

PRACTICE OBSERVED

Practice Research

Screening for hearing loss in childhood: a study of national practice

SARAH STEWART-BROWN, MARY N HASLUM

Abstract

A questionnaire survey of all health districts in England and Wales was carried out at the end of 1984 to document screening programmes for identifying hearing loss in childhood. The response rate was 81.3%. All districts performed distraction testing, all but nine aiming at doing so at 7-9 months of age. All districts tested children's hearing at school, generally before 7 years of age. The number of times that children were screened both before school and at school varied considerably, from one to six times before school and one to six times at school. Few districts collected information that would allow them to make judgments about the efficiency of effectiveness of their screening programmes.

Introduction

Screening schoolchildren for hearing loss has a long history. It dates back to the 1908 Education Act, when routine school medical inspections were introduced for children entering primary school as a method of monitoring morbidity in the population.¹ In that era most children identified as deaf would not have been offered any treatment or help and among those who were few could have

afforded to accept it. Many different methods of screening have been used in schoolchildren, but sweep audiometry is now the most commonly used test.

Screening for hearing loss in the preschool period is a more recent development; it was established to enable deaf children to be treated earlier as experience in treating congenital hearing loss had convinced clinicians that the earlier the condition was diagnosed the better the prognosis. Research into screening tests suitable for use in the neonatal period is in progress, but at present the distraction test carried out at 7-9 months of age is the mainstay of preschool programmes.

The aim of distraction testing is to identify all congenitally deaf children before they reach their first birthday. Several studies have shown that this aim is by no means always achieved.^{2,3} Three reports considered methods of improving detection rates⁴⁻⁶; all three made recommendations about improving the reliability of the distraction test and adding further preschool screening tests. In 1981 the Health Visitors' Association undertook a survey that documented current screening practice.⁹ We report a survey of health districts that was undertaken at the end of 1984 and identified changes in practice that had taken place after the circulation of these previous reports.

Methods

In November 1984 a detailed questionnaire was sent to the district medical officers of all health districts in England, Wales, and Scotland. The questionnaire asked for information about screening programmes for hearing and vision in preschool children and schoolchildren. Responses were received from 165 districts in England and Wales (a response rate of 81%) and from 18 districts in Scotland (a response rate of 64%). Because of the low response rate from Scottish districts we report results for districts in only England and Wales. One of these districts refused to participate in the survey, and 37 districts failed to return their questionnaires after two reminders. There were no significant differences between response rates in

Department of Child Health, University of Bristol, Bristol BS2 8DZ

SARAH STEWART-BROWN, MRCP, MFCM, senior registrar in community medicine

MARY N HASLUM, BSC, PHD, research fellow

Correspondence to: Dr Stewart-Brown.

different parts of the country; 11 out of a total of 15 geographical units (14 regional health authorities and Wales) yielded response rates of 80% or more. The four regions with low response rate were Mersey (40%), North West and North East Thames (66.8%), and Trent (75%). Not all the districts returning questionnaires responded to all the questions; the number of non-respondents is noted in the tables.

Results

PRESCHOOL SCREENING

All districts reported carrying out distraction testing at least once in the preschool period. Table I shows the ages of children at the time of testing.

TABLE I—Age at first distraction test

Age (months)	No of districts	Age (months)	No of districts
6	2	7-10	1
6-7	1	7-18	1
6-8	1	8	53
6-9	2	8-9	12
6-18	1	8-10	2
7	31	9	7
7-8	15	9-18	1
7-9	24	18	2
Total			156

No response was received from nine districts.

Fifty three of the 156 districts aimed at screening all children for the first time at 8 months, and most of the remaining districts screened at 7-9 months. Although expert opinion suggests that the distraction test is unreliable before 8 months,⁶ 79 districts screened some children before this time. Eight districts did not test all children before 10 months, and two districts reported that they did not do distraction tests until 18 months.

The total number of times that children were screened in the preschool period varied considerably. Of the 151 districts that gave a clear response, 34 screened children once, 57 screened at two discrete ages, and 60 screened at three or more ages (39 three times, 16 four times, three five times, and two six times). In the districts where screening was carried out more than once the age at second examination varied greatly (table II). The most common

TABLE II—Age at second preschool hearing examination

Age (months)	No of districts	Age (months)	No of districts
10	2	24-30	2
15	1	27	1
16-18	1	30	19
18	24	30-36	5
18-24	3	30-42	1
18-30	3	30-48	1
18-33	2	30-54	2
18-36	1	36	30
18-40	1	36-42	1
18-48	1	42-48	1
18-60	1	42	8
24	10	60	1
Total			122

No response was received from nine districts. No second examination was performed in 34 districts.

ages were 18 months (24 districts) and 36 months (30 districts), but almost every age was represented. Eighty one districts were attempting to screen children between 10 months and 3 years of age. This is an age range within which children's hearing is particularly difficult to test and screening is not recommended for this reason.⁶

Forty districts failed to reply to a question asking whether all student health visitors underwent practical training in screening techniques; all 125 districts that responded said that they did. Of the 159 districts that replied to the question asking if they ran in service refresher courses on hearing screening for health visitors, 147 (93%) said that they did. This is higher than

reported in the 1981 survey, when seven districts reported having no practical training on their health visitor courses and 40% reported having no refresher courses.⁹

In 144 districts (88% of respondents) some of the children screened had their hearing tested at home. Only 19 of the 165 districts screened exclusively on health service premises. Seventy two districts reported that they had neither a soundproof nor a sound attenuated room available at any of the health service premises where hearing screening took place.

Forty four out of 160 (28%) districts reported that all staff concerned with screening had their hearing tested at least yearly; in most districts it was tested less frequently than this, and in 20 of the districts hearing checks were not carried out at all. (In 1981 only 66% of districts tested health visitors' hearing.) Sound level meters were available to all staff in 72 districts, to some in 46, and none in 47. One hundred and thirty districts employed two trained testers to carry out distraction testing, 23 districts sometimes relied on untrained staff, and 12 sometimes relied on trained health visitors to do the test on their own; this practice is not recommended.

SCHOOL SCREENING

Sweep audiometry was by far the most common method of screening for hearing loss in schoolchildren, being used in 152 districts (92%). Twelve districts screened by pure tone audiometry alone, and six reported that they screened all children for middle ear disease with tympanometry. Table III shows the number of times children had their hearing tested with sweep audiometry in school.

TABLE III—Frequency of sweep audiometry examination in school

No of examinations	No of districts
1	45
2	56
3	19
4	19
5	9
≥6	3
Total	151

No response was received from 14 districts.

Most districts aimed at screening children in school for the first time at 5 years or before; 21 districts at age 6; and only two districts later than this. The most common pattern of sweep audiometry testing (observed in 36 districts) was a single screening at 5 years. The next most common was screening at 5 and 7 years (21 districts), and the third most common at 5 and 8 years (13 districts). Most districts (93), however, reported screening at ages or combinations of ages other than these. Thirty districts reported carrying out sweep audiometry screening at least once in secondary school.

Table IV shows the relation between the number of preschool screening tests and the number of sweep audiometry examinations in schoolchildren in each district. The data do not suggest that the districts that screened

TABLE IV—Relation between school and preschool examinations

No of preschool tests	No of sweep audiometry tests in school			Total
	1	2	≥3	
1	14	10	10	34
2	16	24	17	57
≥3	15	22	23	60

Responses with insufficient information = 14.

frequently during the preschool period screened less frequently in school; indeed, they suggest that districts that screened frequently before school also screened frequently in school; this relation, however, was not significant.

Most of the 165 districts reported screening schoolchildren only on school premises, but others (63) also used clinics or health centres. Most schools (112) had neither a soundproof nor a sound attenuated room available.

Screening audiometers were calibrated at least yearly in all districts and more frequently than this in 41. The hearing level at which children were referred after sweep audiometry varied among districts: 47 of 149 districts referred at 20 decibels, 65 at 25 decibels, 28 at 30 decibels, and the remainder at other frequencies.

INFORMATION COLLECTED ABOUT SCREENING PROGRAMMES

Only 74 of 165 districts collected data on the numbers of children screened in the preschool period. Because of this few were able to estimate the population covered by screening in the first year of life; of the districts that could do this, eight said that they screened less than 80% of children and 18 that they screened 99% or 100%. Information collected about school screening was slightly better, with 129 of 165 districts recording the number of children they screened each year. Only 73 districts could report the referral rate from school screening programmes and only 23 that from preschool screening programmes. Rates reported from the districts that collected these figures varied from 0.5% to 25%.

Discussion

Results from this survey suggest that the publication of the three national reports⁶⁻⁸ had an effect on screening practice in England and Wales. The survey of the Health Visitors' Association in 1981 indicated that only 25% of districts were attempting to screen children's hearing on more than one occasion in the preschool period; at the end of 1984, 80% of districts claimed to be doing so. Questions about school screening were not posed in the 1981 survey, but the observation in this study that the districts screening most frequently in the preschool period were also those screening schoolchildren most frequently does not suggest that additional preschool tests had been introduced in place of other screening tests, rather that they had been added on to current programmes.

Efforts had also been made to increase the reliability of screening tests. Most staff concerned with screening now have their hearing tested regularly, and districts provide more training for screeners. Some aspects still do not measure up to the recommendations that have been made by experts: an appreciable proportion of districts do not provide a sound level meter for screeners to test the volume of their auditory stimuli⁶; in nearly all districts some children are tested at home³; and a significant proportion of districts still rely on one trained member of staff or one trained and one untrained to do distraction testing.^{5,6} Because these aspects of screening programmes were not documented in the 1981 survey we cannot say whether this represents any improvement in practice.

Scientific evidence necessary to prove that early detection of congenital hearing loss is cost effective is incomplete, but the clinical evidence is enough for this to be accepted as a goal by the health service. In the face of evidence that this goal has not been achieved^{2,5} it seems reasonable to modify existing programmes. It might be argued, however, that the general recommendations for improvement made by the various national committees were premature. At the time they were made the evidence that they would improve performance in an average health district was far from conclusive. A more scientific approach would have been to recommend that changes were introduced in selected districts in the context of well controlled studies. These suggestions were not made, and by and large the recommendations seem to have been accepted. As a result preschool children in England and Wales were being screened on average twice as often in 1984 as they were in 1981. More remarkably, this increase in service provision had been made by most districts without any attempt to collect data for evaluation; this lack of information will prevent districts from making a judgment on whether the changes they made improved identification rates. Very few districts were collecting the sort of data that would allow them to make even the most rudimentary assessment of their screening programmes, far less any evaluation of cost consequences or benefits.

Many of those working in the children's audiological service would justify the increased number of tests on the grounds that they greatly increase the number of children identified with conductive

deafness due to secretory otitis media; but the identification and treatment of this group is a much more debatable goal for the NHS than the detection of congenital deafness. Secretory otitis media tends to remit spontaneously,¹⁰ and it is questionable whether surgical intervention has any long term beneficial effect on hearing.¹¹ It is widely accepted clinically that moderate deafness for periods of several months at critical stages in development can have a permanent effect on a child's performance, but this has yet to be shown scientifically; no studies have attempted to assess whether surgery improves performance in the long term, and unwanted side effects are well documented.¹² Thus secretory otitis media fulfils few of the criteria that should be met before a screening programme can be considered likely to be either effective or ethical.¹³

This report documents changes that are likely to be welcomed by many people; it gives some reassurance that the recommendations of national committees do have an effect. From the point of view of people who believe in rational management of the health service, however, the history of screening for hearing loss over the past few years is a sad one. At a time of considerable financial stringency in the health service this service has expanded with no evidence that it will do any good and with no evaluative studies that might clarify the position for the future.

This survey was funded by the Department of Health and Social Security. We thank the many people who completed and returned the survey questionnaires. A copy of the full district screening survey report covering both hearing and vision screening is currently being sent to each district health authority.

References

- 1 Chief Medical Officer. The health of the school child. Fifty years of the school health service. *Report of the chief medical officer of the Ministry of Education for the years 1956 and 1957*. London: HMSO, 1958.
- 2 Martin JAM, Moore W. *Childhood deafness in the European Community*. Luxembourg: Commission of the European Community, 1983. (EUR 6413.)
- 3 Macormick B. Hearing screening by health visitors: a critical appraisal of the distraction test. *Health Visitor* 1983;56:449-51.
- 4 Watson TJ. A hearing impaired school population. *Journal of the British Association for Teachers of the Deaf* 1978;26:178-84.
- 5 Anonymous. Hearing screening in infancy. *Arch Dis Child* 1986;61:637-8.
- 6 Department of Health and Social Security. *Final report of the subcommittee appointed to consider services for hearing impaired children*. London: Advisory Committee on Services on Hearing Impaired People, 1981.
- 7 Department of Health and Social Security. *Prevention in the child health services*. London: DHSS Health Publication Unit, 1980.
- 8 Committee on Child Health Services. *Fit for the future*. London: HMSO, 1976. (Court report.)
- 9 Health Visitors Association. Hearing screening survey (2). *Health Visitor* 1983;56:191.
- 10 Anonymous. Glue ear in children: medical management. *Drug Ther Bull* 1986;24:22-4.
- 11 Anonymous. The surgical management of glue ear. *Drug Ther Bull* 1986;24:49-51.
- 12 Brown MJK, Richards SH, Ambegaokar AG. Grommets and glue ear: a five year follow-up of a controlled trial. *J R Soc Med* 1978;71:353-6.
- 13 Cochrane AL, Holland WW. Validation of screening procedures. *Br Med Bull* 1971;27:3.

(Accepted 13 March 1987)

100 YEARS AGO

Though the defeat which befell the Government on Tuesday night is no more than a just punishment for its crass obstinacy in refusing even to inquire into the circumstances of the arrest of Miss Cass, many persons will be inclined to regret that the incident has ended in an implied censure on a Cabinet Minister, for the simple reason that its transformation into a political event will be apt to obscure the real issue. This is not so much the wisdom or unwisdom of Mr. Matthews and Mr. W. H. Smith as the fact disclosed by this incident that the Police authorities of this metropolis practically admit that no respectable woman can traverse Regent Street in the evening. This has frequently been asserted, and the reproach has been denied. It is something gained to have the truth admitted at last, and Mr. Newton, the police-magistrate, almost deserves to be forgiven his mistake. The condition of Regent Street, the Haymarket, and the adjoining thoroughfares, not only by night, but also during the afternoon, is a crying disgrace to our civilisation, and a standing menace to the moral and physical health of old and young. (*British Medical Journal* 1887;ii:80.)