Original Article

Attendance at Well-Child Visits After Reach Out and Read

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Abstract

Attendance at well-child visits (WCVs) is a *sine qua non* of preventive care. We hypothesized that Reach Out and Read (ROR) would be associated with better WCV attendance. Parents of children 76 to 72 months at 8 clinics who did not yet have ROR reported how many WCVs their child had attended in the previous year; separate samples at the same clinics were interviewed 16 months after the ROR program was instituted. Comparing 267 parents before ROR and 254 after, the percentage who had attended the minimum number of WCVs required by the American Academy of Pediatrics periodicity schedule rose from 67.4% (180/267) to 78.3% (199/254; $P < .01$). This difference remained significant after controlling for multiple potential confounding factors (estimated odds ratio = 2.1, 95% confidence interval = 1.3-3.5). The largest differences were among Latino children and children of less-educated parents. Programs to enhance early literacy may increase attendance at WCVs among at-risk families.

Keywords

well-child care adherence, Reach Out and Read, literacy promotion, primary care

Introduction

Well-child visits (WCVs) are the cornerstone of pediatric health promotion.[1,2] Bright Futures, the American Academy of Pediatrics' (AAP) guidelines for health supervision, calls for 9 office visits from age 2 weeks through 24 months, followed by annual visits thereafter through age 21 (excluding ages 7 and 9).[3] Multiple factors affect families' adherence to the recommended schedule, including insurance coverage, transportation barriers, and waiting times, and whether parents receive the reassurance and information they desire.[4-6] Adherence is lower among children living in poverty.[7,8] Thus, families who stand to benefit most from immunizations, developmental screening, and anticipatory guidance may be least likely to receive the full complement of health promotion services. Interventions aimed at increasing attendance through reminders and case management have shown modest effects, often at considerable cost.[9,10]

Qualitative studies indicate that parents make choices about whether or not to attend WCVs, based on their expectations of how helpful the visits are likely to be.[11,12] To the extent that such parental judgments play a role, innovations that enhance the value of pediatric health promotion, as perceived by parents, ought to boost attendance at WCVs. Clinical experience suggests that Reach Out and Read (ROR), a program to promote reading aloud by parents, may be one such innovation.

The ROR model combines 3 interventions: anticipatory guidance about reading aloud, the provision of a free picture book at each WCV from 6 months through 5 years of age, and literacy-enriched waiting rooms, typically with volunteers reading aloud to the children. ROR is currently a component of WCVs in more than 6000 clinics and offices in the United States. Pediatric and Family Medicine practices apply to the ROR National Center to be recognized as ROR sites, and receive provider training and assistance with obtaining the new, developmentally and culturally appropriate picture books used in the program. The efficacy of the approach is supported by 15 peer-reviewed studies, documenting associations between ROR and positive changes in parental attitudes toward reading aloud, frequency of reading aloud, and child language development.[13]

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The goal of the present study was to see if adding ROR to pediatric practices would be associated with increased parent-reported WCV attendance. To do this, we performed a secondary analysis of data from a multisite national study of parent literacy-related behaviors before and after initiation of ROR.[14] We hypothesized that the establishment of a ROR program would be associated with an increase in the number of parentally reported WCVs, and in the number of children for whom parent-reported attendance at WCVs met or exceeded AAP guidelines for number of visits.

Methods

Eight pediatric clinics in 4 states—California, Ohio, Louisiana, and New York—were included in the dataset for the present analysis. The sites were not selected systematically; participation was open to any site that had successfully applied to participate in ROR but had not yet implemented the program.

At each clinic, a convenience sample of parents was interviewed prior to the implementation of the ROR program. The parents in these samples constituted the comparison ("before") group. An average of 16 months after the ROR program was instituted in each clinic, a second convenience sample of parents was interviewed at the same clinic, using the same survey. The parents in these samples constituted the intervention ("after") group. The "before" data were collected between July 1998 and February 2001, and the "after" data were collected between June 2000 and January 2002. The dates overlap because programs at different sites started in different years.

Subjects in the comparison (before) groups received standard care. Those in the intervention (after) groups received standard care augmented by the ROR interventions—anticipatory guidance, developmentally and culturally appropriate books, and volunteer readers—as provided by the individual sites. All of the sites had been approved by the ROR National Center, and the clinicians and office staffs had been trained in the ROR intervention. However, no attempt was made to standardize the intervention for the purposes of this study or to monitor the intervention during the study.

Inclusion criteria were child age between 6 months and 72 months, coming for a health supervision visit (WCV), with parents conversant in either English or Spanish. Children were excluded if they were not accompanied by their primary care giver, or had severe developmental disabilities by parent report. If more than one child in a family was present, the youngest child was taken as the subject.

Survey Procedure

Parents were informed that their participation in the study was entirely optional and unrelated to their child's medical care, and that there was no potential threat to privacy because no personal identifying information would be asked or recorded. As the surveys did not contain any sensitive questions, the potential for causing harm was felt to be minimal. The study protocol was approved by the institutional review boards associated with each clinic.

The survey instrument was brief, consisting of 15 verbally administered questions. It was administered by trained assistants in the clinic waiting rooms or examination rooms. The interviewers were unaware of the hypothesis that ROR would be related to WCVs. The first question asked parents to supply the "number of well-child visits to this center in the last 12 months (not counting today)." A similar question has been used in a published study of primary care practices.[15] Several questions were asked about parental attitudes and practices related to reading aloud. Parents were also asked to identify their ethnicity, the languages spoken in the home, and the highest grade in school they completed.

Analyses

The dependent variable was whether the number of WCVs attended in the preceding year, according to parental report, met or exceeded the minimum number recommended by the AAP guidelines. In calculating the minimum recommended number of visits, a 2-month grace period was factored in, such that a visit was not considered missed until the child was at least 2 months beyond the age identified with that visit. For example, at 7 months of age, a child needed to have completed at least 3 WCVs prior to the current visit (at 2 weeks, 2 months, and 4 months; the 6-month visit was not counted in this calculation because the grace period for that visit extended to 8 months). Similarly, at 13 months of age, the child would need to have completed 4 visits within the past year (at 2, 4, 6, and 9 months; the 2-week visit was not counted in this calculation because it could have been completed more than 1 year previously, and the 12-month visit was not counted because the grace period for that visit extended to 14 months.) After 36 months of age, a child was expected to have had at least one WCV within the past 14 months.

Subjects were pooled across the 8 study sites creating 2 groups, the comparison (before) group and the intervention (after) group. Two-tailed independent-samples t tests were used for continuous variables such as child age and number of WCVs; cross-tabulations and χ^2 tests were used for categorical variables such as gender and whether or not the minimum recommended number of WCVs had been attended. Associations were considered significant with P values of .05 or less; odds ratios (ORs) and 95% confidence intervals (CIs) were calculated.

Table 1. Demographic Characteristics of the Intervention and Control Groups.

Characteristics	Control (Before), N = 267	Intervention (After), N = 254	*P*
Female (N = 263, 253)[a]	55.5%	52.2%	.5
Mean age (months)[b]	34.9 ± 18.4	33.4 ± 18.5	.3
Age levels			.8
<12 months	12.7%	12.6%	
12 to < 36 months	40.4%	43.3%	
36 to 72 months	46.8%	44.1%	
Birth weight ≥2500 g (N = 256, 240)[a]	86.7%	82.1%	.2
Ethnicity			.2
White	20.6%	14.6%	
African American	22.1%	24.0%	
Latino	52.8%	54.3%	
Other	4.5%	7.1%	
Respondent is child's parent	97.4%	94.5%	.1
Respondents' mean years of education[b] (N = 262, 242)[a]	11.1 ± 3.6	11.0 ± 3.2	.9
Respondent education ≥ high school (N = 262, 242)[a]	57.6%	60.7%	.5

[a]Sample sizes for control and intervention groups, respectively, when less than 267 and 254; reductions in sample size are due to missing data.
[b]Mean ± standard deviation.

Table 2. Association Between ROR Program and Recommended Number of WCV: Unadjusted and Adjusted Odds Ratios.

	Odds Ratio	95% Confidence Interval	*P*
Unadjusted odds ratio	1.8	1.18-2.59	.006
Adjusted odds ratio[a]	2.1	1.33-3.5	.002

Abbreviations: ROR, Reach Out and Read; WCV, well-child visit.
[a]Adjusted for child age, gender, ethnicity (in 3 groups), parent education level, and study site.

In order to control for potential confounding factors, the odds of the parent reporting at least the minimum recommended number of WCVs were estimated using multiple logistic regression. In these analyses, separate dichotomous (ie, "yes/no") variables were entered for each of 3 age ranges (6 to <12 months, 12 to <36 months, and 36 to 72 months) for each of 3 main ethnic categories (African American, Latino, and white), and for each of the 8 sites. Dichotomous variables were also entered for sex, birth weight over 2500 g, and parental education ≥12 years (high school graduation). The variable representing membership in either the intervention or control group was entered last.

Finally, in order to determine whether the association between ROR and adequacy of parent-reported WCVs varied by family characteristics, the main before-versus-after analysis was repeated after stratification by ethnicity and parental education. All analyses were done using SPSS 13.

Results

Data were available for 521 subjects, 267 in the comparison (before ROR) group and 254 in the intervention (after ROR) group. The numbers of subjects from a single site ranged from 34 to 126 (mean 65). The before and after groups were comparable in all respects (Table 1). Data on the number of parent-reported WCVs were not available for a total of 46 subjects (8% of the total), presumably because of interviewer error. Parents in the intervention group reported significantly more positive attitudes toward reading aloud, greater frequency of reading aloud, and greater picture book ownership, suggesting that the interventions were indeed being delivered (documentation of these outcomes for the larger study has been published[13]; data for the subgroup featured in the study are available on request).

The mean number of reported WCVs was significantly higher in the intervention group versus the control group (3.0 ± standard deviation 2.0 vs 2.50 ± 2.3, respectively, $P = .009$). Similarly, the percentage reported to have had the minimum recommended number of WCVs, according to the criteria described above, was higher in the intervention group versus the control group (78.3% vs 67.4%, $P = .006$; also see Table 2). The percentage of parents reporting the minimum recommended number of WCVs was higher in the intervention

(after ROR) versus control (before ROR) at 6 out of 8 clinic sites, although the difference was statistically significant at only 3 sites.

Results of the multivariate analyses agreed substantially with the unadjusted analyses. After controlling for multiple potential confounding variables, the intervention was associated with a 2-fold increased odds of parents reporting having attended at least the recommended number of WCVs in the past year (Table 2).

Analyses stratified by ethnicity showed significant differences in the percentage with adequate reported WCVs, in the predicted direction, among Latinos (81.9% intervention vs 64.5% control, $P = .001$, OR = 2.5, 95% CI = 1.4-4.3; n = 279), but not among African Americans (83.6% vs 72.9%, $P = .2$, OR = 2.0, 95% CI = 0.8-4.6; n = 120); nor whites (59.5% intervention vs 69.1% controls, $P = .3$, OR = 0.7, 95% CI = 0.3-1.6; n = 92).

Analyses stratified by parental education (high school graduates or not) showed significant differences in the predicted direction among parents who had not completed through 12th grade (84.2% vs 65.8%, $P = .003$, OR = 2.8, 95% CI = 1.4-5.5; n = 206). Among parents who had completed through 12th grade or beyond, no association between ROR and increased reported WCVs was found (74.1% intervention vs 68.9% control, $P = .3$, OR = 1.3, 95% CI = 0.8-2.1; n = 298).

Discussion

This study demonstrates a statistically significant association between the implementation of ROR and an increase in attendance at WCVs, as reported by parents. After controlling for potential confounding factors, we found a 2-fold increase in the odds of parents reporting having attended at least the recommended number of WCVs. The association between ROR and parent-reported WCV attendance was strongest among parents who identified themselves as Latino and among parents who had not completed high school. These are the same groups who appear to respond with the largest increase in reading aloud after exposure to ROR.[13]

These results are especially encouraging considering that ROR was not designed to boost WCV attendance. By comparison, a system of automated reminder calls resulted in a 21% increase in immunization completion rates, presumably by increasing attendance at WCVs, at a cost of $79 per each additional fully immunized child.[16] Using a different approach, a case management system resulted in a 20% increase in immunization completion, at a cost of $474 per each additional child fully immunized.[17] Although a direct cost-benefit comparison is beyond the scope of this article, it is worth noting that the average cost per child for 1 year of ROR is approximately $15.

There is a plausible mechanism for the observed association. According to a national survey, parents rank information about how to promote their children's learning near the top of their list of priorities for preventive pediatric care.[18] The ROR intervention, which is aimed at increasing reading aloud by parents, appeals to parents' desire for concrete suggestions to improve their children's educational prospects. Thus, ROR may enhance the value of an aspect of pediatric preventive care that is particularly meaningful to parents. To the extent that parents judge visits to be more valuable to them, they may be more likely to make the effort necessary to attend regularly. Consistent with this speculation is the finding from a national parent survey of an association between higher WCV quality (which is plausibly related to parent-perceived value) and lower likelihood of having missed needed care.[2]

Limitations

Our findings are subject to a number of limitations. The present study relies on a secondary analysis of a dataset designed to answer questions about parental attitudes and behaviors related to reading aloud. Consequently, the dependent variable relies on a single question requiring parents to recall of the number of WCVs their child attended in the last 12 months. Because data were collected anonymously, we had no way to confirm these reports using medical records or insurance claims. It is possible that social desirability may have induced parents to inflate the number of WCVs they reported.[19] Indeed, 67.4% of parents in our control group (before ROR) reported having had at least the recommended number of WCVs, a figure comparable to some previously published findings, but higher than others.[4,5,7,8] However, it seems unlikely that social desirability in the matter of WCV attendance would play a greater role in our intervention group than in our control group, since the intervention was focused on reading aloud, and not on WCV attendance. Therefore, inflation on the basis of social desirability probably does not account for the observed increase.

Because of the reliance on parental recall, we cannot exclude the possibility that the intervention caused parents to remember having attended more visits, even though perhaps the objective facts were otherwise. Even if this were the explanation, the finding that WCVs that include ROR are more memorable to parents would be noteworthy. Because our study employs a historical control group, there is the possibility that secular changes in WCV attendance could account for the observed before-versus-after differences. Changes in state insurance coverage for low-income children

might be particularly important. However, we are not aware of any nationwide trend toward increased WCV attendance. No single event could account for the observed difference, because the ROR program was put in place on different dates in different locations, such that the "before" in some sites overlapped in time with the "after" in others. Although the sample was drawn from a geographically diverse area, no attempt was made to recruit a nationally representative sample; therefore, the ability to generalize from our findings is limited. We cannot directly translate our outcome measure, WCV attendance, into completeness of immunization, although it stands to reason that increased immunization would follow from an increase in opportunities to immunize.[20]

Implications

Given the limitations noted above, these findings should be regarded as preliminary. Prospective controlled studies should be done, utilizing more objective measures of clinic attendance. The potential contribution of this line of inquiry is substantial. One possible interpretation is that an intervention intended to enhance the perceived value of pediatric preventive care may do as much to boost attendance at WCVs as interventions targeted at attendance per se. Future research should be aimed at discovering and strengthening those aspects of primary care that parents value most. There are likely to be payoffs not only in quality of care but in quantity as well.

Author Contributions

All authors contributed to the conceptualization, data collection, and analyses reported; RDN wrote the article, and the other authors reviewed and approved it.

Declaration of Conflicting Interests

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