

# Prevalence of hearing loss among people aged 65 years and over: screening and hearing aid provision

P S WILSON

D M FLEMING

I DONALDSON

**SUMMARY.** *The aim of this study was to assess the prevalence of hearing loss among people aged 65 years and over and to offer hearing aids where necessary. The study was carried out in a large health centre practice in Birmingham with a computerized record system. All patients aged 65 years, and a 20% random sample of patients aged 66 years and over were invited for interview. They were questioned about hearing loss and examined audiometrically. All patients with a hearing loss in the better ear of 35 decibels or more over the speech frequencies (0.5–4 kHz) were offered a hearing aid. A total of 322 patients attended (72% of those invited) and of these 34 patients already had a hearing aid. A further 142 patients were identified for whom an aid was recommended and 69 of these accepted. The acceptance rate was higher among men than women (57% compared with 43%). Sixty one patients (19% of those screened) had an asymmetrical hearing loss and of these 24 required consultant assessment; none had serious underlying pathology.*

*There is a large unmet need for hearing aid provision. Simple audiometric assessment in health centres provides an opportunity to meet this need.*

**Keywords:** *hearing tests; screening; hearing loss; hearing aids; elderly.*

## Introduction

THERE has been much debate about the provision of hearing aids and the way to achieve the best results.<sup>1</sup> Normally, hearing aid provision relies on patients seeking help when they realize they have a problem. Audiometric screening identifies patients who may benefit from an aid, whether they have realized they have a hearing problem or not.

There are comparatively few recent studies of hearing loss and those that exist do not present data in precisely the same age groups. Studies from 1948<sup>2</sup> and 1965<sup>3</sup> suggested that one third of patients over retirement age suffered from hearing impairment and more recently, it has been suggested that 60% of people in this age group would benefit from amplification.<sup>4</sup> These different prevalence figures were based on studies using different methods: a patient questionnaire was used in the two surveys with the lower estimates, whereas the higher value stems from a study of audiometric assessment using a hearing loss criterion of 35 decibels in the better hearing ear. Stephens and colleagues, using a combination of the two methods, found a prevalence of hearing

P S Wilson, FRCS, registrar and I Donaldson, FRCS, consultant surgeon, Department of Otolaryngology, Selly Oak Hospital, Birmingham. D M Fleming, FRCGP, general practitioner, Birmingham.  
Submitted: 16 June 1992; accepted: 21 October 1992.

© British Journal of General Practice, 1993, 43, 406-409.

disability in patients aged 50–65 years of approximately 50% while the number of patients with hearing aids was only 8%.<sup>5</sup>

In this study the prevalence of hearing loss in a practice population of patients aged 65 years and over was determined by audiometric screening. Though 65 years is an arbitrary age in terms of actual life history, this age is of administrative significance. The study aimed to assess the practicality and usefulness of hearing screening on retirement. Increased opportunities for leisure might increase the need for a hearing aid. In this project, hearing aids were offered to patients with a hearing loss of 35 decibels or more in the better hearing ear.

## Method

The study was undertaken in an urban general practice of five partners and 10 000 patients in Birmingham working from a purpose built health centre. A computerized record system was available within the practice and a printout was obtained of all patients aged 65 years and over. All patients reaching the age of 65 years in the year in which the study was carried out (June 1989 to May 1990), and a one in five random sample of patients aged 66 years and over were invited by an appointment posted to their home address to attend the health centre for a hearing assessment. Patients failing to attend were given a second postal appointment. The practice population included 46 men and 39 women aged 65 years, and 580 men and 868 women aged 66 years and over. The number of patients invited to attend was slightly greater than the 375 expected on the basis of these figures because the list of patients to be invited was derived at the beginning of the study from an inflated practice list: substitutes were recruited for those patients who had died or left the practice and had not been removed from that list.

The hearing assessment was carried out by a registrar in otolaryngology (P W) and commenced with an interview asking about family history of deafness, occupational noise exposure, subjective assessment of hearing and whether a hearing aid was worn. The ears were then examined for wax or any abnormality. Rinne and Weber tuning fork tests were performed using a 512 Hz tuning fork in the standard manner.<sup>6</sup> Pure tone audiometry was carried out in a quiet room in the health centre using an Amplivox 2150® portable audiometer. Acoustic isolation was not available. The results of the assessment were recorded on a standard audiogram and discussed with the patient. Patients whose audiograms suggested asymmetrical sensorineural hearing loss were given an appointment with a consultant otolaryngologist (I D). All patients showing a hearing loss of 35 decibels or more over the speech frequencies (0.5, 1, 2, 4 kHz) in the better ear were offered a hearing aid. Those accepting the aid had the mould taken on the same visit; the aid was subsequently fitted at Selly Oak Hospital.

The relative likelihood of requiring an aid among patients exposed to noise was compared with that among those reporting no history of noise exposure and the 95% confidence interval (CI) calculated.

## Results

Of the 445 patients invited for hearing tests 322 attended (72.4%); 290 of the 322 patients (90.1%) attended their first

appointment. Of the 322 patients 137 were men and 185 women. Of these patients 55.5% of men and 39.5% of women thought they had some degree of hearing impairment.

The mean hearing loss in decibels in the better ear is shown in Figure 1 for men and women and typified the high tone hearing loss associated with older patients commonly referred to as presbycusis. Progressive increase of hearing loss at all frequencies was demonstrated as age advanced. The curves for male and female patients were similar. The mean hearing loss in patients reporting exposure to occupational noise was greater than in those not reporting exposure, a difference which was more striking in women (Figure 2).

By the definition of 35 decibels hearing loss or more in the better ear, 175 patients (73 men and 102 women; 54.3% of those screened) required a hearing aid. Of these, 34 patients (10.6% of those screened; 16 men (11.7%) and 18 women (9.7%)) had previously been issued with an aid and 141 (43.8% of those screened) required one (57 men and 84 women). Among the 53 men who reported exposure to occupational noise 33 (62.3%) required a hearing aid compared with 40 (47.6%) of the 84 men not reporting exposure (odds ratio 1.69, 95% CI 0.83 to 3.42). Among the 23 women reporting exposure to noise 15 (65.2%) required a hearing aid compared with 87 (53.7%) of the 162 women not reporting exposure (odds ratio 1.62, 95% CI 0.65 to 4.03). The audiometric pattern typical of exposure to noise (4 kHz dip) was found in only 11 men and three women out of the total 175 with hearing loss. Five of these men and none of the women reported exposure to occupational noise.

From the target population of 141 patients requiring a hearing aid, 48.9% (69 patients) accepted the offer and were issued with a hearing aid. Aids were accepted by 56.1% of the 57 men and 44.0% of the 84 women to whom they were offered. Thus, at the conclusion of the study, 32.0% of the entire group screened (103/322) were supplied with an aid which is equivalent to 58.9% of all of those meeting the criteria for a hearing aid (103/175).

Twenty two men and 39 women (18.9% of patients screened) were found to have asymmetric hearing loss. In 37, this was conductive, in eight sensorineural and in 16 mixed. Thus, 24 patients were given an appointment with a consultant otolaryngologist. No patient was found to have a serious underlying pathology, and 20 of the 24 admitted awareness of asymmetric hearing loss when questioned. No patient was found to have ear disease (other than hearing loss) of which they were not already aware.

**Discussion**

Elderly patients frequently present at hearing clinics having had problems with their hearing for many years.<sup>7</sup> For such a common problem, the actual mechanism is little understood. Fifty five per cent of men and 39% of women interviewed in this study thought they had some degree of hearing impairment but only 12% of men and 10% of women had already sought advice and been issued with a hearing aid. Some patients, even though attending for hearing screening and told of their hearing loss remain reluctant to accept a hearing aid and need encouragement,<sup>3</sup> mainly owing to the stigma attached to wearing a hearing aid.<sup>8</sup> In the private sector, 75% of the hearing aids issued are of the concealed variety.<sup>9</sup> In the early stages of this study it was found that some patients when offered a hearing aid thought that a charge would be levied (actual numbers not recorded) and it was subsequently made clear at the outset of the consultation that no charge would be made if a hearing loss were discovered.

Previous studies have shown that the main cause of delay of issue of a hearing aid is the patient failing to seek advice.<sup>10</sup> The number of patients presenting for assessment can be increased by

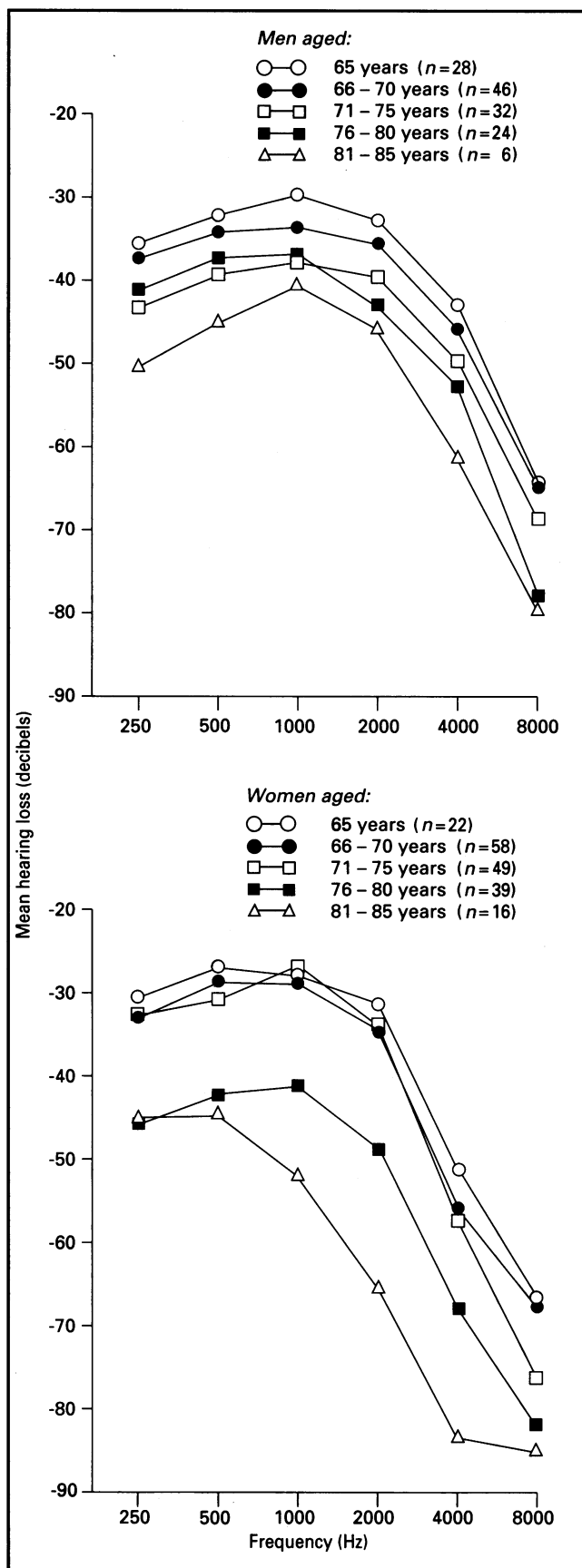


Figure 1. Mean hearing loss in the better ear for men and women patients (n = number of patients in group).

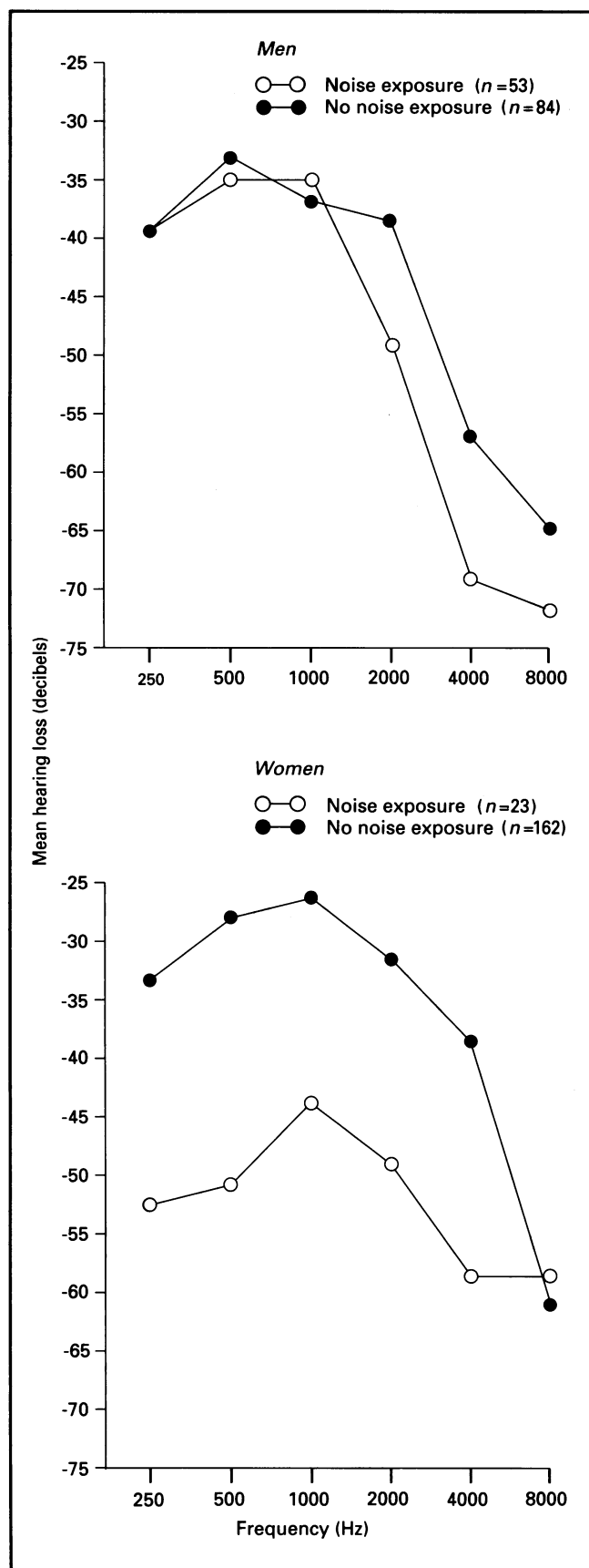


Figure 2. Mean hearing loss in the better ear, by exposure to occupational noise (n = number of patients in group).

advertising the service — King and colleagues showed a doubling of patient attendances for hearing aid provision during a publicity campaign.<sup>11</sup> The prevalence of hearing loss suitable for a hearing aid in this study of patients aged 65 years and over was found to be 54%, though this may be an overestimate for the entire population in this age group since those patients who believe they have a hearing loss may be more likely to attend for screening than those who do not. Of the patients identified in this study with a hearing loss that would benefit from amplification and who did not already have a hearing aid only 49% accepted the offer of an aid. This poor take up rate from screening has been shown before.<sup>5</sup>

No significant difference was found in the proportion of people requiring hearing aids among those who did and did not report occupational noise exposure. Three times as many men as women reported occupational noise exposure (39% versus 12%) but the proportion found to have hearing impairment was about two thirds in each case. However, the characteristic audiometric pattern associated with noise exposure was found rarely, with only five patients reporting noise exposure showing this characteristic pattern. Many reasons might be advanced to account for these apparently paradoxical findings. Perhaps the most important is that persons recognizing a hearing problem are more likely to seek an explanation in a history of noise exposure than in a degenerative disease.

Patients with asymmetric sensorineural hearing loss are commonly referred for screening for acoustic neuroma. The incidence of acoustic neuroma is difficult to determine, owing to many small asymptomatic neuromas being found at autopsy. A diagnosis rate of one per 100 000 population per year is probably an underestimate.<sup>12</sup> This study found 24 patients requiring further assessment for asymmetric sensorineural hearing loss, none of whom was found to have an acoustic neuroma on the normal screening investigations (caloric testing, speech audiometry, brainstem evoked responses and computer-assisted tomography scan if indicated).

In this study 44% of the screened population aged 65 years and over were offered a hearing aid and this has considerable resource implications. Costs associated with patient assessment and provision of a hearing aid in a hospital outpatient department include those for a hearing test, consultant assessment, manufacture and fitting of the mould and amplifier, appropriate service arrangements and a counselling service where available, though the total cost has not been quantified and published. In this study the hearing assessment was undertaken by a registrar in otolaryngology but following completion of the study, the practice has established a hearing assessment clinic employing a nursing sister who undertakes the audiometry, screening four patients per hour (salary of approximately £8.00 per hour). The cost of an audiometer sufficient for the purpose is approximately £750. For the assessment of absolute hearing loss, acoustic isolation is required, but for the determination of potential benefit from a hearing aid, assessment in a quiet room may be more appropriate. The decision to supply a hearing aid was originally taken by the registrar concerned but is now taken within the practice by one of the partners and ratified by the consultant after reviewing the relevant audiograms. The mould is prepared and fitting arranged at the local hospital department. The current cost of the unilateral aid offered is approximately £25.00 — £17.80 for the aid, £5.70 for the ear mould, £0.56 for the batteries and £0.34 for the case (Merseyside Regional Health Authority, January 1991). However, the study did not address the issue of counselling patients requiring a hearing aid and this may be an important, if costly, necessity. The benefits of counselling should be evaluated in an appropriately designed study.

In order to meet the needs of hearing aid provision efficiently

in patients aged 65 years and over, a practice based service has considerable advantages over the existing hospital specialist based systems. These primarily concern the patient who does not have to attend the more distant hospital outpatient department for initial screening or experience the delays associated with that exercise. This in turn benefits the department in releasing appointment slots for patients with more complex hearing problems. It is highly relevant to this programme that among the 34 patients already having a hearing aid and the 141 patients identified as needing a hearing aid, none was found to have serious pathology for which any major intervention was required

### References

1. Royal National Institute for the Deaf. *Hearing aids — the case for change*. London: RNID, 1988.
2. Sheldon JH. *The social medicine of old age. Report of an enquiry in Wolverhampton*. Oxford University Press, 1948.
3. Townsend P, Wedderburn D. *The aged in the welfare state. Occasional papers in social administration 14*. London: Bell and Sons, 1965.
4. Herbst KG, Humphrey C. Prevalence of hearing impairment of the elderly living at home. *J R Coll Gen Pract* 1981; **31**: 155-160.
5. Stephens SDG, Callaghan DE, Hogan S, *et al*. Hearing disability in people aged 50-65: effectiveness and acceptability of rehabilitative intervention. *BMJ* 1990; **300**: 508-511.

6. Fitzgerald O, Conner A. Examination of the ear. In: Booth JB (ed). *Scott Brown's otolaryngology*. 5th edition. Volume 3. Otolaryngology. London: Butterworths, 1987.
7. Stephens SDG, Barcham LJ, Corcoran AL, Parsons N. Evaluation of an auditory rehabilitation scheme. In: Taylor IG, Markides A (eds). *Disorders of auditory function*. Volume 3. London: Academic Press, 1976.
8. Kyle JG, Wood PL. Changing patterns of hearing aid use and level of support. *Br J Audiol* 1984; **18**: 211-216.
9. Bartkin B. Reducing the stigma of deafness — hearing aids with enhanced visual appeal. *Br J Audiol* 1988; **22**: 167-169.
10. Watson C, Crowther JA. Provision of hearing aids: does specialist assessment cause delay? *BMJ* 1989; **299**: 437-439.
11. King RL, Barry B, Brooks DN. Effectiveness of a publicity campaign encouraging earlier referral of hearing loss in adults. *BMJ* 1987; **294**: 1342-1343.
12. Tos M, Thomson J. Epidemiology of acoustic neuromas. *J Laryngol Otol* 1984; **98**: 685-692.

### Acknowledgements

In the prosecution of this study, we would like to acknowledge the help of Clare Seeny and Joan Dainty.

### Address for correspondence

Dr D M Fleming, Lordswood House, 54 Lordswood Road, Harborne, Birmingham B17 9DB.

## RCGP Publications PRACTICE ORGANIZATION

### BOOKS AND PAPERS

#### Doctors on the Move (Occasional Paper 7)

Describes a revolutionary method of organizing a general practice whereby doctors and nurses move from patient to patient instead of following traditional consulting room patterns. £3.00

#### Computers in Primary Care (Occasional Paper 13)

This report from an RCGP working party describes current and future possibilities for computerizing aspects of care in general practice. £3.00

#### Trends in General Practice Computing

Covers computerized prescribing, office systems, computers in the consulting room, attitudes of patients and future developments. An easy-to-read introduction to the subject with plenty to offer those already committed. £12.50

### PRACTICE ORGANIZATION SERIES

#### Age/Sex Registers

Describes the different types of register, their functions and applications, and how to construct and operate one. Suggestions are made on more advanced registers, and computer applications. £3.00 (£4.00 non-members)

#### Entering General Practice

Describes most aspects of entry to general practice for trainees and young GPs, including how to present a CV, how applicants may be assessed by a practice, and how they should assess a practice. There are monographs to help women GPs in full time practice or job sharing. £6.00 (£7.00 non-members)

#### Appointment Systems

Based on the work of the original Practice Organization Committee of Council, the folder covers the amount of time which should be provided for each list size, different booking systems and common faults, together with suggestions on how to adjust an appointment system which is not working properly. £5.00 (£6.00 non-members)

All the above can be obtained from the Sales Office, Royal College of General Practitioners, 14 Princes Gate, London SW7 1PU (Enquiries, Tel: 071-823 9698). Prices include postage. Cheques should be made payable to the RCGP. Access and Visa welcome (Tel: 071-225 3048, 24 hours).

### Practice Information Booklets

Written largely by the College's Patient Liaison Group, this folder has many useful suggestions for the content and presentation of patient information booklets, together with a useful section on the constraints of advertising. £6.00 (£7.00 non-members)

### VIDEO PACKAGES

#### Management in Practice

Produced jointly by the RCGP and MSD Foundation, the package consists of a video and supporting course book. It is the first management video that has been specifically designed for use in general practice by all members of the primary care team. A diabetes mini-clinic is used to illustrate the management problems that can result when new initiatives are not properly thought through. £19.50 (additional course book £4.50)

#### We need a Practice Manager

The second package in the series produced by the RCGP and MSD Foundation. It deals with the process leading to the appointment of a practice manager. The principles demonstrated are relevant to the recruitment of all members of the practice team. £24.95 (additional course book £6.50)

#### Who killed Susan Thompson?

Set in a fictional four doctor partnership in an English market town, this video demonstrates the link between individual clinical competence and medical audit. £30.00 (additional course book £5.00)

### RECORD CARDS

A range of medical record cards and other items are available, including: age-sex register cards, menstruation cards, pink summary cards, obstetric cards, medical summary problem oriented cards (BD1), family and personal history cards (BD2A), drug treatment cards (BD3A), repeat prescription cards (BD3B), flow sheets (BD4), patient questionnaires, pre-school record cards, personal history cards. Prices and samples on request.