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Evaluation of a structured test and a parent led method for screening for speech and language problems: prospective population based study

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BMJ 2002;325:1152-4

Abstract

Objective To evaluate two methods for the identifying speech and language problems in preschool children.

Design Prospective population based study.

Setting Inner London.

Participants and methods 37 health visitors were randomly assigned to use a structured screening test (18) or a parent led method (19). Of 623 eligible children aged 30-36 months, the parents of 582 agreed to participate (353 using the structured test and 229 the parent led method).

Main outcome measures Children were assessed by a speech and language therapist blinded to the test result, using the Reynell developmental language scales. Children were classified as having "severe language problems" if the Reynell score was below the third centile for receptive language and as "needing therapy" if the Reynell score was below the seventh centile for receptive or expressive language and clinical opinion.

Results Reference assessments and usable scores were obtained for 458 (97%) of the 474 children screened. 98 (21%) children had severe language problems and 131 (29%) needed therapy. The sensitivity and specificity for the structured screening test were 66% (95% confidence interval 53% to 76%) and 89% (85% to 93%) respectively for severe language problems and 54% (43% to 65%) and 90% (85% to 93%) for those needing therapy. The sensitivity and specificity for the parent led method were 56% (40% to 71%) and 85% (78% to 90%) for severe language problems and 58% (44% to 71%) and 90% (83% to 94%) for those needing speech and language therapy.

Conclusions Both approaches failed to detect a substantial proportion of children with severe language problems and led to over-referral for diagnostic assessments. Screening is likely to be an ineffective approach to the management of speech and language problems in preschool children in this population.

Introduction

Estimates of the prevalence of language difficulty in preschool children range from 1% to 19%.¹ Moderate to severe language difficulties in young children, particularly those affecting language comprehension, are predictive of long term problems affecting learning, school achievement, and behaviour.²⁻⁶ For an individual child, the prognosis will depend on the cause of the problem and its responsiveness to intervention.^{7,8}

Most children with severe language difficulties are probably identified before they start school, but many may not be identified until they start formal education. Questions have been raised about the effectiveness of

formal screening, although programmes exist in many developed countries and were common in the United Kingdom until recently.⁹⁻¹² Evidence suggests that parents are good observers of their child's development and that parents' reports may be as good as screening in detecting developmental difficulties.^{13,14} As a result, many child health surveillance programmes in the United Kingdom now give advice about language development and rely on parents to identify children with problems in consultation with health visitors.^{10,15}

We compared the performance of a structured screening test with a method based on parental concerns and health professionals' clinical judgment against a reference assessment of speech and language in preschool children.

Methods

We invited all health visitors working in City and Hackney District, London, to participate in the study, and we randomly allocated those who agreed, in blocks of two, to either the structured screening or the parent led method. We asked the health visitors to invite parents of all children attending for their developmental check at age 2½ years to participate in the study whether or not the child had a previously diagnosed developmental problem.

The structured screening test contained 20 questions covering both expressive and receptive language skills and had been previously validated on the local population.¹⁶ A point was awarded for each question and a score of below 10 was regarded as a fail.

In the parent led method, we asked health visitors to discuss with parents whether they had any concerns about their children's language development. From this discussion and using clinical judgment based on history and observation, health visitors decided whether to refer the child, review the child at a later date, or classify the child as having no difficulties.

The assessment was carried out as part of the routine check, and parents were then asked to see one of two research speech and language therapists, either immediately or at an appointment within two weeks. The speech and language therapists carried out a diagnostic assessment based on the Reynell developmental language scales.¹⁷ Therapists were blinded to the outcome of the health visitor's assessment. Parents were asked not to tell the speech and language therapist the results of the screening assessment.

We classified children scoring less than 30% on the Reynell receptive language scale as having severe language problems and children scoring below 70% in either expressive or receptive language or who, in the opinion of the therapist, would benefit from referral as requiring speech and language therapy.

We calculated sensitivity, specificity, and likelihood ratios for each method for the two diagnostic methods.

This study was originally designed as a cluster randomised controlled trial to compare the performance of the two screening methods. As neither performed adequately compared with the reference, it was decided that no statistical comparison should be made between the two methods.

Results

In all, 18 health visitors were allocated to the structured screening group and 19 to the parent led group. In the structured screening group, 376 children were invited to participate and usable results were obtained for 282 (75%). In the parent led group, 247 children were invited to participate and usable results obtained for 176 (77%).

Of the 458 children who completed the reference assessment, 98 (21%) scored below the third centile and 131 (29%) were judged as "needing therapy." Performance in screening tests and reference assessments with likelihood ratios and 95% confidence intervals is given in tables 1 to 4.

The sensitivity and specificity for the structured screening test were 66% (95% confidence interval 53% to 76%) and 89% (85% to 93%) for children with severe language problems and 54% (43% to 65%) and 90% (85% to 93%) for children needing therapy. When children who scored more than 10/20 whose parents or health visitors were concerned were included in the fail category, the sensitivity increased slightly but the specificity decreased.

The sensitivity and specificity for referral by the parent led method were 56% (40% to 71%) and 85% (78% to 90%) for severe language problems and 58% (44% to 71%) and 90% (83% to 94%) for children needing therapy. We also combined the referral and review categories to reflect those children causing some concern. The resulting sensitivity and specificity were 77% (60% to 88%) and 68% (60% to 75%) for children with severe language problems and 79% (66% to 88%) and 74% (66% to 81%) for children needing therapy.

Analysis of the data including only the 387 (85%) children whose first language was English made virtually no difference to the results. Of these children, 72 (19%) scored below 30% on the Reynell receptive language scale.

Discussion

In the United Kingdom, it has been argued that formal screening for speech and language difficulties in preschool children should be replaced by an approach in which health professionals respond to parental concerns. The effectiveness of this approach has not been assessed previously. The results are disappointing; at least within this deprived inner city population, the approach would fail to identify a substantial proportion of children with serious language problems, while also leading to over-referral of children without difficulties.

Our results do not, however, imply that formal approaches to screening are best. The structured

Table 1 Results for structured screening method and comprehension score on Reynell developmental language scales. Values are numbers of children, unless otherwise stated

Score on screening test*	Reynell score		Total	Likelihood ratio (95% CI)
	Below 3rd centile	Above 3rd centile		
<10	42	23	65	6.22 (4.07 to 9.52)
≥10	22	195	217	0.38 (0.27 to 0.54)
Total	64	218	282	

*A score of 10 or less was regarded as a fail.

Table 2 Number of children needing treatment from the structured screening method*

Score on screening test†	Needs therapy	Does not need treatment	Total	Likelihood ratio (95% CI)
<10	45	20	65	5.39 (3.40 to 8.55)
≥10	38	179	217	0.51 (0.40 to 0.65)
Total	83	199	282	

*Comprehension score on Reynell scale below the seventh centile or if the speech therapist thought therapy was necessary.

†A score of 10 or less was regarded as a fail.

Table 3 Results for parent led screening method and comprehension score on Reynell developmental language scales

Result of screening consultation	Reynell score		Total	Likelihood ratio (95% CI)
	Below 3rd centile	Above 3rd centile		
Refer	19	22	41	3.61 (2.22 to 5.87)
Review	7	23	30	1.27 (0.60 to 2.71)
No concerns	8	97	105	0.34 (0.19 to 0.64)
Total	34	142	176	

Table 4 Results for parent led screening method compared with health visitor's decision whether child needs therapy*

Result of screening consultation	Needs therapy	Does not need therapy	Total	Likelihood ratio (95% CI)
Refer	28	13	41	5.74 (3.25 to 10.14)
Review	10	20	30	1.33 (0.67 to 2.64)
No concerns	10	95	105	0.28 (0.16 to 0.49)
Total	48	128	176	

*Based on a comprehension score on the Reynell scale below the seventh centile or a speech therapist's decision that a child would benefit from therapy.

What is already known on this topic

Moderate to severe language difficulties in young children are predictive of long term problems affecting learning, school achievement, and behaviour

Formal screening tests are widely used, but relying on parents' observations and health professionals' clinical judgment may be more effective in identifying children needing therapy

What this study adds

A commonly used screening test and an approach based on parents' observations and health visitors' judgment fail to identify a substantial proportion of children with serious language problems and lead to the over-referral of children without serious difficulties

screening test performed as poorly as the parent led method. A previous assessment of this test in the same area had reported a higher sensitivity, but in that study only some children whose screen showed no language difficulties could be assessed.¹⁶

Applicability of results

The extent to which these results are applicable to other populations is unclear. The application of estimates of test performance from one population to another depends on the relation between the range of abnormality in the two groups. This is likely to differ between more and less deprived areas. Hackney is a deprived area where many people speak languages other than English. Restriction of the analyses to those children whose first language was English, however, made no difference to the results. The results apply most directly to children in other deprived areas.

A further difficulty is that the low uptake of the developmental check at age 2½ years and attrition mean that we cannot assume our sample is representative of children in the district. Children whose parents were anxious about their language development may have been disproportionately likely to participate, and, similarly, health visitors may have preferentially enrolled children whom they were concerned about, which would accord with the high prevalence of serious language problems. This would have biased the study towards overestimating the performance of the screening tests.

Treating or preventing speech and language difficulties

The rationale for trying to identify children with speech and language difficulties is the belief that early intervention by speech and language therapists can improve outcome. A systematic review found that although there are many studies showing positive effects of interventions for speech and language therapy, the evidence was relatively limited.¹ A recent randomised controlled trial suggested that therapy had little effect, although the trial was criticised because of the small amount of therapy provided to the intervention group.^{18 19} This level of therapy is, however, likely to reflect the amount of therapy available in many NHS facilities in the United Kingdom. The effectiveness of therapy is likely to depend on the specific problem and on the presence of comorbidities and other contributory factors.

Early speech and language difficulties are strongly associated with later adverse outcomes.²⁻⁶ Our results suggest that using formal screening or a parent led approach to identify children with speech and language difficulties is unlikely to be effective. Little consensus about alternative approaches, however, has been reached.

Population based approaches to the promotion of language development are intuitively attractive, particularly in areas with a high prevalence of children with serious problems. In line with this approach, initiatives such as Sure Start in the United Kingdom have resulted in a wide range of innovative community based approaches designed to target speech and language development.²⁰ Unfortunately the evidence base for these proposed interventions is relatively weak. Better evaluation of such interventions should be a matter of priority.

We thank the health visitors, parents, and children who participated; Julian Higgins, who did the randomisation; and Bernard Camilleri, who performed diagnostic assessments on some of the children.

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Funding: The Inner City Research and Development Group of the former North Thames regional office of the NHS Executive. Competing interests: None declared.

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(Accepted 12 June 2002)