Developing Competency in the Neonatal Intensive Care Unit: A Hospital Training Program

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There are few specialized programs available to train occupational therapists and physical therapists to treat competently in a neonatal intensive care unit (NICU), yet hospitals are trying to fill such positions, and the need for advanced training is essential. A hospital-based program that provides clinical NICU training to therapists from other hospitals is presented. The program is short-term and highly individualized and emphasizes learning pertinent medical information, nonintrusive evaluation skills, and therapeutic intervention with advanced clinical judgment.

Early developmental intervention, beginning in the neonatal intensive care unit (NICU), has been shown to be effective in improving the developmental outcome of premature infants (Blanchard, 1991; Resnick, Eyler, Nelson, Eitzman, & Bucciarelli, 1987) as well as being cost-effective (Field et al., 1986). Advances in medical technology are allowing younger and smaller infants to survive with fewer major disabilities, but long-term follow-up studies have reported a higher incidence of learning problems, poor academic achievement, and behavioral maladjustments even when cognitive test scores are in the normal range (Escobedo, 1988; Lawhon & Melzar, 1988). The effect of the environment both in the neonatal period and in the first few years of life is increasingly being recognized as a major contributing factor in long-term development (Graven et al., 1992; Infant Health and Development Program, 1990). Although there is some controversy over the type and timing of developmental intervention to be provided to high-risk newborns (particularly those in the NICU), most agree that early intervention, which may provide direct handling of the infant but also targets environmental and parental roles, is important to optimize developmental outcome (Blanchard, 1991; Gunzenhauser, 1987). Because occupational therapists and physical therapists have long been involved in providing developmental services to at-risk children and children with disabilities and their families, involvement with neonates has naturally evolved into a subspecialty of pediatrics for both professions.

Although occupational therapists and physical therapists have traditionally been considered providers of rehabilitative services in pediatrics, their role with high-risk infants also attempts to prevent possible future dysfunction. Therapists may view optimal long-term developmental growth as their primary goal, but survival is the most critical issue in the NICU; therapy services in this setting are secondary. Treating a patient who requires intensive care implies an advanced level of competency and clinical judgment (American Occupational Therapy Association [AOTA], 1993; Scull & Dietz, 1989). Such skills are beyond the scope of standard occupational therapy and physical therapy pediatric practice and can only be achieved through specialized training, study, and practice. Therapists in the NICU also need to develop advanced clinical reasoning skills so that they know not only what to do but also when or whether to do it. Premature and sick neonates are particularly vulnerable to adverse conditions and stress because of their immature nervous systems. In the NICU, inappropriate intervention can have life-threatening consequences and must be reassessed every second.

Why Specialized Training Is Needed

Physicians and nurses are often protective of their patients and their trust must be gained through demonstr-
ed skill, sensitivity, and value of occupational therapy or physical therapy intervention. This part of the medical community may have had limited exposure to either occupational therapy or physical therapy; thus therapists in this setting become representatives of the entire profession, and a trusting relationship must be allowed to develop. Specialized training is required for nurses, respiratory therapists, and physicians to work in the NICU, so it would be remiss to assume that occupational therapists and physical therapists do not also require additional training beyond the pediatric level.

Hospitals frequently try to provide occupational therapists and physical therapists on staff to treat in the NICU but have few clear-cut guidelines for either the experience needed or services to be provided. Therapists who are available and experienced in NICU intervention have been difficult to find. Training resources are scarce and few facilities are available to provide hands-on training or mentoring, especially for therapists outside their own hospitals. With the proliferation of managed care agencies in Southern California in recent years, many hospitals have opened NICUs in a competitive attempt to offer potential clients a full-service center. In a recent nationwide survey of occupational therapists and physical therapists, only 35% of those currently working in NICUs were in hospitals that required any specific level of expertise or experience. Those hospitals primarily required only pediatric experience (Rapport, 1992). Therefore, it is up to occupational therapists and physical therapists to establish standards of practice and methods to achieve these standards. AOTA has completed a knowledge and skills document for occupational therapists working in the NICU (AOTA, 1993) and the Section on Pediatrics of the American Physical Therapy Association has recommended criteria for competencies for neonatal physical therapists (Scull & Dietz, 1989). However, these documents contain recommendations for a standard of practice, not requirements.

Training Program
At Glendale Adventist Medical Center in Glendale, California, we began our NICU training program 7 years ago in response to numerous requests from other hospitals in the Los Angeles area. Often the request was to allow a therapist to "spend Wednesday afternoon seeing what you do" before beginning to treat in his or her own hospital. Because we believed that this 1-day approach was inadequate and would be irresponsible on our part, we developed a short-term program designed to be both introductory and mentoring. Because occupational therapists and physical therapists were seeking training both singly and together, depending on the referring hospital, we began to offer training either alone or as a team with a transdisciplinary approach. We had been providing transdisciplinary services and working together in the NICU since 1981 and had found effective an approach in which one therapist was the primary therapist for each infant and the other professional acted as a consultant or filled in for treatment. We realized that a referring hospital could afford neither the time nor the money to send a therapist or team of therapists for a prolonged training period, nor could our hospital afford to let us spend a great deal of non-revenue-producing time in teaching.

Why Pediatric Experience Is Essential
Fieldwork that uses experienced clinicians as mentors or role models has long been considered an important component of professional education in occupational therapy and physical therapy (Cohn, 1989). Burnard (1990) suggested that the role of a mentor implies a personal, long-term relationship, whereas the role of a preceptor emphasizes the clinical teaching and learning aspects of the relationship. Because we designed our training program to be short-term and intensive by using the fieldwork model, the preceptor concept seemed most appropriate, although there certainly is a mentoring component.

This training program is intended for registered or licensed therapists who already have pediatric experience but little or no neonatal experience and who have been offered positions or are currently treating patients in the NICU in their own hospitals. We emphasize the necessity of prior pediatric experience, preferably several years, so that the therapist has acquired experience and the clinical reasoning skills necessary for working with children and their families. This emphasis on experience for effective intervention in an intensive care environment has been stressed by others (AOTA, 1993; Cohn, 1989). Inexperienced therapists lack the ability to use intuitive judgment in unfamiliar situations or to alter or discontinue a treatment program (Slater & Cohn, 1991). Furthermore, the scope of a 7-day program cannot address basic pediatric therapy skills. It is essential that the therapist seeking NICU training have a thorough knowledge of normal and abnormal infant and child development, experience in evaluating and treating pediatric disabilities and neuromuscular dysfunction, and an understanding of family dynamics, particularly during stressful situations.

On the basis of application information and telephone interview, we accept occupational therapists or physical therapists into the program either individually or as a team, preferably no more than two persons from one hospital at a time. Our NICU only has space for 10 to 14 infants, so more than two trainees would overwhelm the nursery and the infants with extra people. Additionally, we, as trainers, are expected to treat patients for 6 out of 8 hr per day during training and would not be able to provide the one-on-one intensive training that we think is crucial if we had more than two trainees.
Scheduling of Training Sessions

Training is usually provided for 1 day per week for 6 weeks with the seventh day scheduled for several months later. This spacing of sessions gives the trainee the opportunity to practice learned skills in his or her own hospital and identify needs based on the referring hospital's philosophy and programs. Each session is individualized to meet the trainee's need. The seventh session is scheduled for later to help resolve issues that may have become apparent after the therapeutic intervention program has been established at the trainee's hospital and for problem solving and review. Although the scheduling of training sessions is flexible, we found that 7 consecutive days were inadequate because they did not allow for practice time in the trainee's hospital. However, occasionally we have scheduled 2 training days together at the beginning or end of the week for trainees from outside the Los Angeles area.

We emphasize throughout that this is an introductory, hands-on course meant to enhance on-the-job experience and that each therapist needs to do outside reading, practice, and observation and to approach unsupervised direct intervention with caution. Each hospital and neonatologist may have a different philosophy of developmental intervention from ours; thus, while we teach from our perspective, we discuss with trainees the importance of developing their own or fitting into their hospital's current philosophy. The fee charged for our course, which is usually paid by the referring hospital, helps cover some of the expenses, such as notebooks, videotapes, and references, and allows for the purchase of new equipment and books. It does not cover the training therapists' salaries. Because this program is designed to meet the needs of individual therapists with varying backgrounds and levels of experience, the first day of training is usually spent in preparation activities (see Appendix).

Day 1: Introduction

The notebook given to each trainee includes articles on NICU intervention and rationale for treatment; follow-up studies on high-risk infants; physical and behavioral characteristics of premature infants at different ages; guidelines on procedures such as handling, feeding, regulating environmental control, and monitoring response to stress; sample evaluation and documentation forms; resource lists; and an extensive bibliography. Reviewing the training manual is an easy way to lead into the initial interview, so that the interview becomes a valuable tool to adapt the training program to fit individual needs. Topics covered include size and level of trainees' NICU, conditions treated, therapist-patient ratio, history of intervention services and role delineation, current philosophy regarding developmental intervention, high-risk follow-up services, productivity levels, and priorities of the occupational therapy and physical therapy departments. If an occupational therapy-physical therapy team is being trained, we discuss level of teamwork, issues of role delineation, and transdisciplinary philosophy. Although the course uses a transdisciplinary approach, we emphasize that each profession has unique skills and knowledge that complement the other. The trainee's priorities for learning are discussed. Do they think their greatest needs are in evaluation? Hands-on practice? Program development? High-risk follow-up? Once all of these issues are covered, mutual goals and a time line can be established so that the training time can be used most effectively.

An introduction to the NICU requires learning about the ecology, that is, the interrelationships of the infants, the caregivers, and the environment. Even before entering the nursery, the trainee learns about the high-tech, intensive environment. Although many hospitals have separate areas providing different levels of neonatal care, we use the intensive care nursery to illustrate the effect of lights, noises, positioning, and medical care on the infant's immature and vulnerable nervous system. Medical and developmental information specific to fetal development and characteristics of prematurely born or sick full-term infants are discussed at this point and throughout the training period. The interaction of the staff members, their responsibilities, and the varying levels of emotional tension in the NICU as they try to cope with a sick infant, anxious family members, and other hospital personnel are important aspects that need to be considered. The NICU is not only a place where critical care for infants is provided; it is also a source of intense anxiety for parents. Personal interactions can become complex and tense in a confined physical space.

The next step is to take the trainee to the NICU, demonstrate scrubbing techniques, and emphasize the importance of infection control. We introduce him or her to the staff members and selected infants currently in the unit. Equipment used for monitoring and medical intervention is discussed in detail. We have found that this preceptor model of teaching, done infant by infant with the equipment, medical condition, developmental level, and responses to intervention and the environment reviewed as they relate to a specific infant, is effective. Chart review is an easy way to begin discussion of medical terminology and medical complications. The trainees might not be able to directly handle an infant on Day 1, but clinical teaching is begun by observation of the preceptor treating the infant. Clinical reasoning and decision making are continually emphasized during this demonstration.

Days 2–6: Evaluation

Once a specific patient is identified for evaluation, a specific chart review is done. Information to be gathered
before seeing the infant includes current age, gestational age at birth, diagnosis, medical status, response to necessary medical procedures, response to environmental stimuli, and tolerance to nonmedical handling. Depending on the philosophy of the neonatologist and the trust established, the therapist may receive orders to begin intervention while the infant is on the warming table, intubated, on intravenous fluids, and in critical but stable condition. A particular infant may have specific orthopedic, neuromuscular, craniofacial, or other problems requiring a specialized approach or intervention. We teach the trainee to begin by observing and evaluating without touching the infant or disturbing the isolette. These observations include physiologic parameters of heart rate, respiration, oxygen requirements, and temperature stability as well as physical parameters of state of alertness, posture, and movement. Depending on the results of the observation, the infant may be available for handling and further evaluation. Our initial evaluation form is brief and includes medical information, state of alertness, response to sensory input (tactile, vestibular, visual, auditory), posture, muscle tone, range of motion, reflexes, active movement, oral-feeding skills, other variables (e.g., physical characteristics, anomalies, social factors, environmental responses), and parental interactions. The initial evaluation can cover only a few categories or can be extensive depending on the medical condition, gestational age, and tolerance of the infant. Once the initial evaluation is complete, a treatment plan can be developed with the infant’s family and NICU staff members.

**Intervention**

Timing of intervention, which is dependent on the state of alertness and medical status of the infant; environmental factors such as lights, noises, and infant posture; family teaching; and treatment contingent upon the infant’s moment-to-moment responses are all crucial to appropriate therapeutic management in the NICU. Responsible treatment and decision making are continually emphasized to prevent adverse reactions in the infant. Tactile, vestibular, and other sensory or motor input, whether for the purpose of evaluation or treatment, is provided cautiously as the infant is able to tolerate it. Each infant requires an individualized treatment plan that must be flexible enough to respond to subtle nuances of change in the infant. One infant may only be able to tolerate indirect intervention through the parents and NICU staff members. Another infant may tolerate direct hands-on treatment and require a more active program based on sensory integration and neurodevelopmental treatment (NDT) principles. We also emphasize that sometimes the best treatment at a given moment is to do nothing. Our thoughts regarding when and whether to provide treatment, according to our experiences, are continually shared with the trainee in an attempt to model clinical reasoning skills and to determine his or her level of understanding. Trainees are instructed to continually monitor the infant’s responses and only to proceed with caution.

Treatment for NICU infants has evolved from emphasizing extra stimulation, because infants were once seen as sensorily deprived, to emphasizing minimal handling, because they were seen as sensorily overloaded, to the current emphasis on thoughtful intervention based on the infant’s cues and medical and physiologic status. Although we treat according to the theory that appropriate sensory input can have a positive effect on an immature nervous system and help to enhance neurophysiological and neuromuscular development, constant reassessment is an integral part of daily treatment. Acutely ill infants are frequently medically vulnerable and fragile and “interventions that to the novice therapist appear to be innocuous can trigger physiologic instability in an infant” (AOTA, 1993, p. 1100). Treatment techniques used for both preterm and sick full-term infants can be based on the infant’s need at the moment, and can vary from positioning the infant or altering the environment with inhibitory calming techniques, to gentle tactile stimulation or rocking, to facilitation of prefeeding skills, to feeding and developmental activities.

As Sweeney and Chandler stated: “Routine, presumably benign, assessment and treatment procedures for other hospitalized pediatric and adult patients cannot be assumed to be appropriate or safe with neonates. Even with low-risk preterm and healthy full term infants, neuro­logical assessment can be overstimulating” (1990, p. 60). When discussing the training for physical therapists, they noted that postgraduate education in neonatal physical therapy, including a clinical preceptorship, is critical. Without it, there are “physiologic and musculoskeletal risks to the infant . . . medical-legal risk to the physical therapist, and . . . quality control risk for the medical center” (p. 60).

Occupational therapists also recognize potential harm in that “traditional occupational therapy approaches, such as sensory integration or neurodevelopmental treatment, may not be appropriate or may need to be modified according to the infant’s medical status and developmental needs” (AOTA, 1993, p. 1100). This theme of not only providing helpful treatment but also doing no harm is emphasized throughout the training program. This philosophy is supported by Gorski, Huntington, and Lewkowicz, who stated that “most medical and developmental risks resulting from premature birth stem from the immature organism’s limited ability to adapt to the caregiving environment outside the womb” (1987, p. 43).

Once a treatment plan has been initiated, the use of good judgment continues to be a critical issue. The infant’s primary caregiver, usually the nurse, must be consulted before handling is begun before each treatment.
Effective intervention also includes developing goals and intervention strategies with the parents and other team members. We emphasize that the trainees need not only to learn pertinent medical information, noninvasive observation skills, characteristics of infants with different gestational ages and diagnoses, and basics of evaluation and treatment, but also to experience the feel of handling many different infants, which can only be gained through mentored practice. Because our training program is short, it is essential that the trainees practice handling low-risk infants in their own setting between sessions and bring back questions and observations. For example, after the first session, we encourage the trainee to find, among friends or family, healthy full-term babies younger than 6 months of age that they can observe and handle. After the second session, we encourage them to find and evaluate several healthy, full-term newborns by observing posture, motor skills, and quality of motion; by handling to feel muscle tone; by noticing behavioral and interactive skills; and by talking to the parents. We discuss the importance of being able to differentiate the range of normal development from that which is worrisome. During this period we also want the trainee to become familiar with his or her own NICU and staff members and begin observing the infants without intervening. After the third session, we expect the trainee to have had some practice handling and evaluating low-risk premature or full-term infants in the intensive care or intermediate care nursery of their own hospital with the primary caretaker present. Between succeeding sessions, the trainee is encouraged to continue observations, evaluations and intervention in a cautious manner and to demonstrate their handling abilities with the babies in our NICU when they return to the course.

**Discharge From the NICU**

We emphasize that handling the infants on the NICU is only one part of the overall intervention process. Intervention includes long-range planning with the infant’s parents and the neonatal team, parental teaching, discharge evaluation and planning, making referrals, and resolving funding issues. Trainees are taught to perform a full discharge evaluation based on the Brazelton Neonatal Behavioral Assessment Scale (Brazelton, 1984) with the parents present, if possible. The interactive nature of this evaluation—in attempting to elicit the infant’s best performance—provides an opportunity for the therapist, if she or he has not already done so, to demonstrate to the anxious parents the capabilities and strengths of their infant and to offer suggestions for appropriate calming and play activities to enhance their infant’s coping strategies, interactive skills, and overall development at home. The therapist also discusses the neuromotor expectations during the first year, when the extensor muscle tone is frequently greater than the flexor muscle tone (Gorga, Stern, & Ross, 1985; Hyde, 1992) and ways of remediating this tonal imbalance through everyday caretaking and play. The importance of obtaining follow-up evaluations for NICU graduates who are at high risk for neuromuscular and developmental delay and the necessity of correcting age for prematurity are emphasized. If there are other areas of medical, neurological, or muscular dysfunction, whether in a preterm or full-term infant, a home program to address these issues may be necessary, as well as referral to appropriate outside agencies.

At Glendale Adventist Medical Center, we provide follow-up evaluations for the first 2 years for NICU graduates who are at high risk for neuromuscular and developmental delay. If the trainee identifies this as a need, we spend some time on developmental and neuromotor evaluations appropriate to high-risk infants, recommendations for parents, and criteria for referral to local agencies if formal intervention is indicated.

**Day 7: Review**

The seventh training session is usually scheduled for several months after the others have been completed so that the trainees will have had time to learn to work together as a team, develop a program, and develop working relationships with the other staff members at their hospital. This last session is used for review, questions, problem solving, and resource sharing. Most of our trainees have found this distancing from the other six sessions to be beneficial as they have had a chance to practice their skills and often have different questions and concerns than they would have had earlier. They also become part of our informal neonatal therapists’ network in Southern California, which meets occasionally to share resources and support and to discuss common concerns and new information.

**Summary**

As more hospitals are seeking occupational therapists and physical therapists to treat in NICUs, those of us who have been working in this area are becoming increasingly concerned with the need for training competent pediatric therapists beyond the basic skills level and the paucity of training centers available. We have described a 7-day course in NICU skills for the working therapist with prior pediatric experience. The success of this program depends on several factors:

- A well-motivated, sensitive therapist who has pediatric experience and works well with a team but recognizes his or her need for specialized training
- A recognition of the critical nature of neonatal intensive care and the potential for harm as well as benefit from well-intentioned intervention
- The opportunity to practice with infants between...
Appendix

Curriculum Outline For 7-Day Course in NICU Skills

Day 1: Introduction
Interview of trainees as to their needs and expectations
Review of trainees’ experience
Discussion of philosophy
Introduction to the training manual
Discussion of services and occupational therapy/physical therapy role on the NICU team at Glendale Adventist Medical Center
Introduction to NICU and staff members
Introduction to equipment-NICU and occupational therapy/physical therapy
Introduction to medical terminology and medical complications frequently encountered
Review of fetal development
Discussion of advanced clinical reasoning in decision making
Clinical teaching through demonstration and observation

Day 2-6: Evaluation Skills
Chart review— including prenatal conditions, perinatal events, postnatal complications affecting development and family
Initial evaluations
Premature infants—with emphasis on age appropriate skills and expectations

Day 7: Review
Review of training experience
Addressing of specific needs and questions
Feedback on program development in referring hospital
Exit interview

References


