Effectiveness of a Home Intervention for Perceived Child Behavioral Problems and Parenting Stress in Children With In Utero Drug Exposure

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Objective: To determine if a home-based nurse intervention (INT), focusing on parenting education/skills and caregiver emotional support, reduces child behavioral problems and parenting stress in caregivers of in utero drug-exposed children.

Design: Randomized clinical trial of a home-based INT.

Settings: Two urban hospital newborn nurseries; homes of infants (the term infant is used interchangeably in this study with the term child to denote those from birth to the age of 36 months); and a research clinic in Baltimore, Md.

Participants: In utero drug-exposed children and their caregivers (N=100) were examined when the child was between the ages of 2 and 3 years. Two groups were studied: standard care (SC) (n=51) and INT (n=49).

Intervention: A home nurse INT consisting of 16 home visits from birth to the age of 18 months to provide caregivers with emotional support and parenting education and to provide health monitoring for the infant.

Main Outcome Measures: Scores on the Child Behavior Checklist and the Parenting Stress Index.

Results: Significantly more drug-exposed children in the SC group earned t scores indicative of significant emotional or behavioral problems than did children in the INT group on the Child Behavior Checklist Total (16 [31%] vs 7 [14%]; P=.04), Externalizing (19 [37%] vs 8 [16%]; P=.02), and Internalizing (14 [27%] vs 6 [12%]; P=.05) scales and on the anxiety-depression subscale (16 [31%] vs 5 [10%]; P=.009). There was a trend (P=.06) in more caregivers of children in the SC group reporting higher parenting distress than caregivers of children in the INT group.

Conclusions: In utero drug-exposed children receiving a home-based nurse INT had significantly fewer behavioral problems than did in utero drug-exposed children receiving SC (P=.04). Furthermore, those caregivers receiving the home-based INT reported a trend toward lower total parenting distress compared with caregivers of children who received SC with no home visits.

Arch Pediatr Adolesc Med. 2001;155:1029-1037

Each year, approximately 221,000 or 5.6% of US infants are born to mothers who used illicit drugs during pregnancy.1 In some high-risk urban centers, rates of fetal exposure to illicit drugs may be as high as 18%, based on maternal self-report and urine toxicology results, to 31%, based on fetal meconium level.2,3 These infants have multiple risk factors for compromised growth and intellectual and social or behavioral development due to in utero drug exposure and a stressful postnatal environment. Children living with substance-abusing parents are more likely than others to live in disorganized households, which may include parental criminal involvement and drug dealing; passive exposure to illicit drugs; and parents who are ill, absent, depressed, or stressed.4 There is some evidence linking in utero drug exposure to compromised behavioral outcomes; however, findings of the association between in utero cocaine exposure and behavioral problems are not convincing.5 Studies6-7 of neonatal behavior in cocaine-exposed newborns report a dose-response relationship between state regulation, as measured by the Brazelton Behavioral Scale, and prenatal cocaine exposure. Caregivers of children exposed to cocaine reported their children, at the age of 3 years, to be more aggressive and to show destructive behavior.8 Teachers of elementary school-aged children, blinded to cocaine exposure, rated...
PARTICIPANTS AND METHODS

STUDY DESIGN

This randomized clinical trial, designed to examine the effectiveness of a home nurse INT for in utero drug-exposed infants (the term infant is used interchangeably in this study with the term child to denote those from birth to the age of 36 months), recruited infants born to mothers who used cocaine and/or opiates. The design was intent-to-treat in that families randomized to the INT were included in the INT group regardless of the number of HVs they received. After informed consent was obtained, mothers-infant dyads were randomized into the INT or standard care (SC) groups by selecting an envelope with a computer-generated random number. Subjects with odd numbers were assigned to the INT group, and those with even numbers were assigned to the SC group.

INTERVENTION

The home INT consisted of 16 home nurse visits from birth to the age of 18 months, with more frequent visits during the infant’s first 6 months of life. Home visits were conducted by 2 pediatric nurse specialists (PNSs) who were community health nurses experienced in conducting HVs with inner-city populations and specifically trained and supervised in basic pediatric assessment skills for in utero drug-exposed infants. Ongoing supervision of the PNSs by a pediatric nurse practitioner (A.M.B.) was conducted on a monthly basis to ensure the integrity of the INT delivered to each infant in the INT group and for quality assurance purposes. The pediatric nurse practitioner was available to the PNSs by beeper 24 hours a day for immediate problems. The PNSs established a caring relationship with the caregiver, provided emotional support, modeled positive parent-child interactions, and provided health monitoring of the infant. Parenting information was provided, and specific skills were taught to the mother or caregiver to enhance maternal-infant interaction. The parent educational component of the home INT was based on the Hawaii Early Learning Profile22 and the Carolina preschool curriculum.23 The Hawaii Early Learning Profile curriculum includes activity sheets illustrating for the parent step-by-step instructions for several hundred developmental skills. The Carolina preschool curriculum for high-risk infants is based on effectiveness teaching principles for young children (providing choices and building learning experiences into daily routines). The PNS tailored the type of educational information provided to the mother or caregiver at each visit according to the needs of the mother. The mean number of HVs received by children in the INT group and their caregivers was 12.8 (SD, 3.2; range, 1-20), of the 16 scheduled visits, with nearly 90% of the families receiving 9 or more visits and 86% of the families receiving 10 or more visits. Additional details of the home nurse program can be found elsewhere.24

All children were examined for growth, development, and behavioral outcomes every 6 months from birth through the age of 36 months. The emotional/behavioral problems detected in this sample of children by the age of 36 months are reported herein. The study was approved by the institutional review boards of The Johns Hopkins Medical Institutions and the Bayview Medical Institution, Baltimore, Md. From December 1, 1994, to January 31, 1997, 204 singleton newborns born to cocaine- and/or opiate-using mothers were recruited with their mothers from 2 urban hospitals into the ongoing home nurse clinical trial.

SAMPLE

Drug-Exposed Study Population

Eligibility for enrollment was based on maternal delivery of a neonate at 1 of 2 urban hospitals, maternal age between 19 and 40 years, and maternal use of cocaine and/or opiates during the index pregnancy. Adolescent and older mothers were excluded because cost constraints for the larger study precluded development of multiple age-specific INTs. To reduce confounding with child behavioral and developmental outcomes, infants were excluded if they (1) were younger than 35 weeks’ gestational age; (2) required admission to the neonatal intensive care unit for longer than 24 hours; (3) were discharged directly into nonkinship foster care; or (4) were born to mothers with a major psychiatric diagnosis, including schizophrenia and other psychotic disorders. Maternal human immunodeficiency virus status was recorded when known.

Eligible mother-infant dyads were identified by postpartum staff based on (1) medical record documentation of maternal self-report of prenatal cocaine and/or opiate use or any positive prenatal urine toxicology screen results and/or (2) a positive maternal urine toxicology screen result obtained during labor or a positive infant urine toxicology screen result obtained within 24 hours of birth. Mothers who received no prenatal care were included only if a positive urine toxicology screen result was obtained at the time of delivery of the neonate. The standard of care at the 2 study hospitals included performing urine toxicology screens on all women being delivered of a neonate at these sites. If a maternal toxicology screen was not performed before delivery of the neonate, an infant urine toxicology screen was performed in more than 90% of the cases. Concomitant alcohol and nicotine use was recorded. Type of fetal drug exposure, based on maternal self-report and toxicology screen results, was classified into 3 groups based on exposure to cocaine and opiates: cocaine only, opiate only (heroin and/or methadone), and cocaine plus opiate. Information was elicited on use of other drugs, including marijuana, barbiturates, and amphetamines; however, we based our analysis on cocaine and/or opiate use and controlled for in utero alcohol and nicotine exposure in the analyses.

Eligible mothers were informed of the study by 1 of 2 research nurses and invited to participate. After the study was explained to the mother and informed consent was obtained, a structured interview was conducted by trained interviewers to determine demographic information and prenatal and lifetime drug, alcohol, and tobacco use by the mother. For the latter, the Addiction Severity Index, previously validated in male veteran alcoholics and male and female drug-dependent populations, was used. The Addiction Severity Index provides assessment of alcohol and other drug use and severity ratings of multiple problems associated with alcohol- and other drug-dependent persons. The Addiction Severity Index has been extensively used in homeless substance abusers,26 rural substance abusers,27 urban outpatient female substance abuse clinic patients in the United States,26 and Dutch drug-dependent persons.28 A certificate of confidentiality was obtained from the National Institute on Drug Abuse, Bethesda, Md, assuring participants that no personal information would be shared with anyone outside the study team. Participants were...
informed of their risk that any detection of child abuse or neglect by study personnel would be reported. The timing of prenatal cocaine and/or opiate use was based on (1) self-report by trimester of use and (2) urine toxicology screen results obtained during labor by nursing staff.

Self-report

The Addiction Severity Index and additional drug use questions elicited information on frequency, use by trimester, and route of use of alcohol, nicotine, marijuana, cocaine, heroin, tranquilizers, barbiturates, and other illicit substances during and before pregnancy and type, if any, of drug treatment received before or during the pregnancy. Questions were designed to elicit general patterns of use by each trimester of the pregnancy, asking about behavior in a typical week, frequency of use for each substance in a day, and cost of use of each substance per week. When mothers reported a change in type of drug use during the pregnancy, the trimester during which the change in use occurred was recorded. For each trimester, type of drug use was recorded and coded (ie, cocaine only, opiate plus cocaine, or opiate only). Nicotine use was also recorded by trimester of use.

Toxicology Screens

Maternal urine specimens (30 mL) were collected by labor and delivery nursing staff and sent to the hospital laboratory for toxicology screening. Each urine sample was tested using thin-layer chromatography for the following substances: cocaine, opiates, barbiturates, and cannabinoids. Infant toxicology screens were performed within 24 hours of birth for those infants in whom a maternal toxicology screen was not obtained.

OUTPATIENT FOLLOW-UP

After informed consent was obtained from the caregiver at each visit, the drug-exposed children were examined by research staff without knowledge of type of in utero drug exposure; health and development and behavioral characteristics were evaluated every 6 months from birth to the age of 36 months. Objective standardized measures of child emotional/behavioral problems (Child Behavior Checklist [CBCL]) and parenting stress (Parenting Stress Index [PSI]) were administered to caregivers when the children were between the ages of 2 and 3 years. To improve completion and comprehension of the 2 measures, each instrument was read aloud to all caregivers by one research staff member who was masked to study group. This was done because the average caregiver's reading level was previously evaluated to be at a fourth- to fifth-grade level. Neither group had a greater familiarity with the interviewer administering the CBCL or the PSI.

MEASURES

Child Behavior and Emotional Functioning

The CBCL is a written parent report measure designed to assess behavioral/emotional problems in children. 30 The CBCL takes approximately 15 minutes to complete. The CBCL for ages 2 to 3 years (100 items) yields normalized t scores (mean, 50; SD, 10) that assess behavioral problems in several specific areas. These scores are also combined into 3 global scores: an Internalizing score for emotional problems, an Externalizing score for behavioral problems, and a Total problem score. Higher scores indicate greater emotional/behavioral problems, with t scores of 60 or greater denoting clinically significant problems. 30

Parental Stress

The PSI–Short Form (PSI-SF) is a written parental report measure of the magnitude of stress in a parent-child system, and is completed by a parent or other caregiver. 31 The PSI-SF consists of 36 items and takes about 15 minutes to complete. Parental stress is assessed in 3 areas, each of which receives a subscale score: difficult child (child’s adaptability, manageability, and temperament), parental distress (self-perception of competence in the parenting role, restrictions in life outside of the family, and external and spousal support), and parent-child dysfunctional interaction (degree to which the parent lacks satisfaction from interaction with the child and the child falls short of parental expectations). 31 The PSI-SF yields percentile scores for the 3 subscales, and for Total Stress. Scores above the 90th percentile are generally considered indicative of significant stress. Percentile scores were converted to standard scores (mean, 100; SD, 15) for data analysis purposes in this study.

Item analysis was conducted on one item from the PSI-SF (item 22). In this item, caregivers are asked to evaluate their parenting skills. The parent is asked to endorse 1 of 5 responses to the following statement: “I feel that I am: (1) not very good at being a parent, (2) a person who has some trouble being a parent, (3) an average parent, (4) a better than average parent, or (5) a very good parent.” Caregiver responses were recorded on this Likert scale item for each caregiver completing the PSI-SF.

STATISTICAL ANALYSIS

Frequency distribution and the mean and SD of the CBCL and the PSI scores were examined. Using χ² analysis and t test analysis, we examined initially for differences between the respondents and nonrespondents for child sex, race or ethnicity, gestational age, type of in utero alcohol and other drug exposure and maternal age, educational level, and marital status. Using an analysis of variance and χ² analysis, we determined if there were differences in CBCL and PSI Total and subscale scores by group status, that is, SC or INT, and by dose of INT or number of HVs. Based on the number of HVs received, children were categorized into “high HVs” (received ≥9 HVs [90th percentile]) or “low HVs” (received ≤8 HVs [10th percentile]). The cutoff of 8 or fewer HVs was based on the frequency of HVs received by the families. Using stepwise multiple logistic regression, several models were tested to identify variables that could predict risk of child emotional/behavioral problem, that is, earning a score of 60 or greater on the Total CBCL. Candidate predictor variables in the regression models included group status (SC or INT) or number of HVs, caregiver type, biological mother’s age, educational level, marital status, and child sex. These variables were selected for inclusion in the models based on the bivariate analyses and theoretical considerations. Odds ratios and corresponding 95% confidence intervals are presented for those predictors that remained in the model at the .05 significance level. Spearman ρ rank correlations were conducted to determine if there was an association between Total CBCL scores and Total PSI-SF and subscale scores. Statistical analyses were performed using the Statistical Package for the Social Sciences. 32 All reported P values used 2-tailed tests of significance.
the cocaine-exposed children as having significantly more attention problems than nonexposed children. This was supported by Richardson et al, who demonstrated that in utero cocaine-exposed children made more errors of omission on a continuous performance test, suggesting poorer levels of attention, and by Chasnoff et al, who reported that cocaine/polydrug exposure had a significant effect on children’s behavior, particularly impulse, frustration, and tension control, at the ages of 4, 5, and 6 years.

Parenting skills and stress are suggested to play a significant role in determining whether a child has a behavior problem. Evidence indicates that levels of parenting stress were higher as reported by mothers compared with foster mothers of drug-exposed children, and by a comparison group of non–drug-exposed mothers of a similar socioeconomic status.

Data are conflicting for what constitutes effective parent educational interventions (INTs) addressing child behavioral problems and parenting stress in substance-abusing families with children. Because of the shortage of drug treatment programs for pregnant and parenting women with children, other types of treatment strategies, including home-based INTs, have been evaluated. Increased maternal–infant communication and lower stress were demonstrated in polydrug-dependent adolescent mothers who received an educational, vocational, and infant day care INT. In a clinical trial of a home INT program for drug-using women with newborns, the home-visited group provided marginally more stimulation to their children, yet child-related stress was not influenced by the INT. No difference was seen in the quality of home stimulation for high-risk infants (maternal homelessness or mental illness) who received a home visit (HV) or a case management INT compared with standard clinic care.

Home INTs have been reported to reduce child behavioral problems in unmarried teenaged mothers and their children and in infants with failure to thrive. Nurse-visited low-income children displayed fewer behavioral problems with toilet training and extreme shyness as preschoolers than their counterparts who did not receive HVs. Parenting stress was reduced during the second year of follow-up in low-income families receiving HVs by paraprofessionals in the Hawaii Healthy Start Program. Cautious optimism is indicated for positive child outcomes following home-based INTs for many high-risk groups, including low-income mothers, drug-dependent mothers, and mothers with less than a high school education.

This study determines if a home-based nurse INT, focusing on parenting education/skills and caregiver emotional support, reduces child behavioral problems and parenting stress in caregivers of in utero drug-exposed children. We hypothesized that a nurse HV INT aimed at increasing parenting skills would decrease the rate of child behavioral problems and the level of parenting stress in families with drug-exposed children.

## RESULTS

### SOCIODEMOGRAPHIC CHARACTERISTICS BY RETENTION STATUS

As seen in Figure 1, 248 mother-infant dyads were eligible for participation in the study between December 1, 1994, and January 31, 1997. Of these dyads, 233 (94%) were approached for enrollment into the study; 15 mothers left or were discharged from the hospital before consent could be obtained. Of the 233 mothers approached for enrollment, 204 (88%) consented. Of the 29 mothers who refused to participate, most (26 of 29 or 90%) denied drug use or feared disclosure of their drug use to family members. This group did not differ significantly from the study group for maternal age, race, type of drug use, and amount of prenatal care. Between birth and the age of 36 months, 1 infant died, 6 infants moved out of the study area, 14 caregivers refused to bring the child to the clinic for follow-up examinations, and 66 infants could not be located. Children lost to follow-up or not retained (n=87) were significantly less likely to be in the care of their biological mother than the retained children (n=117) (P<.01), but were comparable for sex, race, gestational age, and type of in utero drug exposure and maternal age, educational level, and marital status (Table 1). Data for 100 children and caregivers who were examined to assess emotional/behavioral problems and who have complete data on the CBCL and PSI measures are presented herein. In addition to the examination of the child for emotional/behavioral problems, caregivers were examined to assess their level of parenting stress when the child was aged 2 to 4 years.

### SOCIODEMOGRAPHIC CHARACTERISTICS BY GROUP STATUS

For the total sample, most infants were African American, full term, and exposed in utero primarily to nico-
tine, followed by cocaine plus opiates, opiate only, and cocaine only (Table 2). Daily prenatal alcohol use was reported by 9% of mothers, with 28% reporting occasional alcohol use (<1 time per week). Most mothers reported no alcohol use during the pregnancy. The mean age of the mothers was 28.5 years, and the mothers were primarily single and had less than a high school education. More than two thirds of the infants were residing with their mother at the age of 36 months; however, most mothers reported continued postnatal drug use. One third of the mothers reported continued alcohol use during the follow-up period. As seen in Table 2, there were no significant differences between the SC and INT groups, with the exception of more female children randomized to the INT group.

There were no significant differences between children receiving a high number of HVs and those receiving a low number of HVs for prenatal maternal smoking or alcohol use; maternal marital status, educational level, and age; infant sex, race, gestational age, and type of in utero drug exposure; and continued postnatal maternal drug use. Caregiver type at the age of 36 months was significantly different by number of HVs, with children in foster care more likely to receive more HVs (P = .01). The lost to follow-up rates were comparable (SC group, 59 of 108 children or 55%; and INT group, 58 of 96 children or 60%).

**CHILD EMOTIONAL/BEHAVIORAL PROBLEMS**

Overall, the total sample did not demonstrate serious perceived emotional/behavioral problems at the age of 30 months (CBCL Total mean t score, 49.5; SD, 10.76), although 23% (23/100) of all children showed clinically significant perceived emotional/behavioral problems, defined as earning a CBCL Total t score of 60 or greater. As seen in Table 3, mean t scores for the subscale “withdrawn” were significantly higher in the SC group compared with the INT group. No significant differences were noted by group status for Total, Internalizing, and Externalizing scales and the anxiety-depression, sleep, somatization, aggression, and destruction subscales.

Based on χ² analysis and scoring 60 or greater on CBCL scales or subscales, significantly more children in the SC group earned t scores indicative of significant perceived emotional or behavioral problems on the Total (P = .04), Externalizing (P = .02), and Internalizing (P = .05) scales and on the anxiety-depression (P = .009) subscale than did children in the INT group (Figure 2). Of the 51 children in the SC group, 16 (31%) earned CBCL Total t scores of 60 or greater, compared with only 7 (14%) of the 49 children in the INT group. Almost one quarter (23% [23/100]) of all children earned CBCL Total t scores of 60 or greater. More than one third (19 [37%]) of the SC group earned scores indicative of an externalizing behavior problem (ie, is defiant, hits others, or is easily frustrated) in contrast to 8 (16%) of the INT group. Anxiety-depression problems were reported by 16 (31%) of the children in the SC group compared with 5 (10%) of the children in the INT group (P = .009). There was no significant difference by category of number of HVs (low vs high) or by continued maternal alcohol and other drug use for CBCL Total and all subscales scores.

**PARENTING STRESS**

Overall mean parenting stress scores were not elevated across all children (PSI-SF Total standard score mean, 96.9; SD, 19.3). As seen in Table 4, there was a trend in caregivers of children in the SC group reporting a significantly higher mean on the parent distress subscale compared with caregivers of children in the INT group. Based on scoring at the 90th percentile or higher or a standard score of 119 or greater, indicative of high levels of parenting stress, there was no significant difference in Total Stress scores or dysfunctional parent-child interaction, difficult child, or parental distress subscale scores between the 2 groups. Almost one fifth (19%) of all caregivers in this study reported dysfunctional parent-child interactions. There was no significant difference by category of number of HVs (low vs high), continued maternal alcohol and other drug use for Total Stress, and all subscales.

Most caregivers rated their parenting skills as very good based on item analysis of their self-rating of parent-child interactions. There was no significant difference by category of number of HVs (low vs high), continued maternal alcohol and other drug use for Total Stress, and all subscales.
2 groups ($\chi^2 = .05, P = .81$). Caregiver rating was not associated with high parenting stress (PSI-SF) scores in that most caregivers with high Total PSI-SF scores (≥90th percentile) rated themselves as very good parents ($P = .76$). Last, caregiver ratings were not associated with mean CBCL Total scores.

**Table 2. Sociodemographic and Health Characteristics by Group Status**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Standard Care (n = 58)</th>
<th>Intervention (n = 59)</th>
<th>Total (N = 117)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>24 (41.4)</td>
<td>35 (59.3)†</td>
<td>59 (50.4)</td>
</tr>
<tr>
<td>Male</td>
<td>34 (58.6)</td>
<td>24 (40.7)</td>
<td>58 (49.6)</td>
</tr>
<tr>
<td>Race or ethnicity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>55 (94.8)</td>
<td>57 (96.6)</td>
<td>112 (95.7)</td>
</tr>
<tr>
<td>White or other</td>
<td>3 (5.2)</td>
<td>2 (3.4)</td>
<td>5 (4.3)</td>
</tr>
<tr>
<td>Gestational age, wk‡</td>
<td>38.7 (1.5)</td>
<td>38.3 (1.7)</td>
<td>38.5 (1.6)</td>
</tr>
<tr>
<td>In utero nicotine exposure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cocaine only</td>
<td>12 (20.7)</td>
<td>12 (20.3)</td>
<td>24 (20.5)</td>
</tr>
<tr>
<td>Opiate only</td>
<td>13 (22.4)</td>
<td>12 (20.3)</td>
<td>25 (21.4)</td>
</tr>
<tr>
<td>Cocaine plus opiate</td>
<td>33 (56.9)</td>
<td>35 (59.3)</td>
<td>68 (58.1)</td>
</tr>
<tr>
<td>Prenatal alcohol exposure</td>
<td></td>
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<tr>
<td>None</td>
<td>35 (60.3)</td>
<td>39 (66.1)</td>
<td>74 (63.2)</td>
</tr>
<tr>
<td>Occasional</td>
<td>18 (31.0)</td>
<td>15 (25.4)</td>
<td>33 (28.2)</td>
</tr>
<tr>
<td>Daily</td>
<td>5 (8.6)</td>
<td>5 (8.5)</td>
<td>10 (8.5)</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age at birth of child, y‡†</td>
<td>28.9 (4.6)</td>
<td>28.9 (4.5)</td>
<td>28.5 (4.5)</td>
</tr>
<tr>
<td>Educational level, y‡†</td>
<td>11.4 (1.6)</td>
<td>11.2 (1.7)</td>
<td>11.3 (1.6)</td>
</tr>
<tr>
<td>Single, never married</td>
<td>58 (100.0)</td>
<td>57 (96.6)</td>
<td>115 (98.3)</td>
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<tr>
<td>Continued postnatal use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>21 (36.2)</td>
<td>17 (28.8)</td>
<td>38 (32.5)</td>
</tr>
<tr>
<td>Other drugs</td>
<td>33 (56.9)</td>
<td>42 (71.2)</td>
<td>75 (64.1)</td>
</tr>
<tr>
<td><strong>Caregiver type when the child is aged 36 mo</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biological mother</td>
<td>40 (69.0)</td>
<td>40 (67.8)</td>
<td>80 (68.4)</td>
</tr>
<tr>
<td>Kinship care</td>
<td>18 (31.0)</td>
<td>15 (25.4)</td>
<td>33 (28.2)</td>
</tr>
<tr>
<td>Foster care</td>
<td>0</td>
<td>4 (6.8)</td>
<td>4 (3.4)</td>
</tr>
</tbody>
</table>

*Data are given as number (percentage) of children in each group unless otherwise indicated. Percentages may not total 100 because of rounding.
†More female children were randomized to the intervention group ($P = .047$).
‡Data are given as mean (SD).

**Table 3. CBCL Total Score and Subscale Normalized t Score Results by Group Status**

<table>
<thead>
<tr>
<th>CBCL Scales</th>
<th>Group Status†‡</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standard Care (n = 51)</td>
</tr>
<tr>
<td><strong>Subscales</strong></td>
<td></td>
</tr>
<tr>
<td>Anxiety-depression</td>
<td>55.8 (7.8)</td>
</tr>
<tr>
<td>Withdrawn</td>
<td>55.1 (7.6)</td>
</tr>
<tr>
<td>Sleep</td>
<td>53.2 (5.9)</td>
</tr>
<tr>
<td>Somatization</td>
<td>53.6 (5.7)</td>
</tr>
<tr>
<td>Aggression</td>
<td>55.9 (7.9)</td>
</tr>
<tr>
<td>Destruction</td>
<td>54.1 (6.1)</td>
</tr>
<tr>
<td><strong>Total Scales</strong></td>
<td></td>
</tr>
<tr>
<td>Externalizing</td>
<td>52.2 (12.2)</td>
</tr>
<tr>
<td>Internalizing</td>
<td>51.0 (12.5)</td>
</tr>
<tr>
<td>Total</td>
<td>51.0 (12.9)</td>
</tr>
</tbody>
</table>

*The normalized mean (SD) t score is 100 (10). Data are given for the 100 children with complete Child Behavior Checklist (CBCL) and Parenting Stress Index information.
†Data are given as mean (SD) score.

PREDICTORS OF A PERCEIVED CHILD EMOTIONAL/BEHAVIORAL PROBLEM

Using multiple logistic regression to predict the risk of perceived child emotional/behavioral problem, that is, earning 60 or greater on the CBCL Total scale, the only significant covariate was maternal age (odds ratio, 1.14; 95% confidence interval, 1.01-1.23; $P = .04$), while controlling for group status (SC or INT), maternal educational level, prenatal alcohol use, continued maternal drug use, and child sex. Similar models adding prenatal smoking, type of in utero drug exposure, type of caregiver at the age of 36 months, continued maternal alcohol and/or other drug use, and number of completed HVs as covariates did not change maternal age as the only significant covariate.

ASSOCIATION OF PERCEIVED EMOTIONAL/BEHAVIORAL PROBLEMS AND PARENTING STRESS

The CBCL Total t score and the PSI-SF Total standard score were highly correlated (Spearman $\rho = 0.42$, $P = .001$). All clinical subscales of the PSI-SF were highly correlated with the CBCL Total t score: parental distress (Spearman $\rho = 0.29$, $P = .02$), parent-child dysfunctional interaction (Spearman $\rho = 0.26$, $P = .04$), and difficult child (Spearman $\rho = 0.46$, $P < .001$).
Influenced by parenting skills and by the parent’s own term follow-up data of Olds et al. Parental distress is proving the quality of the mother-child interaction during the crucial early years, as suggested by the long-term follow-up data of Olds et al. Parental distress is associated with a significant decrease in total parenting stress scores, a trend was noted in a decrease in mean parental distress scores in the INT group. These results are most likely due to the effect of the INT in fostering and improving the quality of the mother-child interaction during the crucial early years, as suggested by the long-term follow-up data of Olds et al. Parental distress is influenced by parenting skills and by the parent's own needs and coping strategies, and is potentially the most direct way to affect child development and behavior.

Caregivers who reported high parenting stress levels were more likely to report significant behavioral problems in their child. Although the directionality of the relationship cannot be determined (ie, does having a child with behavioral problems increase parenting stress or does high parenting stress result in children with emotional/behavioral problems?), caregivers of children with in utero drug exposure did report high levels of parenting stress. Almost 1 of 4 caregivers (23%) reported significant child behavioral problems in their child. Although the directionality of the relationship cannot be determined (ie, does having a child with behavioral problems increase parenting stress or does high parenting stress result in children with emotional/behavioral problems?), caregivers of children with in utero drug exposure did report high levels of parenting stress. Almost 1 of 4 caregivers (23%) reported significant child behavioral problems in their child, indicating that this is a significant stress on these families.

The PSI measures multiple domains to assess stress in the parent-child system. One item includes the caregivers’ perception of themselves as a parent, with lower parental rating generally being associated with higher parenting stress. Despite reporting parenting stress, most drug-exposed caregivers in this study believed they were and rated themselves as being good to very good parents. Possible explanations for this discrepancy are offered. First, the caregivers may be in denial of the less optimal level of their parenting skills, really believing their parenting abilities are good or very good. Second, it may well be that caregivers with substance abuse in this study are competent parents despite a high level of parenting stress.

These findings must be interpreted with caution. First, the sample size is small, with a 49% follow-up...
Infants with in utero drug exposure have multiple risk factors for compromised growth and intellectual and social or behavioral development secondary to in utero drug exposure and a stressful postnatal environment. Previous clinical trials of home-based INTs indicate cautious success in reducing child behavioral problems in unmarried teenaged mothers and their children and in infants with failure to thrive. This study was conducted to determine if a home-based nurse INT focusing on parenting educational skills and caregiver emotional support reduces child behavioral problems and parenting stress in caregivers of in utero drug-exposed children.

In utero drug-exposed infants receiving a home-based nurse INT had significantly fewer perceived behavioral problems compared with infants receiving SC with no home INT. We suggest that more aggressive and intensive home-based INT services (more HVs over a longer duration) may have a greater impact on perceived behavioral problems and parenting stress and should be considered as a treatment option for drug-using mothers and their children. In addition, observation of a parent-child interaction with modeling of appropriate interactions and stimulating a child interaction with the caregiver during well-child visits provides the caregiver with behavior modification techniques to use at home.

REFERENCES

7. TRONICK EZ, Frank DA, Cabral H, Mirochnick M, Zuckerman B. Late dose...