Home-based developmental screening of children in foster care

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Abstract:
Children in foster care have a high prevalence of developmental delay. A program for developmental screening was designed to address the increased risk of developmental delay among children in foster care. Fifty-two children birth to 18 months were evaluated using the Denver Developmental Screening Test-II (DDST-II), Early Language Milestone Scale-2 (ELM-2), and the HOME Scale. Forty-nine children were screened with the Infant Neurological International Battery. Thirty five percent of the children failed DDST-II screening. Language assessment with the ELM-2 resulted in a mean global ELM-2 standard score of 89. Sixty-one percent of children had abnormal neurologic INFANIB screening exams. HOME scores reflected foster care environments that provided adequate developmental and emotional stimulation for the children. Implications for future interventions should move from developmental screening to comprehensive developmental testing and expansion of foster parent education regarding the growth and development of the foster children in their care.

Full Text:
In the United States there are more than 500,000 children in the foster care system. Between 1985 and 1988, the number of children in foster care grew by an estimated 23%, with the proportion of children under the age of 6 years rising 40% (Ruff, Blank, & Barnett, 1990). The present national trends of increasing numbers of children within the foster care system is linked to multiple factors which include increasing numbers of children being abused and neglected, persistent poverty, homelessness, family violence, and substance and alcohol abuse within the biologic families. Some authors have suggested that change to a nonabusive and supportive home environment is associated with better development, emotional health, and medical health for these children (American Academy of Pediatrics [AAP], 1994; Simms, 1991).

Children are placed within the foster care system because legal action has been taken on their behalf to provide out of home care. Most children entering this system have suffered combinations of physical, emotional, or sexual abuse or have been neglected in having their physical, emotional, or medical needs met. Children in foster care suffer from a cluster of health problems directly related to abuse and neglect (AAP, 1994; Blatt et al., 1997; Chernoff, Coombs-Orme, Risby-Curtiss, & Heisler, 1994). A profile of their health status shows that 40-95% experience emotional and behavioral disturbances, 60% have developmental delays, 35-45% have chronic medical problems, 45% have experienced acute medical problems, and 15% have birth defects (Blatt & Simms, 1997). Reasons cited for this health profile include the effects of abuse and neglect, lack of access to appropriate health and mental health services, lack of stimulation, alcohol and substance abuse, poor or lack of prenatal care, and congenital infections. Regarding substance abuse, cocaine has become increasingly popular with the heaviest abuse found among the 18-25 year age group. This subset involves the peak maternal childbearing years with specific health effects on infants born to these mothers. These include vascular and neurobehavioral complications, congenital defects, prematurity, and intrauterine growth retardation (Forrest, 1994).

Children in foster care have complex health problems that demand complex responses on the part of the health care system. To best meet the special needs of this at risk population, successful programs have demonstrated the need for a comprehensive, coordinated, multidisciplinary, primary health care model (AAP, 1994; Blatt et al., 1997; Halfon & Klee, 1987; Simms & Kelly, 1991). One such program is ENHANCE Services for Children in Foster Care (Excellence in Health Care to Abused and Neglected Children) located in Syracuse, New York. It provides a multidisciplinary, comprehensive, and coordinated approach to health care for preteenaged children in conjunction with the Department of Pediatrics and the Division of Child Psychiatry at the State University of New York Health Science at Syracuse and the Onondaga County Department of Social Services (DSS). The staff includes two pediatricians, a child development specialist, a child psychologist, a pediatric nurse practitioner, a clinical nurse specialist, a registered nurse, a liaison case worker from DSS, and a secretary. The children receive primary pediatric health care that includes developmental and psychologic assessments. The developmental assessment is integrated into a home visiting program. This approach provides an opportunity to assess the developmental status of infants entering foster care age 1 month to 18 months in a milieu more conducive than the medical setting.

Review of the Literature

Prior to foster care placement, children may not have been detected as having medical or developmental delays. This can be, in part, due to living in an environment with substance and/or alcohol abusing parents or living in highly mobile impoverished families, which may result in less frequent contacts with the health care system. Another theory that puts children in foster care at risk for developmental delay is that abused and neglected children do not form the secure attachments necessary to proceed with the developmental tasks appropriate for their age, and their higher-order cognitive and language skills suffer (Cicchetti & Carlson, 1989).

Despite the known vulnerability and developmental delay of children in foster care, early childhood development has not been effectively addressed by the child welfare system. In most communities, children entering foster care seldom receive consistent comprehensive primary pediatric care, which would include developmental assessments and plans of care. Reasons cited include the time commitment involved, in meeting the complex health care needs of these children, which takes into account continuity of care and coordination between several systems (i.e., medical, child welfare, foster family, other community agencies).

In a study of 113 children in foster care aged 1 month to 6 years, 61% of children were developmentally delayed in one or more portions of developmental assessment, and 60% of these children were not involved in any community educational or therapeutic program (Simms, 1989). Hochstadt, Jaudes, Zimo, and Schachter (1987) found that 25.4% of children under the age of 4 had gross motor delay, 12.7% had fine motor delay, and 15.5% had personal-social skills deficits. Eighty seven percent of the sample fell below the 25th percentile on the adaptive behavior composite of the Vineland Behavior Adaptive Scales. Marked deficits were found in communication, daily living skills, socialization, and motor skills. Horwitz, Simms, and Farrington (1994) found that 50% of children in foster care commonly show developmental delays. Children who were older at entry into care and who had developmental problems identified were 1.93 times more likely to remain in foster care. Nearly all children in foster care show some degree of behavior problems (Simms, 1991). Although these behaviors may have been adaptive in their biologic homes, they are challenging in the context of a foster home and contribute to foster care drift (multiple foster care placements). For children in foster care, early intervention programs and placement in stable foster homes with responsive caregivers are two ways to support children at medical, psychologic, or developmental risk.

The merits of early intervention for children with a wide variety of developmental disabilities have been well reported (Liaw, 1991). These merits are based on a risk model that recognizes that fetal exposure to drugs, poor prenatal care, and physical and emotional abuse and neglect compromise or jeopardize developmental processes. It also recognizes that individual and environmental forces can contribute to positive developmental outcomes.

There is increasing evidence that the best chance for effecting developmental change is while the nervous system of the very young child is still malleable and responsive (First & Palfrey, 1994). Even though Public Law 99-457 (reauthorized as the Individuals with Disabilities Education Act) mandates that states provide early intervention services for infants and young children with or at risk, for developmental delays, children in foster care frequently experience. Delays both in initial referral to intervention services and in maintaining continuity of services once placed (Simms, 1989). The reasons for these delays center around the multiple factors that resulted in foster care placements, which include (a) difficulty contacting biologic families, (b) mobility of these families, (c) their lack of trust with community agencies, and (d) substance and alcohol abuse. Even after placement in an early intervention program, the development of children in foster care needs continued monitoring.

One way that development of children and systematic follow-up can occur is through the use of a home visitation program. A home visitation program for developmental assessment of children in foster care has not been evaluated, although these models are well established in the early intervention community as well as in many programs concerned with parent-infant dyads (Black et al., 1994). Since the public health emphasis on home visitation for children and families at risk in the early 1970s, few home visitation programs have been devoted to prevention and health promotion (Olds, 1992; Olds, Henderson, & Kitzman, 1994). In recent years, a growing body of concerned organizations has recognized home visitation as a cost effective and efficient way to deliver services. For example, the U.S. Board on Child Abuse and Neglect has identified home visitation as a promising intervention strategy for preventing abuse (U.S. Advisory Board, 1990). The National Commission to Prevent Infant Mortality has included home visitation as a central part of its strategy to improve the outcomes of pregnancy and reduce infant mortality and morbidity (National Commission to Prevent Infant Mortality, 1989). A large visitation program by nurses addressed women at risk for poor pregnancy and child health outcomes by virtue of their being poor, unmarried, or teenaged. Significant improvement of pregnancy outcomes, care-giving, maternal personal development, and effect on government spending were demonstrated (Olds, 1992; Olds et al., 1994).

Method

Sample. All children entering ENHANCE aged birth to 18 months and remaining in foster care 1 month after placement between December 1993 and September 1994 were enrolled in this program. There were 25 males and 27 females for a total of 52 children. Of these 52 children, 11 (21%) were born with positive toxicology screens and 13 (25%) of the biologic mothers reported drug use during the prenatal period. Other medical problems included prematurity, failure to thrive, shaken baby syndrome, and tracheomalacia.

Seventy-three percent of children were in two-parent foster homes, while 27% were in single-parent foster homes. Foster parent years of experience ranged from 0-32 with a mean of 8 years. The mean number of foster children in the foster home was 1.8 (range 0-6) and the mean number of biologic children in the foster home was 1.8 (range 0-8). Fourteen (27%) children were in their second foster home placement. The mean gestational age of the children was 36.1 weeks with a mean birth weight of 2550 gms (815 gms-3987 gms). Eight (15%) infants were born preterm. Of the 52 children sampled, 33 were African-American, 16 were Caucasian, 1 was Native American, and 2 were mixed ethnicity.

The mean age for biologic mothers in this study was 22.7 years (range 13-36). Twenty-five mothers (48%) received poor or no prenatal care, 10 mothers (19%) received adequate prenatal care, and no prenatal information was available on 17 mothers (32%).

The mean number of weeks of prenatal care was 7 (range 1-40). Mean number of previous pregnancies was 1.5 (range 0-9).

Design. All children received comprehensive and primary pediatric health care at ENHANCE. At the initial visit at ENHANCE, usually within 1 week of placement into foster care, the Clinical Nurse Specialist (CNS) obtained permission to visit the home. The home visit took place within one month of foster care placement. At that visit, a brief history was obtained and the assessment tools were administered. This visit also provided the CNS with an opportunity for foster parent education. The approximate time for assessment was 45 to 60 minutes. The child development specialist was consulted for specific developmental issues and met regularly with the CNS. Screening results were discussed with the ENHANCE multidisciplinary team and treatment plans were made. The CNS continued to monitor the child's developmental progress through regular contact with foster parents and, when appropriate, with early intervention programs. The following measures were used:

1. Denver Developmental Screening Test-II (DDST-II) -- an instrument used for screening and surveillance of the development of young children aged 1 month to 6 years. This instrument divides development into the categories of personal social skills, fine motor skills, language, and gross motor skills. Interrater reliability for this test and between examiners in this study is 92.4% to 98.2% (Frankenburg & Dodds, 1992). Validity is shown between the DDST-II, the Stanford Binet, and the Bayley quotients (Bayley, 1993) with co-positivity 0.23 and co-negativity 0.92 in all quotients of 70 and above. Scoring used criteria recommended by the developers of the tool. An intersecting age line appropriate for the child's age was drawn, and each item within this line was scored as recommended. Each child received a score of pass or fail in each domain. A caution was scored when the child failed or refused an item for their age line, which fell between the 75th and 90th percentile. For purposes of analysis, two or more suspect (caution) scores were considered a failure. Administration time is 15-20 minutes.

2. Early Language Milestone Scale-2 (ELM-2) -- a language assessment tool dividing language into four domains: auditory expressive, auditory receptive, visual language, and intelligibility. Both a pass-fail scoring system (screening) and a point scoring system (testing) are available for analysis. A vertical line was drawn through the items of the child's chronologic or adjusted age, and items were scored as a pass or fail. This study applied the point scoring method that uses raw scores in each of the 3 component divisions. These scores are converted to percentiles and standard scores with an age equivalent for each division. The scoring system provides finer gradations than pass/fail. Interobserver correlation coefficients range from .93 to .99 and test-retest correlation coefficients range from .77 to .94 (Coplan, 1993). Validity has been established by Coplan with the Peabody Picture Vocabulary Test, the Stanford Binet Intelligence Scale and a subset of the Illinois Test of Psycholinguistic Abilities. The test can be administered in 5 to 10 minutes.

3. Infant Neurological International Battery (INFANIB) -- an instrument to assess the neurological integrity of infants to the age of 18 months. It uses the chronologic or adjusted age for the infant. The 20-item instrument has five factors: spasticity, vestibular function, head and trunk, French angles, and legs. Cut points are set that separate infants by age into three categories: normal, transiently abnormal, and abnormal neurologic development. Total score reliabilities for all subjects equals .91. The interrater reliability for total scores on the INFANIB was r = .97 (Ellison, Horn, & Browning, 1985). This assessment can be completed in 5 minutes, while scoring takes approximately 10 minutes (Ellison et al., 1985).

4. Home Observation for Measurement of the Environment (HOME) -- an observational tool designed to determine the frequency of contacts between care givers and children, the type of environment children live in, the emotional climate in which they live, the provision for sensory experiences, the identification of family strengths and weaknesses, and the identification of developmental risks before a child is 3 years of age. The HOME for infants and toddlers measures 45 items in six major categories: responsivity, acceptance, organization, play materials, involvement, and variety. Scoring results in both subscale scores and total scores can fall into the lowest middle ([is less than] 50%), the middle half (50-75%), or the upper fourth ([is greater than] 75%). Test-retest reliability of the total scale is r = 0.84 (Caldwell & Bradley, 1984). Criterion related validity was established by correlating mental test scores at the following ages: 6 months, r = .5; 12 months, r = .57; and 24 months, r = .7 (Caldwell & Bradley, 1984). The CNS completed the HOME inventory within 30 minutes after leaving the foster home.

Those children failing any portion of the developmental screening program were referred to the child development specialist for a comprehensive evaluation, which included assessment of cognitive skills, speech and language skills, fine and gross motor skills, and personal/social/adaptive skills. The child development specialist and the county early intervention official worked together to ensure timely enrollment in early intervention programs for children with documented delay. Children who passed the screening were reassessed at 6-month intervals. Data were analyzed by computer generating measures of a central tendency and measures of variability.

Results

A total of 52 children were screened with all the DDST-II, ELM-2, and the HOME Scale. Forty nine were screened with the INFANIB. Results of the DDST-II showed that 65% (n = 34) of the children passed and 35% (n = 18) of the children failed screening or had a screening with two or more cautions. For the purposes of this analysis, two or more cautions were considered a failure. A total of 18 children failed; of this number, 8 (44%) were African-American, 9 (50%) were Caucasian, and 1 (6%) was of mixed ethnicity (see Figure 1). Of those children failing the DDST-II, the language sector had the greatest failure rate (35%), the gross motor and personal-social sectors had a failure rate of 20%, and the fine motor sector had a failure rate of 15%.

Language assessment with the ELM Scale-2 resulted in 8% (n = 4) failing. The mean global ELM-2 standard score for all children was 89. For this test, normal includes any standard score falling within two standard deviations from the mean (70 to 130). The differences between African-American children and Caucasian children approached, but did not reach, statistical significance on the ELM-2 (p =.056), with African-American children performing better on the ELM-2 than did Caucasian children (see Figure 2). There was no statistical significance between scores based on gender.

The INFANIB showed that 39% (n 19) passed, 59% (n = 29) of the children had transiently abnormal neurologic screening exams, and 2% (n = 1) failed. Of the children passing the INFANIB, 21% (n = 4) had a positive maternal drug history and/or a positive toxicology screen in the newborn. Of children with a transient abnormal neurologic result, 45% (n = 13) had a positive maternal drug history and/or a positive toxicology screen in the newborn. Maternal and infant birth history were unknown in the child with the abnormal results (see Figure 3).

When the INFANIB results were analyzed by age, there were more abnormalities in tone in children under 6 months of age. There were 25 children less than 6 months of age in the sample. Of these, 88% (n = 22) had transient abnormalities. Of the 24 children 6 months of age or older, 33% (n = 8) had transient abnormalities.

HOME scores reflected foster care environments in the upper half for 100% of the children. Forty-nine percent were in the upper fourth and 51% were in the middle half. This indicated that the foster parents provided an adequate environment responsive to the children's developmental and emotional needs.

In response to a confidential survey, 100% of foster parents enthusiastically supported the home-based developmental screening program. Foster parents indicated satisfaction in learning about their child's developmental strengths and weaknesses.

Discussion

This study documents developmental delay of 35% among children within 1 month of placement in foster care. This figure is substantially higher than the national figure of 10% developmental delay among the general population (Drillien, Pickering, & Drummond, 1988). This is attributed to the cluster of developmental, emotional, social, and medical problems related to the environments from which children were removed (Simms & Halfon, 1994). Further, this study specifically documents a high incidence of abnormal muscle tone. Children under the age of 6 months demonstrated more abnormalities in muscle tone than did children more than 6 months of age, which we believe is due to transient hypertonia associated with prenatal cocaine exposure (Forrest, 1994). An alarming 25% of mothers had a positive history for cocaine use during pregnancy and 21% of newborns had positive toxicology screens. In many cases, these factors were the reason for foster care placement. Although language was the sector most often failed on the DDST-II (35%), only 8% of children failed the ELM Scale-2, a specific too] for language screening. This finding is attributed to the limited number of items that can be administered on the DDST-II in the language sector.

Home-based developmental screening was enthusiastically received by 100% of foster parents (measured by a foster parent satisfaction survey) and provided the opportunity for exchange of developmental and parenting information early in the course of foster care placement. Discussion of developmental issues within 1 month of placement was reported to have facilitated a smoother transition into care. The nurse home visitor believed the children were more secure and comfortable in their home setting than in the clinic setting, thereby providing a more accurate picture of developmental abilities.

Implications for Nursing Practice

This study suggests that nurses working with young children in foster care in primary care settings should have a high index of suspicion for developmental and neurologic problems. Developmental screening with the DDST-II, ELM Scale-2, and INFANIB is one way to routinely screen children in foster care and ensure timely referrals to early intervention and preschool programs. This pro-active approach may save limited health care dollars in the future.

Since the Public Health Nursing initiative, nursing has long valued the importance of home visitation programs. This program supports home visitation as an opportunity for the nurse to assess and intervene with children in their ecologic context. The nurse can initiate timely referrals to early intervention. The nurse also has the opportunity to discuss the developmental status of the foster child with foster parents, a factor many of the foster parents in this study highly desired. This exchange of information was believed to facilitate a better understanding of the child's needs and behaviors.

Further, home-based assessment provides nursing a more relaxed and familiar forum to assist the foster family in discovering the developmental strengths and weaknesses of the child. It affords nursing the time to discuss with the foster family anticipatory guidance issues appropriate to the child's age. It also provides nursing many opportunities for improving the coordination and integration of services and referrals for these children.

This program demonstrated that the nurse is an integral team member, particularly in identifying and coordinating a plan of service for the child who is developmentally delayed. The nurse can be instrumental in linking the child and family with services necessary to promote the child's health and well being. The nurse is often the only health professional on a team with the educational and practical experience necessary for this type of case management.

Future Directions

Based on the results of this study, which confirmed the high degree of developmental and neurologic problems among young children in foster care, ENHANCE has replaced the screening measures with home-based, formal, comprehensive assessment using the Bayley Scales of Infant Development-II, ELM Scale-2 and INFANIB. With this more sophisticated assessment we believe we will be better able to track, over time, the development of young children in foster care, and contrast this data with information about the quality of the foster home environment. Future work will address the developmental impact of early versus late placement in the foster care home and address foster parenting skills through an intervention program for foster parents.

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