Objectives: To estimate the prevalence of developmental delay and service use among children in the child welfare system and to identify factors that influence these outcomes.

Design: A descriptive study using wave 1 of the National Survey of Child and Adolescent Well-Being.

Participants and Setting: Children aged 0 to 10 years (n=4324) and their caregivers were interviewed within 60 days of a report being made to the child welfare system. Children's development was measured directly using standardized assessment tools. Three questions from the caregiver interviews estimated receipt of developmental services.

Main Exposures: Subjects were characterized as having developmental delay if any developmental measure fell more than 2 SDs below the mean. Prevalence of developmental delay and service use by age group, type of maltreatment, type of placement, race, sex, and income were reported. Odds that children aged 0 to 2, 3 to 5, and 6 to 10 years with developmental delay would receive developmental services were calculated using weighted logistic regression.

Main Outcome Measure: Receipt of developmental services by children with developmental delay.

Results: Younger children aged 0 to 2 and 3 to 5 years had higher rates, 33% and 36%, respectively, of developmental delay than school-aged children (13%) (P<.01). Despite their high prevalence of developmental delay, children aged 0 to 2 years were less likely to receive developmental services than preschool-aged children (odds ratio, 2.4; 95% confidence interval, 1.6-3.7) or school-aged children (odds ratio, 4.2; 95% confidence interval, 2.9-6.0).

Conclusions: Rates of developmental delay are high and developmental services are underused, particularly by young children in the child welfare system. Strategies for overcoming barriers to using early intervention services should be implemented.

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The lives of children in the child welfare system are often characterized by exposure to numerous risk factors for developmental delay, including the direct effects of abuse and neglect, poverty, in utero drug exposure, parental substance abuse, and mental health disorders. Studies have estimated that between 13% and 62% of children entering foster care have developmental delay. Studies have also looked at developmental delays in clinically referred populations of maltreated children and have found higher rates of cognitive language delays, adaptive skill delays, and poorer academic performance than nonmaltreated peers.

The influence of potentially important variables such as race, sex, income, type of placement, and type of maltreatment on developmental outcomes has rarely been described for this group of children. Interpretation of the available data is limited by the use of small convenience samples, but it suggests that age group, sex, and maltreatment type may be important predictors of developmental outcome. Less is known about the influence of placement type, income, and race on developmental status.

Methods used in prior studies to describe the rates of developmental delay among children in the child welfare system have serious limitations. Much of the data are based on convenience samples of patients referred to diagnostic clinics because of foster care entry, behavioral problems, or abuse itself. Convenience samples are problematic since they may have an intrinsic bias toward more severe developmental problems and may overestimate the proportion of children in the child welfare system with developmental delay. The
METHODS

STUDY DESIGN AND SUBJECTS

This is a descriptive study using wave 1 of the NSCAW. The NSCAW database collected information from 3504 children aged 0 to 14 years and their caregivers who were reported to the child welfare system because of a concern regarding abuse or neglect. Developmental measures and caregiver interviews were performed within 60 days of the close of the child welfare investigations. Many children remained in the home of their permanent caregivers or parents after the investigations, but if the child was living in an out-of-home placement, attempts were made to interview both the current and permanent caregivers. Since complete developmental measures were available for children aged 0 to 10 years, the analysis was constrained to children aged 0 to 10 years (n=4324).

SURVEY DESIGN

Children were selected using a 2-stage stratified sampling design. The primary sampling units were county child welfare agencies from across the United States. The secondary sampling units were children randomly selected from lists of closed child welfare investigations from within those agencies. The sample was divided into 9 strata, 1 stratum for each of 8 key states and 1 stratum for combined data from 28 other states. Analysis weights were constructed to produce national estimates based on probability that a child would be selected from a primary sampling unit and a county within that primary sampling unit. Further details regarding the sampling design and weighting procedure are published in the NSCAW user’s manual. The data analysis protocol was approved by the University of Pittsburgh institutional review board.

STUDY MEASURES

Measures used to assess cognitive, language, and adaptive skill development of the study participants are presented in Table 1. A subject was categorized as having developmental delay if a standard score on any developmental measure was less than 70 (2 SDs below the mean); otherwise, the subject was classified as not having developmental delay.

Three questions from the caregiver interviews were chosen to estimate receipt of developmental services: (1) Was the child ever evaluated by a medical or educational professional for a learning problem or developmental delay? (2) Is the child receiving any special education services? and (3) Does the child have an Individualized Education Plan or Individualized Family Service Plan?

Subjects were categorized by age group: 0 to 2, 3 to 5, and 6 to 10 years. These categories were chosen because they reflect the usual age cutoffs for delivery of developmental services through early intervention programs, including infant and toddler programs (ages 0–2 years), Head Start or Child Find programs (ages 3–5 years), and school-based developmental services (ages ≥6 years).

Child welfare workers were asked detailed questions about the specific nature of the alleged maltreatment. Data were coded. Then, independent raters used a modified Maltreatment Classification Scale to determine maltreatment types, including physical abuse, sexual abuse, emotional abuse, neglect, and other maltreatment. This scale is used in numerous research laboratories to operationalize maltreatment types into consistent categories.

Subjects were classified as living in 1 of 4 possible placements: at home, with a nonrelative foster parent, with relative foster parents (kinship care), or in a group home.

<p>| Table 1. Measures Used to Assess Developmental Status of Study Subjects |
|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Measure</th>
<th>Age, y</th>
<th>Measure</th>
<th>Age, y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive development</td>
<td></td>
<td>Language development</td>
<td></td>
</tr>
<tr>
<td>Batelle Developmental Inventory cognitive subscale</td>
<td>*</td>
<td>Preschool Language Scale (ages 0-5 y)</td>
<td>*</td>
</tr>
<tr>
<td>Kaufman Brief Intelligence Test</td>
<td>††</td>
<td>Woodcock-Johnson Tests of Achievement reading subscale (ages 6-10 y)</td>
<td>††</td>
</tr>
<tr>
<td>Adaptive skills</td>
<td></td>
<td>Adaptive skills</td>
<td></td>
</tr>
<tr>
<td>Vineland Adaptive Behavior Scales daily living subscale (ages 0-10 y)</td>
<td>*</td>
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</tbody>
</table>

*The tests were administered to the age group.
††The tests were not administered to the age group.

In summary, children in the child welfare system may be at risk for developmental delay, but accurate prevalence data and identification of factors that influence developmental status are lacking. Furthermore, rates of developmental service use among this high-risk population are rarely described in the literature. Therefore, the objectives of this study are to estimate the prevalence of developmental delay and developmental service use among children in the child welfare system and to identify factors that influence developmental delay and use of these services.
Caregivers reported the child’s race. Data were collapsed into 4 categories: white, African American, Hispanic, and other races. Caregivers were asked whether anyone in the home receives government assistance, including assistance from the Special Supplemental Nutrition Program for Women, Infants, and Children, assistance from the Temporary Assistance to Needy Families program, food stamps, housing support, or a disability check. A dichotomous variable was created to indicate whether anyone in the home receives government assistance.

DATA ANALYSIS

Sample weights were used in all of the calculations using the survey set function of the Stata release 8 software (Stata Corp, College Station, Tex). The survey prop command was used to tabulate all of the proportions. The survey logit command was used to calculate odds ratios. To account for the complex survey design, a Wald correction was used, and statistical significance was set at P < .01.

RESULTS

SUBJECT CHARACTERISTICS

Infants aged 0 to 2 years represented 46% of the sample (n = 1998), preschoolers aged 3 to 5 years represented 19% (n = 834), and school-aged children aged 6 to 10 years accounted for 33% (n = 1492). Boys represented 52% of the study sample. Forty-two percent were white and non-Hispanic subjects, 33% were African American and non-Hispanic subjects, 18% were Hispanic subjects, and 7% were subjects of other races and ethnicities. Reasons that the youth came to the attention of the child welfare system included alleged neglect (47%), physical abuse (21%), sexual abuse (11%), emotional abuse (6%), and other types of abuse (7%). Sixty-three percent of the reports made to child welfare authorities resulted in a substantiated report of abuse or neglect. For the remaining 37% of the cases, either child welfare authorities could not gather enough information to name a perpetrator or the report was not deemed to rise to the level of abuse or neglect. Many children (74%) remained in the homes of their parents, 15% were living in foster homes, 11% were living with relative foster parents (kinship care), and 1% were living in group homes or other out-of-home facilities.
Table 3. Odds of Developmental Service Use by Older Children Compared With Children Aged 0 to 2 Years in the Child Welfare System

<table>
<thead>
<tr>
<th>Age, y</th>
<th>Any Service, OR (95% CI)</th>
<th>Developmental Evaluation, OR (95% CI)</th>
<th>IEP or IFSP, OR (95% CI)</th>
<th>Special Education, OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5 (n = 280; 33%)</td>
<td>2.4 (1.6-3.7)</td>
<td>2.5 (1.6-3.7)</td>
<td>2.8 (1.4-5.8)</td>
<td>3.0 (1.2-7.2)</td>
</tr>
<tr>
<td>6-10 (n = 274; 13%)</td>
<td>4.2 (2.9-6.0)</td>
<td>4.1 (2.9-5.9)</td>
<td>4.1 (2.9-5.9)</td>
<td>7.2 (3.3-16.1)</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; IEP, Individualized Education Plan; IFSP, Individualized Family Service Plan; OR, odds ratio.

2 and 3 to 5 years had higher rates of developmental delay, 33% and 36%, respectively, than school-aged children (13%) (P < .01 for both age groups). Race, sex, income, type of child maltreatment, and placement status did not have a significant impact on developmental scores or service use (P > .05 for all of the variables).

USE OF DEVELOPMENTAL SERVICES AMONG CHILDREN WITH DEVELOPMENTAL DELAY

Developmental services were underused by all of the age groups. Overall, about 24% of the assessed children exhibited developmental delay, but only 38% of children with delay were using developmental services. This underuse of services appeared to be most dramatic for the youngest children, with only 20% of children aged 0 to 2 years with developmental delay, 38% of children aged 3 to 5 years with delay, and 57% of children aged 6 to 10 years with delay receiving any developmental services.

Table 3 confirms the underuse of services by the youngest children in the sample using odds ratios, comparing service use by children aged 0 to 2 years with developmental delay vs older age groups. Children aged 3 to 5 years with delay were 2.4 times more likely to be using developmental services than children aged 0 to 2 years (95% confidence interval, 1.6-3.7). Children aged 6 to 10 years with delay were 4.2 times as likely to be using these services as compared with children aged 0 to 2 years (95% confidence interval, 2.9-6.0).

COMMENT

Data from the NSCAW is a unique opportunity to provide national estimates of developmental status and service use among the child welfare population. Our analysis confirms the reports of high rates of developmental delay from previous studies of foster care and maltreated children. In our analysis, 24% of children in the child welfare system had developmental delay. The youngest children were particularly vulnerable, with 33% of infants and 36% of preschoolers having developmental delay. Developmental services were underused by all of the age groups, but children aged 0 to 2 years with delay were significantly less likely to use services than older children.

One striking finding of this study was the higher prevalence of developmental delay among the youngest children, those aged 0 to 5 years. This finding is consistent with the study by Urquiza et al that measured the cognitive development of children entering protective custody. Urquiza and colleagues found higher rates of cognitive delay among children aged 0 to 2 years (45%) in comparison with older children as measured by the Bayley Scales of Infant Development.

In our analysis, factors other than age group did not account for any variability in developmental outcomes. Although our analysis failed to identify these factors, it is still likely that the reasons for the increased rate of developmental problems among this population are multifactorial. Potential factors might include the home environment and maladaptive parenting practices, including lack of exposure to age-appropriate developmental activities or poor parenting practices that do not reinforce the child’s emerging developmental skills. It is possible that young children are more susceptible than older children to poor developmental outcomes because parents are often the sole caregivers for children until they enter the public school system. Other studies highlight the importance of the home environment in promoting positive child developmental outcomes. By school age, children in abusive or neglectful homes are exposed to teachers and other caring adults who may act as protective factors, buffering the effects of maltreatment. Unfortunately, for many young children, there is no such adult in the child’s life to provide the needed nurturing and developmental stimulation.

The fact that the rates of developmental delay did not vary by subtype of abuse is inconsistent with previous data suggesting that child neglect was a larger risk factor for developmental delay than other subtypes of maltreatment. For example, Fox et al compared a referred population of abused and neglected children with controls of similar socioeconomic background. Control children had the highest language scores, with all of the groups of abuse and neglect having significantly lower language scores. Severe neglect emerged as the worst prognostic language indicator. The reason for this discrepancy in findings from previous research is interesting but cannot be fully explained by this analysis. Future studies might look at a severity-of-neglect index to determine whether children with more severe degrees of neglect are more likely to experience developmental problems.

There are several potential explanations for underuse of developmental services by children aged 0 to 2 years with developmental delay in the child welfare system. One explanation is that health care and child welfare professionals are not adequately identifying the developmental needs of these young children and are not making referrals to early intervention. Furthermore, these
professionals may not be aware of the federal law mandating availability of early intervention services to young children in the child welfare system. Leslie et al\(^1\) investigated whether child welfare agencies had comprehensive policies for assessing the health and developmental status of children entering foster care, and they found that only 58% of the primary sampling units that were interviewed had policies regarding child development and only 42% provided developmental examinations. This finding suggests that child development issues are not being prioritized in many child welfare agencies. Another potential reason for underuse of services may be a reflection of the way in which the NSCAW questioned caregivers about the use of developmental services. The questions asked whether the child was evaluated by an educational or child development professional, whether the child had an Individualized Education Plan or Individualized Family Service Plan, or whether the child was receiving special education services. Although an evaluation by a child development professional and development of an Individualized Family Service Plan are typical procedures undertaken when a child is enrolled in early intervention, the NSCAW survey did not directly ask whether the child was involved in early intervention services. This line of questioning may have resulted in underreporting developmental service use by this age group. Further studies that directly assess developmental service use by parent report or linking early intervention databases to child welfare databases would help to answer this question.

The underuse of developmental services by children with clear developmental delay in the child welfare system is a travesty, particularly in light of the fact that federal legislation made these children automatically eligible for services. Our study used a very conservative cutoff for identifying developmental delay. Children were considered delayed if their developmental functioning was more than 2 SDs below average. This level of developmental delay in a child is usually not subtle and could easily be identified by persons who are regularly in contact with children.

Why are so many of these children not receiving services that are clearly needed? The answer is not completely clear, but many potential barriers to receiving early intervention services exist, including social isolation of families living in abusive homes and lack of knowledge of services available to their children. One could argue that once a child welfare professional becomes involved, the professional would identify the needs of the child and ensure that these services are put into place. With regard to developmental services, this does not appear to be happening at an acceptable rate. Children who enter foster care have another set of barriers and challenges to receiving health and developmental services. Children are often brought for health care visits by foster parents or caseworkers who are unfamiliar with the children’s baseline developmental statuses. Prior health records are difficult to obtain and require consent from biological parents, making analysis of baseline developmental status challenging. In many cases, children change primary health care providers when they enter foster care. These providers are unfamiliar with the children, trying to gather basic information about the child’s health statuses and visit histories rather than focusing on development.

Our findings suggest that federal laws making early intervention services available to children in the child welfare system have had little impact. Our current systems of care are failing to detect and refer this vulnerable group of children to services that provide the potential for improved developmental outcomes. This is disturbing, particularly given the growing number of children entering foster care\(^2\) and the fact that over 1.7 million children per year are involved in the child welfare system.\(^3\)

New strategies that might impact service use and outcomes are needed. One strategy is to empower physicians caring for children to assume a higher level of responsibility as the medical home for these vulnerable children. It may be beneficial for child health care providers to develop a system for automatically making referrals to early intervention for these children and to develop internal systems within their own practice to follow up on these referrals. Education of child welfare workers about the high prevalence of developmental delay for children in their care and the positive impact of early intervention services on outcomes is another potentially important strategy. On a systems level, child welfare agencies might examine their policies toward training caseworkers about the availability of early intervention services and begin conversations with early intervention agencies to break down communication barriers that exist between these 2 systems. Early intervention providers could develop strategies for reducing the administrative burden that prevents foster parents from enrolling children in early intervention services. Foster parents are often allowed to sign children into school but are not given the same rights to ensure that children under their care are in early intervention services.

In conclusion, this study shows that lack of service use for developmental delay is a significant problem in the child welfare population. Strategies for overcoming barriers to using early intervention services should be implemented.

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Author Contributions: Dr Zimmer had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

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REFERENCES


