

Deafness in adults – screening in general practice

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SUMMARY. A random sample of 1,083 people, drawn from the lists of two practices in Leeds, was used to estimate the prevalence of deafness among adults. A test for deafness (defined as failure to hear 35 decibels at 1000 Hz in one or both ears) using a portable audiometer proved simple to operate with little observer variation. Eight per cent of adults were found to be deaf. The prevalence of deafness increased with age and was lowest in social classes I and II; there was no significant difference between the sexes. Audiometry showed that 17 per cent of those who thought their hearing was abnormal had no recorded loss of hearing using the stated test and that 18 per cent of those who are deaf would be overlooked if the question "Do you think your hearing is normal?" was used for initial screening in general practice. Less than 20 per cent knew of any services or aids for the deaf apart from those available through general practitioners.

Introduction

MANY people have hearing difficulty but estimates of the extent of the problem vary, partly because different criteria are used to define deafness, and partly because hearing handicaps may be caused by failure of the brain to discriminate and interpret sounds as well as by failure of the sense organs in the ear to respond to noise. Pure tone audiometry measures only the response in the ear, so that there may be considerable hearing handicap without measurable hearing loss (Noble and Atherley, 1970).

In the United Kingdom there has been no large-scale study of the prevalence of deafness to compare with the American study in which 6,672 people were tested for

air conduction hearing at six frequencies (United States National Centre for Health Statistics, 1965). However, in two general practices in south-east England, 5.8 per cent of people aged 40-64 years were found to be deaf in both ears and 14.5 per cent to be deaf in one ear with some hearing loss in the other one (D'Souza *et al.*, 1975). Using questionnaires, an earlier survey of a sample of people aged over 65 found that 30 per cent admitted to having hearing problems (Townsend and Wedderburn, 1965). These studies indicate a bigger problem in England and Wales than is suggested by simply applying information extrapolated from the American study (DHSS, 1973). A recent review suggests that 15 to 20 per cent of all those aged over 65 may be deaf (Hull, 1978). Shepherd (1978) discussed the lack of agreed definitions of deafness and the difficulty in standardizing those which are in use. The most recent information, from the General Household Survey, gives an overall prevalence rate for 'difficulty with hearing' of 14 per cent in females and 17 per cent in males aged 16 and over; only about 15 per cent of those found to have hearing difficulties wore a hearing aid (OPCS, 1979).

Aims

The aims of this study were to:

1. Estimate the prevalence of deafness in adults using a random sample drawn from the lists of general practitioners.
2. Assess the effectiveness of a simple question in screening for deafness.
3. Identify variables associated with an increased frequency of deafness.
4. Discover the level of knowledge in the population about equipment and places of help for deaf people.

Method

We used portable audiometers (Keeler audioscreeners) on which three frequencies were available, 250 Hz, 1000 Hz and 4000 Hz. At each frequency the sound could be produced at 20, 30, or 60 (+ 5) decibels.

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Definitions of deafness vary widely; here we examined three:

1. An inability to hear 35 decibels at 1000 Hz in one or both ears.
2. An inability to hear 20 decibels at 1000 Hz in one or both ears.
3. An inability to hear 20 decibels in one or both ears at any two of the three test frequencies 250 Hz, 1000 Hz, and 4000 Hz.

We chose the first of these definitions as we found it reliable both when the sequence of testing procedures was varied and when subjects were retested by different observers.

The computerized age-sex registers of two practices in Leeds serving over 17,000 patients provided the sampling frame. From this we chose a one in seven random sample. Children aged under 16 were then excluded. Letters were sent from the practices to the 1,697 subjects thus selected, inviting them to co-operate and suggesting a time when an interviewer might call. Stamped, addressed envelopes for reply to the doctors were enclosed. If no reply was received a second letter was sent. The addresses of non-responders were then checked from the clinical records but their names were removed from the sample only if they were definitely known to have moved away or died. Persistent non-responders who consulted their doctors during the following year were tested at the surgery to try and find out if bias had been introduced by non-response.

Those who agreed to participate were visited between November 1977 and May 1978 by one of four interviewers, who administered a short questionnaire and tested the subject's hearing using an audiometer. The audiometers were standardized at the beginning and at the end of the study; no change was found. At each available frequency (250 Hz, 1000 Hz and 4000 Hz) the sound was produced at 20 db, 35 db and 60 db. Subjects could not see the apparatus during testing. We investigated the reliability of the tests by asking a sample of subjects if they would agree to be retested by a second interviewer.

We gave the audiometry results to the general practitioners. We did not examine the ears for wax or eustachian catarrh.

All interviewers attended a one-week course on interviewing techniques at which they became familiar with the questionnaire. The questions were about the subject's own perception of hearing, use of hearing aids, knowledge of help available to the deaf, family history of deafness, smoking habits and occupation.

The results were coded and analysed using the SPSS computer programs.

Results

Sixty-four per cent (1,083 out of 1,697) of the adult sample agreed to take part, were interviewed and tested.

Table 1. Deafness by age, (percentages are given in brackets).

		Age			Total
		16-44	45-64	65 and over	
Deafness	Present	12 (2)	25 (7)	53 (24)	90 (8)
	Absent	481 (98)	348 (93)	164 (76)	993 (92)
Total		493	373	217	1,083

Table 2. Deafness and perception of deafness.

		Hearing perceived as normal		
		No	Yes	
Deafness	Present	71 (82)	16 (18)	87
	Absent	170 (17)	805 (83)	975
Total		*241 (23)	821 (77)	1,062**

*This includes those who indicated that hearing was not normal in one ear.

**Twenty-one replies could not be classified.

The refusal rate was similar in the two practices. No approach was made to four per cent because they were severely ill, bereaved or suffering from some other recent distress known to their doctor. The data for both practices have been combined. The age-sex distribution of the non-responders did not differ from that of the sample as a whole. The prevalence of deafness by age is shown in Table 1. There was no evidence of a different prevalence among those non-responders who were tested later.

Among the deaf 18 per cent were deaf in both ears. For comparison with other studies we report that of those who were deaf in one ear more than half the men (19 out of 35) were deaf in the left ear, and more than half the women were deaf in the right ear (25 out of 39). This difference is not statistically significant.

Deafness varied with social class from about 50 per thousand in social class I to 180 per thousand in social class V. Twenty-nine per cent of the sample tested belonged to social classes I and II, compared with an expected 20.8 per cent in the Leeds Metropolitan District as a whole (OPCS, 1975). We discuss this difference later in relation to possible bias.

People's perception of their hearing was based on the question "Do you think your hearing is normal?". Self-assessment differed from the objective measurement obtained through audiometry as shown in Table 2. The question produced a false positive rate of 17 per cent and a false negative rate of 18 per cent.

Twenty-six per cent of those who were deaf wore hearing aids (23 out of 90). Only fourteen per cent of the sample (152 out of 1,069) knew about equipment for the deaf other than hearing aids—for example, amplifiers for the telephone, television and record player; flashing

Table 3. Knowledge of where to go for help with hearing.

Hospital	90
ENT specialist	26
Hearing aid shop	60
Occupational health	5
Leeds Centre for the Deaf	17
Other	37
Total	235*
None known	870
Total interviewed	1,083

*Twenty-two (two per cent) knew of more than one place of help.

lights for the telephone or door bells; audio-teaching aids. Of all of these, telephone accessories were the most widely known.

The majority of people (870 out of 1,083) knew of no source of help, apart from the general practitioner, to which those with hearing difficulties could go. Table 3 shows how often the different places of help were mentioned.

Hearing difficulties in at least one close relative over two generations were reported by just over a third of the sample. This aspect of family history was similar whether or not the subject had normal hearing, was deaf in one ear or deaf in both ears.

We asked about perception of noise levels at work using the question "Have you ever worked or spent time in a noisy place?". Those answering "Yes" were asked how many years they had spent there. Fifty per cent of the sample (541 persons) had worked in a noisy place. Eight per cent (34 out of 436) of those who had spent up to 25 years in a noisy place were deaf; 14 per cent (15 out of 105) of those who had spent longer in such conditions were deaf. The latter group naturally contained more older people than the former. Subsequent analysis showed that the difference between the two groups was no longer significant when age was allowed for.

Amongst those who smoked, or used to smoke more than 20 cigarettes per day for at least 10 years, deafness was found to be slightly more frequent than in light or non-smokers. This difference is not statistically significant.

Discussion

Strict comparisons between this study and earlier ones are impossible, because we carried out the audiometry in the person's home with a simple apparatus and because we used only one frequency in analysing the findings. Nevertheless our prevalence rates for deafness broadly agree with those cited in the introduction: two per cent in 16 to 44 year olds, seven per cent in 45 to 64 year olds and 24 per cent in those aged 65 and over.

The sample, which was taken in 1977, contained more people in social classes I and II and fewer in social class V than would have been expected from the regional population (OPCS, 1975). The social class distribution

in the area of Leeds covered by this survey is not known. However, in one of the practices housing is mainly private; the other contains large council estates. Our findings agree with others (D'Souza *et al.*, 1975; Beasley, 1940) in showing that deafness occurs more commonly in social class V than in social classes I and II. This suggests that our sample may have been biased so as to under-record the frequency of deafness. It is possible that non-responders contained more people who could not read or write and that those in social class V are less likely to agree to appointments at home than those in social classes I and II.

D'Souza *et al.*, (1975) reported 27.1 per cent refusing an invitation to attend a special screening clinic at which a hearing test was a small part of a general health check. The refusal rate of 32 per cent in our study may be high either because deafness is seldom perceived as an important disability or, conversely, because of stigma being attached to the idea of being thought deaf. The co-operation given to interviewers in the other surveys mentioned was as good or better than the response to our letters requesting co-operation sent by the patients' general practitioners.

Our method of testing hearing, which we found reliable, is simpler than those employed in studies using audiograms obtained in specially quiet rooms. Any general practitioner, or an assistant, could do a similar test in the home or surgery in less than five minutes. D'Souza *et al.* (1975) reported that wax was present in approximately 20 per cent of those who had measured hearing loss, but the general practitioners in this study did not find that more patients requested them to remove wax as a result of audiometry.

If patients were screened by being selected for audio-testing only if they thought that their hearing was abnormal, 23 per cent of adults would be tested and 82 per cent of the deaf would be identified. Amongst the deaf detected in this way would be those who might benefit from removal of wax or from a hearing aid after further specialist audiometry. Our findings about the use of hearing aids agree with those of the General Household Survey, that is, two per cent of the total population use an aid but this is only about one in five of those who are deaf.

The general ignorance in the population, both about places to go for help with hearing difficulties and types of aids available for the deaf, is surprising, especially since more than a third of the population has a close relative with hearing difficulties.

Conclusion

This study has described the pay-off which could be expected if screening for deafness were carried out in general practice using simple methods and equipment. Whilst the general practitioner is likely to refer for specialist opinion those who are identified as deaf, much general information and advice about deafness is

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available which is at present not known by the majority who visit their doctor.

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Source: Prior, J. G. & Cochrane, G. M. (1980). Home-monitoring of peak expiratory flow rate using mini-Wright peak flow meter in diagnosis of asthma. *Journal of the Royal Society of Medicine*, 73, 731-733.