

The Effect of a Literacy Training Program on Family Medicine Residents

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Background and Objectives: *Pediatric literacy promotion programs carried out in the primary care setting, such as Reach Out and Read (ROR), have been associated with improved language skills for preschool children. Primary care physicians have frequent contact with young families and may be well situated for a literacy promotion program for both children and adults. We examined whether introducing ROR and an adult literacy intervention improves family medicine residents' literacy knowledge, attitudes, and practices. Methods:* We conducted a single group pretest/posttest evaluation design study of residents in a family medicine residency program serving low-income families. Residents completed self-administered questionnaires assessing literacy knowledge, attitudes, and practice. Then, through educational conferences, precepting, and ROR, residents were trained to assess and counsel patients about literacy. The same questionnaire was readministered 8 months later. **Results:** All 24 (100%) residents completed both the pre- and post-intervention questionnaires. Literacy knowledge mean scores increased from 74.5% to 83.1%. After the intervention, residents reported a greater sense of comfort in counseling about childhood and adult literacy. After the intervention, a greater proportion of residents reported usually or always asking about literacy milestones (30.2% to 79.2%) and parent-child reading (65.2% to 97.8%) during well-child visits. **Conclusions:** A family literacy promotion program improved family medicine residents' self-reported literacy knowledge, attitudes, and practices. Such interventions can be incorporated into the education of family medicine residents with meaningful results.

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Low literacy is a common problem among both children and adults. Thirty-five percent of children who enter kindergarten lack language skills that are prerequisites of literacy acquisition.¹ Children living in poverty bear a disproportionate burden of language delay and reading disability.^{2,3} An estimated 44 million American adults, 20% of the population, have poor functional literacy skills.⁴ Poor literacy skills are associated with unemployment, poverty, and high-risk health activities.⁵ Adult low literacy is associated with poor adherence to medical regimens, increased rates of hospitalization, and poor rates of diabetes control.⁶⁻⁹

Children whose parents frequently read to them are more likely to learn to read at grade-appropriate levels,^{4,10,11} but reading to a child at least a few times a week is less common in parents with lower income and

lower education.^{11,12} Parents are more likely to read to their child when their physician encourages them to do so.¹³ Primary care physicians serving low-income families are well positioned to address literacy problems by regularly encouraging reading.

Reach Out and Read (ROR), a reading intervention in primary care clinics, improves literacy activities for low-income children. ROR consists of (1) volunteers in clinic waiting rooms who model reading aloud to young children, (2) physicians giving parents anticipatory guidance about reading to young children, and (3) physicians giving the child a new book during each well-child visit between the ages of 6 months and 5 years. After involvement with ROR, parents have 4 to 10 times the odds of reading books with their children,^{13,14} and children show clinically improved expressive and receptive language skills, important prerequisites for learning to read.¹⁵⁻¹⁷

Hazzard et al studied pediatric residents before and after a ROR-like literacy intervention and found a trend toward increased literacy assessment of children,¹⁸ yet no prior study has assessed the effect of an educational

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intervention focused on teaching residents to counsel adults and children about literacy. We hypothesized that an educational intervention would improve residents' knowledge, attitudes, and practice concerning early childhood and adult literacy.

Methods

We performed a single group pretest/posttest evaluation of an educational intervention, using a repeated measures design in which family medicine residents were tested for knowledge, attitudes, and behaviors about child and adult literacy before and after literacy training. Over a 1-month period, using educational resources from the ROR national office,¹⁹ one investigator and one community member taught a childhood and adult literacy curriculum. Residents' success in adopting the literacy curriculum to their practice was assessed through a comparison of their pretest and posttest scores on a confidential, self-administered questionnaire.

Setting

The Franklin Square Family Health Center (FHC) serves as a primary care health center in Baltimore for 10,000 patients with 27,000 visits annually. There are approximately 275 well-child visits per month by children in the target age range of ROR (6 months to 5 years). The children seen in the FHC are 58% Caucasian, 28% African American, and 3% Latino/Hispanic; 67% are insured through Medicaid or Medicaid HMO and 15% are uninsured. In Baltimore County, where the clinic is located, low literacy is highly prevalent. Up to 30% of adults read below a ninth-grade level.²⁰

Eight family medicine attending physicians, three pediatric attending physicians, and 24 family medicine resident physicians see patients for health maintenance and acute care visits at the FHC. The FHC is operated by the Department of Family Practice, which has an affiliation with the University of Maryland Medical School. The MedStar Institute Institutional Review Board (Baltimore) granted approval for the study. Each resident gave written consent prior to participation in this study.

Instrument

To measure residents' knowledge, attitudes, and practices, we adapted an instrument used by Hazzard et al. This instrument was previously validated by experts in pediatric literacy and found to be reliable in a previous study of pediatric residents.¹⁸ The instrument surveys knowledge of literacy counseling, attitudes toward literacy assessment and counseling during health maintenance visits, exposure to previous literacy training, literacy assessment and counseling behaviors during health maintenance visits, and perceived barriers to these behaviors. We added five knowledge questions, three attitude questions, and two practice questions to

also focus on adult literacy. We pilot tested all questions with faculty at the FHC, leading to changes on two questions.

Intervention

After collecting baseline data, one investigator trained all residents and attending physicians in literacy assessment and guidance, using didactic sessions, role-playing, and peer feedback, during one grand rounds and two noon conferences. Additionally, a volunteer trainer from a local adult literacy organization led one grand rounds. The total time devoted to training was 4 hours.

Childhood literacy training included role-modeling techniques in teaching parents developmentally appropriate literacy activities for each age group and demonstrating such activities in the office visit through the use of a new, developmentally appropriate book. One investigator trained the residents to use the child's book during the well-child visit both to perform the neurodevelopmental exam (ie, watching a 1-year-old point at a named object) and to observe the parent-child interaction (ie, observing a parent watch her 18-month-old child's glee at holding the book and turning the pages). Residents were advised that adding the literacy component may increase the quality and quantity of the information gathered.

Adult literacy training consisted of role-playing techniques in nonjudgmental information-gathering and counseling skills. For example, residents were taught statements like, "Many people have trouble understanding their physician's instructions. Does this ever happen to you?" and "Instructions for immunizations are often hard to read. Do you ever have trouble reading them?" Clinicians were encouraged to give bookmarks with the name and address of a free, local adult literacy organization. The bookmarks were also with the child's book and in the waiting room, exam rooms, and bathrooms.

Volunteers spent most of their time reading to children in the waiting room. Using public librarians as trainers, each volunteer received training in the mission of ROR, child development, and advice on reading aloud.

Assessment

Eight to 10 months after the literacy educational intervention, each resident took a post-intervention survey that was identical to the pre-intervention survey. The 8–10 month interval was chosen to allow short-term changes to extinguish.

Data Analysis

We calculated a composite knowledge score (percent correct of the knowledge questions) and the composite attitude score, which was calculated from 5-point

Likert scale items; higher scores represent more literacy-facilitative attitudes. Practice assessment was based on two questions: the frequency with which residents (1) asked about reading or literacy milestones as a part of their history or developmental assessment and (2) discussed parent-child reading as a part of anticipatory guidance. Residents were asked to answer questions about each of these two items for four children's age groups (less than 12 months, 12–24 months, 2–5 years, and greater than 5 years) using a 5-point Likert scale. We coded the variable into never/rarely/sometimes versus usually/always and calculated the percentage of times that residents reported usually or always performing the literacy-oriented task. Open-ended questions related to barriers to literacy counseling were grouped by category.

Paired *t* tests were used to compare normally distributed variables before and after the intervention. The Wilcoxon signed rank test was used for paired non-parametric data. Logistic regression was used to assess if improvements in practice were associated with exposures, attitudes, or knowledge. Data were analyzed using STATA Windows version 7.0 (College Station, Tex) or Statgraphics Plus version 3 (Manugistics Inc, Rockville, Md).

Results

All 24 (100%) family medicine residents completed both questionnaires. Residents' demographic characteristics are shown in Table 1. Forty-six percent reported reading to a child in the 6 months prior to the intervention; 8% had received training in literacy counseling prior to the intervention used in this study.

Pre-intervention Data

Average knowledge scores by year of residency ranged from 70.6% for first-year residents to 77.3% for second-year residents, with an overall average of 74.5% (Table 2). Residents' knowledge was best in areas related to other streams of development. For example, 96% knew the age a child turns pages in a board book, a skill that depends on knowledge of fine motor skills development as much as language development. Residents' knowledge was poorest in questions about adult literacy.

Regarding attitudes (Table 3), residents reported, on a 5-point Likert scale, that spending time during well-child visits assessing literacy was worthwhile (mean=4.8), and using a book would facilitate the assessment (mean=4.2). Residents reported feeling less comfortable discussing parental literacy than parental use of illicit drugs (mean=2.2). Regarding their practices, residents reported usually/always asking about reading or literacy milestones in 30.2% of well-child visits and discussing parent-child reading 65.2% of the time (Table 4).

Post-intervention Data

Mean knowledge scores increased significantly ($P<.001$) after the intervention from 74.5% to 83.1% (Table 2). The knowledge score improved in 67% of residents. After the intervention, residents reported a greater ($P<.001$) sense of comfort in assessing literacy in preschool and adult patients (Table 3), as well as in counseling about childhood literacy and adult literacy. The composite attitude scores increased from 87 to 93 ($P<.001$).

As noted, residents were exposed to the literacy intervention through attendance at pediatric or family medicine grand rounds on literacy (96%), reading articles about literacy in primary care (74%), and reading to a child during the intervention (52%). In addition, outside of the formal intervention, 52% discussed the topic with an attending, and 13% observed an attending model the intervention. No individual exposure, nor group of exposures, was associated with increased knowledge, increased literacy-oriented attitudes, or increased literacy practice.

Self-reported literacy assessment improved with the intervention (Table 4). "Usually or always" asking about reading or literacy milestones increased from 30.2% to 79.2% ($P<.001$). "Usually or always" asking about parent-child reading increased from 65.2% to 97.8% ($P<.001$). Incorporating literacy into practice improved for 92% of residents, and the increase was significant within each year of residency. Knowledge, exposure, and attitude post-intervention scores or change in scores were not associated with practice outcome.

Table 1

Characteristics of Family Medicine Resident Study Participants at Baseline (n=24)

Characteristic	n (%) or Mean
Gender	
Female	18 (75%)
Male	6 (25%)
Race	
Caucasian	17 (71%)
African American	1 (4%)
Asian	6 (25%)
Age	30.5 years
Year in training	
First	8 (33%)
Second	7 (29%)
Third	9 (38%)
Had read to child of his/her own in prior 6 months	5 (21%)
Had read to a child in prior 6 months	11 (46%)
Had literacy training prior to the intervention	2 (8%)

Table 2
Family Medicine Residents' Knowledge
of Preschool and Adult Literacy

	Mean % Correct (SD) *		P Value
	Before Intervention	After Intervention	
All residents (n=24)	74.5(10.5)	83.1 (8.9)	<0.001
First-year residents (n=8)	70.6(10.4)	77.9 (9.3)	0.13
Second-year residents (n=7)	77.3 (7.1)	84.0 (8.1)	0.04
Third-year residents (n=9)	75.8(12.6)	86.9 (7.7)	0.01

SD—standard deviation

* Data were compared using two-sided paired *t* tests.

The residents reported that their biggest barriers to literacy assessment and counseling in children were time (67%) and knowledge (8%). In adults, the biggest barriers were time (54%); trying to avoid an uncomfortable, awkward, or embarrassing situation (29%); knowledge (17%); and inexperience (13%).

Discussion

Our data show that introducing a clinic-based ROR and an adult literacy intervention improves family medicine residents' self-reported knowledge, attitudes, and

practice for literacy assessment of both children and adults. Our findings extend prior research demonstrating the utility of counseling families about early childhood literacy activities.¹⁴⁻¹⁸ The increasing evidence of the role of adult literacy on childhood health, combined with the unique role of the family physician to care for the whole family, argue for the importance of both aspects of the intervention.^{22,23}

Our finding builds on and contrasts with a previous study that failed to detect a statistically significant difference in pediatric residents, despite using a similar intervention and similar instrument.¹⁸ Perhaps our including strategies for both children and adults reinforced the importance of literacy.

When asked about barriers to literacy assessment and counseling in adults, 30% of residents reported being uncomfortable or feared offending the parent; no resident mentioned this as a barrier to assessing children. Recognizing that a parent's literacy is associated with a child's literacy activities¹⁴ as well as parents' perception of how sick a child is,²² adult literacy is an important childhood issue. Since parents of young children may not have their own regular source of health care but regularly interact with their child's physician, the only person counseling adults on health-related topics may be the child's physician.²³ The residents' discomfort may represent an important educational barrier. Not surprisingly, time was the most frequently reported

Table 3

Family Medicine Residents' Attitudes Toward Assessing and Counseling About Literacy in Well-child Visits

	Mean (SD)*		P Value	Range
	Before Intervention	After Intervention		
"A child's primary health care provider has a unique opportunity to encourage behaviors that improve a child's chances to succeed in reading."	4.8 (0.4)	4.8 (0.5)	1.0	1-5**
"Giving away a book during the well-child visit would facilitate talking with parents about literacy."	4.2 (1.1)	4.7 (0.5)	.03	1-5
"I am more comfortable asking about literacy than illicit drug use."	2.2 (1.1)	2.5 (1.2)	.46	1-5
"I feel comfortable assessing literacy in my adult patients and parents of my pediatric patients."	2.3 (0.6)	3.0 (0.7)	.001	1-5
"I feel comfortable assessing literacy in my preschool-age patients."	2.6 (1.0)	3.7 (0.7)	<.001	1-5
"I feel comfortable giving literacy-related counseling to my adult patients."	2.5 (0.6)	3.4 (0.6)	<.001	1-5
"I feel comfortable giving literacy-related counseling to parents concerning their young children."	3.3 (0.9)	4.0 (0.7)	<.001	1-5
Overall literacy-oriented attitude score	87 (5)	93 (8)	<.001	23-115

SD—standard deviation

* Data compared using two-sided paired *t* tests

** 1=strongly disagree, 5=strongly agree. A higher number indicates a more literacy-oriented attitude.

Table 4

Family Medicine Residents' Practice of Literacy-related Tasks in Well-child Visits

	% of Times Answered "Usually or Always" (SD)*		P Value
	Before Intervention	After Intervention	
Frequency of asking about reading or literacy milestones in a well-child visit	30.2 (37.6)	79.2 (32.7)	<.001
Frequency of discussing parent-child reading in a well-child visit	65.2 (35.9)	97.8 (7.2)	<.001

SD—standard deviation

* Data compared using Wilcoxon signed rank test

barrier. Clinicians who have incorporated ROR into their practice, however, have anecdotally reported that it improves the neuro-developmental exam and observation of the parent-child relationship without lengthening the office visit. They also report improved bonding among clinician, child, and parent.²⁴

Limitations

There are several limitations to our study. First, the study was conducted at a single site and had a small sample size. Second, we had no control group. Thus, we cannot determine whether observed improvements were related to a secular trend or to the natural growth that educators expect of residents throughout their training. Third, we cannot determine which components of our intervention—didactic sessions, role-modeling, precepting—were most important in changing behaviors. Fourth, we did not collect data on the dose of the intervention (eg, number of residents who attended the noon conferences, number of books each resident gave to a child, number of well-child visits within the target age range, number of families each resident counseled). Finally, our outcomes were based on physician self-report. They may have been providing socially acceptable answers, although this would not explain observed improvements over time. While a Hawthorne effect is possible, we attempted to minimize this threat to validity by referring to our study as "Improving Parent and Child Activities in the Family Health Center," rather than giving it a literacy-based name. Other studies that have examined language and literacy outcomes in children, however, find that when clinicians claim to have succeeded in counseling, improvement occurs.²⁴

Conclusions

Encouraging families to read to young children is important for school readiness, for parental satisfaction, and for many aspects of a child's development.^{22,25-27} A limited intervention, such as that described here, can be implemented with free educational resources from the ROR national office (www.reachoutandread.org), voluntary teaching from community literacy organizations, and fiscal support for the children's books.

Our results are important because the intervention can be easily incorporated into family medicine residents' education. Family physicians are well situated to intervene simultaneously on behalf of children and adults. ROR may be the only well-child intervention that has been shown to affect parents' attitudes and behaviors, as well as a child's language development.²⁴ Our data demonstrate that after a limited ROR intervention, residents are capable and willing to incorporate literacy advocacy of both children and adults into well-child care.

Future studies should evaluate primary care-based literacy programs using randomized controlled trials. Such future studies should collect outcome data from parents, as well as from physicians.

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REFERENCES

1. Carnegie Foundation. Ready to learn: a mandate for the nation. New York: Carnegie Foundation, 1991.
2. National Center for Education Statistics. The condition of education. Washington, DC: US Department of Education, Office of Educational Research and Improvement, 1996.
3. Anastasiou N, Hanes ML, Hanes M. Language and reading strategies for poverty children. Baltimore: University Park Press, 1982.
4. Kirsch I, Jungeblut A, Jemkins L, Kolstat A. Adult literacy in America: a first look at the results of the National Adult Literacy Survey. Washington, DC: National Center for Education, US Department of Education, 1993.
5. Berlin G, Sum A. Toward a more perfect union: basic skills, poor families, and our economic future. New York: Ford Foundation, Project on Social Welfare and the American Future, 1988.
6. Weiss BD, Hart G, McGee DL, D'Estelle S. Health status of illiterate adults: relation between literacy and health status among persons with low literacy skills. *J Am Board Fam Pract* 1992;5(3):257-64.
7. Kalichman SC, Ramachandran B, Catz S. Adherence to combination antiretroviral therapies in HIV patients of low health literacy. *J Gen Intern Med* 1999;14(5):267-73.

8. Baker DW, Parker RM, Williams MV, Clark WS. Health literacy and the risk of hospital admission. *J Gen Intern Med* 1998;13(12):791-8.
9. Schillinger D, Grumbach K, Piette J, et al. Association of health literacy with diabetes outcomes. *JAMA* 2002;288(4):475-82.
10. Wells G. Preschool literacy-related activities and success in school. In: Olsen DR, Torrance N, Hilard A, eds. *Literacy, language, and learning* New York: Cambridge University Press, 1985:229-55.
11. Anderson A, Stokes S. Social and institutional influences on the development and practice of literacy. In: Goelman H, Oberg A, Smith F, eds. *Awakening to literacy*. Exeter, NH: Heinemann Educational Books Ltd, 1984.
12. Feitelson D, Goldstein Z. Patterns of book ownership and reading to young children in Israeli school-oriented and nonschool-oriented families. *Reading Teacher* 1986;39:924-30.
13. Golova N, Alario AJ, Vivier PM, Rodriguez M, High PC. Literacy promotion for Hispanic families in a primary care setting: a randomized, controlled trial. *Pediatrics* 1999;103:993-7.
14. High P, Hopmann M, LaGasse L, Linn H. Evaluation of a clinic-based program to promote book sharing and bedtime routines among low-income families with young children. *Arch Pediatr Adolesc Med* 1998;152:459-65.
15. Mendelsohn AL, Mogilner LN, Dreyer BP, et al. The impact of a clinic-based literacy intervention on language development in inner-city preschool children. *Pediatrics* 2001;107:130-4.
16. High PC, LaGasse L, Becker S, Ahlgren I, Gardner A. Literacy promotion in primary care pediatrics: can we make a difference? *Pediatrics* 2000;105(suppl):927-34.
17. Sharif I, Reiber S, Ozuah PO. Exposure to Reach Out and Read and vocabulary outcomes in inner-city preschoolers. *J Natl Med Assoc* 2002;94:171-7.
18. Hazzard A, Dabrow S, Celano M, McFadden-Garden T, Melhado T. Training residents in pediatric literacy: impact on knowledge, attitudes, and practice. *Ambulatory Child Health* 2000;6:237-46.
19. www.reachoutandread.org. Accessed June 10, 2003.
20. Adult Education and Family Literacy Plan, 2001–2004, Maryland State Department of Education and Family Literacy FY 2000–2004, Health Profile and Select Demographics for Baltimore County, Maryland. Baltimore: Baltimore County Department of Health, 1997.
21. Grus CL, Lopez-Hernandez C, Delamater A, et al. Parental self-efficacy and morbidity in pediatric asthma. *J Asthma* 2001;38(1):99-106.
22. Moon RY, Cheng TL, Patel KM, Baumhaft K, Scheidt PC. Parental literacy level and understanding of medical information. *Pediatrics* 1998;102(2):25.
23. Berman S. Caring for parents versus caring for children. Is there a difference? *Arch Pediatr Adolesc Med* 2003;157(3):221-2.
24. Klass P. Pediatrics by the book: pediatricians and literacy promotion. *Pediatrics* 2002;110(5):989-95.
25. Whitehurst G, Arnold D, Epstein J, Angell M, Fischel J. A picture book reading intervention in day care and home for children from low-income families. *Dev Psychol* 1994;30:679-89.
26. Heath SB, Branscombe A. The book as narrative prop in language acquisition. In: Schiefflin B, Gilmore P, eds. *The acquisition of literacy: ethnographic perspectives*. Norwood, NJ: Ablex, 1986:16-34.
27. Shore R. *Rethinking the brain: new insights into early development*. New York: Families and Work Institute, 1997 and *Arch Pediatr Adolesc Med* 1998;152:255-62.