from 20 preterm infants, identified as Cohort I, being cared for in the NICU before the developmental approach was set in place as the standard. The other 20 preterm infants, identified as Cohort II, were cared for under the adaptation of developmental care. Their Assessment of Preterm Infants' Behavior (ABIP) scores were compared at approximately two weeks after

the expected due date. All staff members were trained formally in the concepts of individualized developmental care for the preterm infants. The parents were included within 24 hours of birth in the care of their infant.

Findings: Individualized developmental care in the NICU is adapted to meet infants' behavioral strengths and their endeavor at reducing stress from overstimulation of the critical care environment. After assessment using the APIB tests and after adjustment for covariables, specific categories from the data analyzed revealed that the infants in Cohort II had better motor functioning scores than those from the Cohort I group on eight of the 23 summary variables. They also had improved scores on seven of the 17 specific motor variables on the APIB tests. Cohort II infants demonstrated more competent behavioral systems organization and increased autonomic and motor stability. These infants were well regulated and stable, had a decrease in their extensor overflow, and more effective flexor maintenance comparable to that of a full-term infant. Infants in the NICU who were not involved in the individualized developmental care approach study demonstrated APIB scores as high as those included in the study. The findings suggest the possibility that preterm infant function, especially motor function, can easily be influenced by modification in caregiving approach.

Research reviewed by Brenda Friend, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Porter, F., Wolf, C., & Miller, J. P. (1999). Procedural pain in newborn infants: The influence of intensity and development. *Pediatrics, 104*(1), e13.

Premise: Even at very early prematurity, infants respond to pain and can differentiate between stimulus intensity.

Research Questions: Does infant response to painful stimuli differ as a function of the intensity or invasiveness of the procedure and does it differ by gestational age at birth? How do clinicians rate the pain for various procedures?

Background: Infant pain is often poorly managed and dismissed.

Subjects: The study included 152 infants; 135 of these infants were studied at least two times (ranges 2-27). Both premature infants <28 weeks gestation and term infants within the first postnatal week of life were studied.

Study Design: Informed consent was obtained from the mothers of the eligible infants based on the set criteria. The infants were grouped by gestational age and did not have major congenital anomalies or cardiac defects. The popula-

tion included premature infants, full-term infants, and healthy and sick infants. The infants were studied during their hospitalization and during medical/nursing procedures. The procedures were documented as mildly, moderately, or highly invasive. Procedures were also categorized by duration, site of procedure, and depth and extent of tissue damage. To measure the outcome before the procedure, three electrodes were placed on the chest, along with a pulse oximeter and blood pressure cuff. Input was collected at the bedside by a documenting computer. Information was collected during four stages: a) the baseline period, b) the preparatory period, c) during the procedure, and d) during the recovery period. Current medications were also documented. Procedures included gavage tube insertion, physical examinations, nose cultures, umbilical arterial catheter insertion (mild), venous punctures and heel sticks (moderate), lumbar puncture, circumcision, and eye exams for retinopathy (highly invasive).

Findings: Both full-term and preterm infants demonstrated increased magnitude responses to increasingly invasive procedures. Thus, infants not only respond to noxious stimuli but also differentiate their intensity.

Research reviewed by Kay Liska, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

Lawrence, J., Alock, D., McGrath, P., Kay, J., MacMurray, S., & Dulberg, C. (1993). The development of a tool to assess neonatal pain. *Neonatal Network, 12*(6), 59-66.

Premise: It is important to be able to accurately assess neonatal pain because not all pain can be avoided.

Research Questions: What is the reliability and validity of a tool to examine the reliability and validity of a tool to measure neonatal pain?

Background: Health professionals are acknowledging infant pain and taking an active role in managing infants' pain.

Subjects: The Neonatal Infant Pain Scale (NIPS) was used to evaluate pain in 38 neonates during 90 procedures. No single infant was used for more than three procedures. Infants that received analgesics within three hours were excluded.

Study Design: The procedures were videotaped using ambient lighting. The infant was taped for two minutes prior to the needle stick and three minutes after the completion of the procedure. The infant's response was rated on the NIPS (0-7) based on facial expression, crying, breathing patterns, flexion of arms and legs, and state of arousal.

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Findings: The NIPS had a high internal consistency with Alphas of .95, .87, and .88 before, during, and after the procedure. Inner rater-reliability was .92 to .97. Concurrent validity within a visual analog scale was .53 to .84. The NIPS was judged to be an objective reliable tool to assess infant pain.

Research reviewed by Kay Liska, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.

To, T., Agha, P., Dick, P., & Feldman, W. (1999). Cohort study on circumcision of newborn boys and subsequent risk of urinary-tract infection. *Journal of Urology*, 162(4), 1562.

Premise: Only a minimally reduced risk of urinary infection exists in circumcised infants.

Research Question: Does a greater incidence of urinary tract infection (UTI) occur in uncircumcised males?

Variables: Incidence of UTI in newborn males born between 1993 and 1994 at one year follow up.

Subjects: A total of 69,100 male neonates born in Ontario, Canada, between April 1993 and March 1994.

Data Collection: Hospital discharge data used in a population-based cohort study.

Findings: Of 69,100 eligible boys, 30,105 (43.6%) were circumcised and 38,995 (56.4%) were uncircumcised. Admissions for UTI were 1.88 per 1,000 (247 cases at the end of follow-up). Findings support the notion that circumcision may protect boys from UTI. At one year, hospital admissions for circumcised infants were 83 and uncircumcised infants were 247. The researchers concluded that 195 infants would need to be circumcised to prevent one hospital admission. This rate is similar to Australia and lower than previous figures in the United States. Realization that the actual number are lower than previously thought led the American Academy of Pediatrics to conclude that the difference is not great enough to advocate routine circumcision for male infants.

Research reviewed by Luetta Bell, RN, while a student at Virginia Commonwealth University, School of Nursing, in Richmond, VA.