The Impact of Early Literacy Guidance on Language Skills of 3-Year-Olds

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Summary: The objective of this prospective study was to determine the impact of early literacy anticipatory guidance (AG) with provision of books on language development in 3-year-olds in an early literacy program at a University-affiliated inner-city pediatric clinic. The Peabody Picture Vocabulary Test (PPVT-III) and the Expressive One Word Picture Vocabulary Test (EOWPVT-R) were administered to 33–39-month-old children exposed to an early literacy program, which included AG and provision of an age-appropriate book at each well-child visit starting at 2 months old. Children with developmental delays were excluded. Parental surveys on literacy and demographic data were obtained. Univariate and multivariate analyses were performed. Sixty-four children were evaluated; 88% African American, 89% Medicaid recipients. Fifty-eight percent of families reported family-centered literacy orientation. The PPVT-III scores directly correlated with the number of AG visits with book given × number of books purchased ($r^2 = 0.025$, $p = 0.0006$). Higher scores in EOWPVT-R were predicted by race and the number of visits with books given × number of books purchased ($r^2 = 0.182$, $p = 0.0009$). All families reported reading together, half reporting positive family-centered literacy. Given the same number of books purchased for each child, the outcome scores were higher the greater the number of clinic visits wherein AG included early literacy and provision of books. *Clin Pediatr.* 2003;42:165-172

Introduction

Research has shown that children's language and literacy development are interwoven and continuous beginning in infancy.[1,2] The acquisition of reading skills begins long before kindergarten, and children whose parents begin sharing books with them consistently at an early age are more likely to be able to read by the time they enter school.[3,4] Indeed, reading aloud to children is the single most important parental activity to prepare children to succeed in learning to read.[5,6] Dialogic reading is believed to enhance parent-child verbal interactions that occur during reading. Whitehurst et al[3] reported that a 4-week intervention of training parents in dialogic reading was associated with improvement in both expressive and

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receptive language. When different activities such as playtime, mealtime, dressing, and reading were compared, Hoff-Ginsberg[7] reported that the greatest quantity and quality of language interaction occurred during parent-child reading activities. Early onset of home reading routines has been associated with increased expressive and receptive language skills in toddlers[8,9] and higher reading scores and verbal performance in the primary grades.[10-12]

Several studies evaluated the efficacy of literacy-promoting anticipatory guidance (AG) provided by pediatric primary care providers as part of well-child care. Positive book-sharing behaviors were significantly more likely to be reported by parents whose children were given books by their pediatricians as compared to controls.[13-18] Jones et a
served that book distribution enhanced effectiveness of a literacy intervention beyond what could be achieved by just anticipatory guidance alone.

The first prospective study to demonstrate that a literacy-promoting intervention delivered by pediatric primary care providers can enhance the development of children's early oral language skills was reported by High et al.[18] They found a strong association between this intervention and both receptive and expressive vocabulary in older toddlers, 18–25 months old, but not in younger toddlers 13–17 months old. Lancioni et al[20] reported that their early literacy intervention program (Reach Out and Read) improved the early language skills of their kindergarten children. On the other hand, Rice,[21] assessing the effects of the same intervention on language development and literacy orientation among low-income urban families, showed no significant impact on the child's longitudinal language development but did demonstrate increased family literacy orientation independent of the intervention. In a more recent study of a clinic-based literacy intervention based on Reach Out and Read (ROR), Mendelsohn et al[22] showed statistically significantly higher receptive and expressive scores in 3-year-old children in the intervention group when compared to a control group.

Our study was conducted 6 years after initiation of our early literacy program to determine the effects of early literacy anticipatory guidance that included distribution of age-appropriate books during well-child visits that began at 2 months of age. We hypothesized that early and repeated guidance of parents at

and providing them with the tool to practice it will have a positive impact on language development, increasing scores on language testing.

Participants and Methods

Following approval by the Institutional Review Board of the University of Louisville, convenience samples of children presenting for routine 3-year-old checkups between June and November 1999 were enrolled in the study. Inclusion criteria were the following: child 33 to 39 months old, no documented developmental delay or sensory impairment. After written parental consent, any 1 of the 5 investigators administered a receptive and expressive language development test using the Peabody Picture Vocabulary Test III—Revised (PPVT-III) and the Expressive One Word Picture Vocabulary Test—Revised (EOW-PVT-R), respectively. The PPVT-III (Form B) was chosen based on ease and brevity of administration. This instrument yields standardized information vs. gathering critical vocabulary information from parent report. The EOW-PVT-R was chosen to measure expressive language abilities as it correlates well with the PPVT-III in regards to reliability and validity. It can be administered quickly and yields standardized information. The PPVT-III was also chosen to measure receptive language in light of previous research conducted by Washington and Craig[23] documenting that this instrument is culturally fair and appropriate for use with at-risk African-American preschoolers.

Before the language tests were administered, the investigator asked the parent what activities parent and child most enjoyed doing together, the frequency of reading with the child at home and at daycare, attendance at daycare, and the number of books purchased by the parents for the child. Demographic data recorded include age, sex, race, gestational age of the child, maternal age, number of years the mother attended school, and the socioeconomic status.

Intervention

Our inner-city pediatric clinic serves children who are predominantly Medicaid recipients (95%) and African-American (82%). The clinic is affiliated with the Department of Pediatrics, University of Louisville, and is a training site for 40 Pediatric and Medicine/Pediatric residents and medical students. In 1993, we began an early literacy program, modeled after the Reach Out and Read

(ROR) program in Boston. We included early literacy promotion in the anticipatory guidance given at well-child visits (WCV) starting at 2 months old, and thereafter at 4, 6, 9, 12, 15, 18, 24, 36, and 48 months old. At the end of each visit, an age-appropriate book was handed out by the physician for the parent to take home. Suggestions for how, when, and where to share the book with their children were given. Additional opportunities for parents to observe interactive reading were provided by volunteers in the waiting room. Each child could potentially receive a total of 10 books if the WCVs began in our clinic at 2 months old and the child came for all the WCVs through the age of 4 years. Each book was loosely wrapped with paper with printed information on age-appropriate literacy development; this printed information is similar to that which was shared by the physician with the parent during the visit. Accurate tracking of books distributed was maintained by recording each book given in the patient's chart and in a computer data bank.

Training for physicians on early literacy development and on advocacy of early literacy practices such as book sharing and reading aloud to children was conducted yearly. Our physicians were expected to include early literacy promotion in their routine anticipatory guidance and to document such activity in age-specific structured encounter forms.

Data Analysis

Data were analyzed by use of both univariate and multivariate methods. Two tailed *t*-test was used to compare scores of categories within each discrete independent variable. Pearson's correlation coefficient, r, was determined to assess the relationship between language scores and each of the continuous independent variables. Variables that met statistical significance at $p<0.2$ by univariate analysis were used for multivariate analysis (multiple regression model) to determine their effect on outcome measures. The variable, number of books given at the clinic, represented the intervention variable and was therefore included in the multivariate model. Interaction between number of books given and number of books purchased was also included in the model. The reported results of the analysis include the r-squared, the p value for the model, the coefficient, and p value for each of the variables retained in the model.

Results

During the study period between June 1 and November 1999, 150 children came to clinic for routine 3-year-old checkup; 123 children met the study criteria and 64 of these eligible children (53%) agreed to participate. Four parents refused participation owing to time constraints. Eighteen percent (27 of 150) of 3-year-olds were excluded owing to documented developmental delay.

The mean age of study participants was 36.8 months and 58% were female. The racial prevalence (88% African-American) and socioeconomic level (89% Medicaid recipients) of the participants were not significantly different from those of the clinic population. The mean estimated gestational age was 38.8 weeks (range of 30–44 weeks). The mean maternal age was 25.8 years (range of 15–43 years), and 12 years of schooling was reported by the majority of the mothers. The number of adults and children living in the home ranged from 1 to 3 (mean 1.4) and 1 to 6 (mean 2.1), respectively. Half of the study participants were enrolled for varying periods of time in a daycare program where the majority (90%) were read to at this setting.

While all families reported reading to their children at home at least once a week, only 58% of the families listed reading as an activity mother and child most enjoyed doing together. The title of the child's favorite book was recalled by 85% of the families. The majority of families reported purchase of books for their children with a mean of 30 books per child. Each child received an average of 5 books (range 2 to 8) and attended an average of six WCV (range 2 to 8) with early literacy AG. The maternal age and education level, the number of children and adults in the home, gestational age, and attendance in daycare did not significantly affect receptive or expressive language scores.

The mean standard scores on the receptive language test (PPVT-III) was 82±10. The receptive language scores were higher with more books purchased for the child ($p=0.046$). By multivariate analysis (Table 1), the receptive language scores were higher with more anticipatory guidance visits (AGV) × the number of books purchased by the parent ($r^2=0.025$, $p=0.0006$). Results were similar when only the African-American children were taken into consideration ($r^2=0.227$, $p=0.0002$). In Figure 1, we illustrate the effects of the number of AGV with the number of books purchased on PPVT-III scores based on the multivariate analysis

Table 1

MULTIVARIATE ANALYSIS OF RECEPTIVE AND EXPRESSIVE LANGUAGE SCORES

Outcome Variables	R^2	Model p Value	Variable	Coefficient	p Value
Standard	0.17	0.0005	Books clinic × books purchased	0.025	0.0006
EOWPVT	0.247	0.0001	Race	3.58	0.03
			Books clinic × books purchased	0.182	0.0009

Table 2

UNIVARIATE ANALYSIS OF RECEPTIVE AND EXPRESSIVE LANGUAGE SCORES

	PPVT-III		EOWPVT	
Variable	Mean (SD)	p Value	Mean (SD)	p Value
Gender				
58% female (n=36)	81 (11)	0.72	85 (7)	0.09
42% male (n=27)	82 (8)		89 (7)	
Race				
88% African-American (n=56)	81 (10)	0.06	85 (7)	0.06
12% non African-American (n=8)	87 (12)		92 (10)	
Gestational Age				
78% term (n=49)	83 (11)	0.15	88 (8)	0.27
22% preterm (n=14)	78 (9)		85 (3)	
Activities enjoyed together				
58% listed reading (n=36)	82 (9)	0.50	86 (12)	0.48
42% did not list reading (n=27)	81 (11)		88 (8)	
Naming of a favorite book				
85% could name one (n=53)	81 (11)	0.32	87 (7)	0.90
15% could not name one (n=10)	85 (10)		87 (8)	

results. Whether the number of books purchased is 10 or 20, there is no significant impact on the PPVT-III scores when there is no AGV. Scores increase, however, with increasing visits, and the number of books purchased further influenced improvement in the language scores.

As to expressive language, the mean EOWPVT score was 88±7. Univariate analysis (Table 2) revealed the white children scored higher on the expressive language test compared to the African-American children ($p=0.06$). Multivariate analysis showed that expressive language scores were predicted by race ($p<0.03$); and number of WCV with books given × number of books purchased ($p<0.001$) with model $r^2=0.18$, $p<0.001$. The number of WCV with AG and book given significantly predicted the scores of both expressive and receptive language tests.

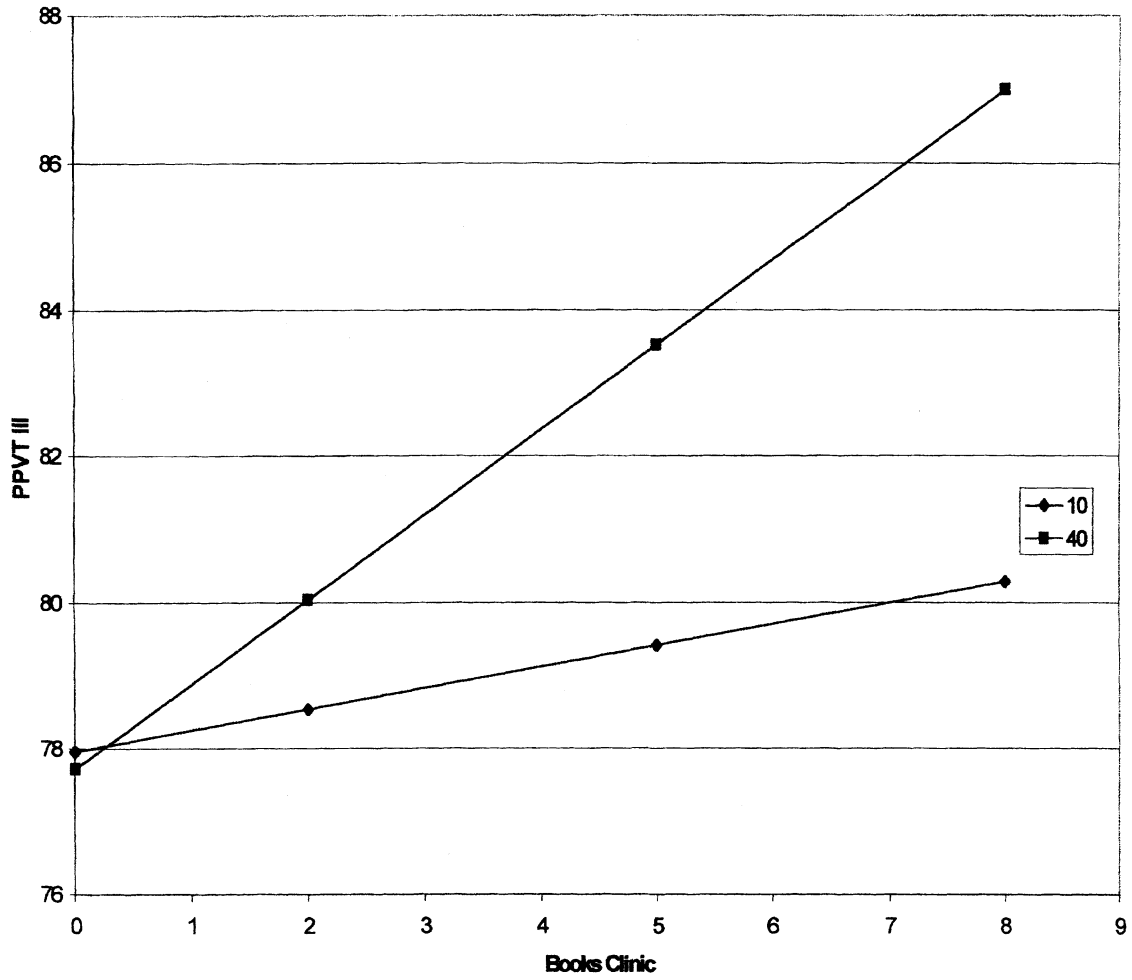

Figure 1. ◆ No. of AGV with 10 books purchased; ■ No. of AGV with 40 books purchased.

Discussion

Our study confirms previous reports on the value of AG on early literacy with a gift of a book by the primary care provider during each WCV. More specifically, it confirms the strong association between this intervention and both receptive and expressive vocabulary in older toddlers first reported by High et al[18] and later by Mendelsohn et al.[22] We found a positive correlation between the receptive and expressive language scores and the total number of children's books in the household, i.e., books given at WCV and books purchased by parents. We speculate that parents may have become motivated to acquire more books through purchase after observing the effects of their book sharing and reading aloud with the books received at WCV. We demonstrated in an earlier study, that primary care physicians perceived an increased parental receptiveness to the literacy AG when given a book, while the parents themselves felt the physician was helpful.[19] This recurring positive interaction at each WCV likely reinforced book sharing, reading, and, consequently, language development as shown by the language scores in this current study. In contrast, a study conducted in an emergency department with a single contact promoting literacy demonstrated no significant change in reading regardless of whether a brochure alone was given or a book was given with the brochure promoting literacy.[24]

Our results demonstrate the "dose effect" of both early literacy

AG at WCV and the books acquired and bought by parents on the expressive and receptive language scores of 3-year-olds. It has been reported that teaching parents specific techniques in sharing books with their toddlers can increase the child's language development. To this end we facilitated and ensured the delivery of age-appropriate techniques of book sharing/reading and the review of the child's response at different ages with the mother by physicians' use of the printed information on each book wrap before handing out the book. We felt this step enhanced the physicians' consistency in providing AG on literacy and, consequently, may have enhanced not only the parents' motivation to read to their child but also the quality of their literacy interaction. As observed by Teale,[25] the quality of early literacy experiences affects the child's ability to profit from formal reading instructions once in school.

Direct observational studies in the home show children are more expressive during book sharing with parents, while the parents are more likely to "teach" or label objects during reading sessions.[12] Wells[12] found that approximately 5% of daily speech in a sample of 24-month-olds occurred during story time. All of our families reported reading to their children at home and a majority of those attending daycare were also exposed to reading. Most of our families (85%) could name the child's favorite book, often naming a book received from the physician. The recollection of the title of the child's favorite book may be a reflection of the frequency with which book sharing occurred. There is significant published evidence that clinic-based literacy intervention is effective in increasing child-centered literacy orientation (CCLO).[13-18] Fifty-eight percent of our families reported reading as an activity most enjoyed doing together. This CCLO activity is slightly higher than that observed by High et al,[17] who found that only 38% exhibited CCLO. The rhythmic patterning and repetition of reading aloud serve as memory aids for young children, enhancing their vocabulary.[8] Our study shows no significant difference in language testing between families reporting book sharing as a favorite activity and children whose families did not report this activity.

Previous literature on the importance of reading to the very young is substantial[26-30] and most early childhood professionals realize the value of introducing books early. Allison and Watson[31] supported the idea of reading to children as early as 0–3 months old as they found that the earlier parents began reading to their child, the higher the child's emergent reading level was at the end of kindergarten. In the past, the mechanics of actual implementation of book sharing in early infancy had stood in the way of frequent and early book experiences.[32] We believe the ROR program started at 2 months old provides an excellent opportunity for physicians as childhood professionals to encourage book sharing early on.

According to the United States Department of Education, children in the United States who live near or below the poverty line have lower reading scores than their peers.[33] African-American children in the United States are disproportionately poor. This population has been shown to be poorly prepared for kindergarten lacking the vocabulary and sentence structure crucial to learning and success in school.[34] In these children, the need for assessment instruments that are not culturally biased is critical. Washington and Craig,[23] using the PPVT-III, found the instrument an informative and appropriate tool for assessment of receptive vocabulary of at-risk African-American preschoolers. The receptive language scores of our African-American participants were approximately 1 standard deviation lower than the scores reported by Washington and Craig[23] for children of similar ethnicity. However, the children in Washington's study were older (47–57 months, mean 51 months of age) and, therefore, had been exposed to learning experiences in preschool. Furthermore, 35% were in the middle-income bracket. In our study, children were younger, the majority (89%) were at or below the poverty line and had not been exposed to formal learning experiences such as Head Start or preschool programs. These variables may account for the difference in language scores of our study participants and those in the study of Washington and Craig.[23] We plan to test the language skills of our study participants at 4–5 years of age and compare the results to their earlier outcome scores and to those of Washington and Craig.

Our clinic serves a predominantly African-American impoverished population. Despite the small percentage of white children in our study, they did significantly better on expressive language testing than African-American children.

Our study is the first to quantify the number of WCV with AG with a tool to promote early literacy (the number of books received by the child) and the number of books purchased by

families and their positive effects on both expressive and receptive language scores. Our findings underscore the important role played by primary care providers who see patients repeatedly for well-child visits during the early formative years of language development. They can dispense information on book sharing with infants and teach the parents the importance of reading to the very young.

We did not have controls since all of our children under 5 years old were exposed to the early literacy program. The absence of a control group and the small sample size are limitations of our study. However, within this sample of children we studied, we did find that given that for each child the number of books purchased was the same, their receptive and expressive scores were higher the more WCV attended with AG and a book given.

The results of our study confirm the findings of High et al[18] and Mendelsohn et al[22] that early literacy intervention increased the expressive and receptive language scores of preschool children. It remains to be seen whether the positive effects of this intervention will translate into better school performance and reading abilities in the older child.

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