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**To cite this article:** Niall Maguire (General Practitioner) (General Practitioner) (Research Fellow) (Qa and Research Fellow), Sheelagh Prosser, Ronan Boland & Ann McDonnell (1998) Screening for Hearing Loss in General Practice Using a Questionnaire and the Whisper Test, The European Journal of General Practice, 4:1, 18-21, DOI: [10.3109/13814789809160779](https://doi.org/10.3109/13814789809160779)

**To link to this article:** <https://doi.org/10.3109/13814789809160779>



Published online: 11 Jul 2009.



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# Screening for hearing loss in general practice using a questionnaire and the Whisper Test

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**Objectives:** The prevalence of unreported hearing loss among the elderly is estimated from numerous studies in small areas or single practices. In Ireland, where case-finding examinations of the elderly have been proposed, there is a need to measure the national prevalence. The methods of examination used in screening for hearing loss, while evaluated in specialist settings, have not been studied in the context of service general practice, where such screening is likely to occur. To measure the prevalence of hearing loss among patients, 75 years old and over, of general practitioners in the Irish Republic, using a simple screening protocol - patient questionnaire and the Whisper Test.

**Methods:** Random sample of 480 patients registered with 68 volunteer general practitioners in nine geographic areas. Each patient was administered the Abbreviated Mental Test, a study specific questionnaire including the Royal College of General Practitioner's screening question for hearing loss and the Whisper Test. Ears were checked for wax.

**Results:** The doctor response rate was 69% and valid examinations were performed on 71% of the patients selected in these practices. Self or carer reported hearing difficulty was found in 30% of patients. The Whisper Test was failed in both ears in 17.4% and in one ear in a further 10.4%. The screening questionnaire and Whisper Test agreed in 29.5% of cases of possible deafness defined by either method. Occlusive ear wax was present in 26.5% of ears. For 27.3% of

subjects with hearing problems, the examining general practitioner had previously been unaware of the findings.

**Conclusions:** Screening of elderly patients by their own general practitioner using a simple screening protocol yields large numbers of undetected hearing problems. Our results support use of the Whisper test and questionnaire in case-finding among elderly patients.

*Eur J Gen Pract* 1998;4:18-21.

**Keywords:** hearing loss, elderly, general practice, screening

## Introduction

Hearing impairment is an affliction of old age, which can often be alleviated but which is under-reported and under-treated in the community.<sup>1,2</sup> Important consequences of untreated deafness include depression and social isolation.<sup>3,4</sup> Poor communication is also associated with abuse of the dependent elderly.<sup>4</sup> Deafness is common, with a prevalence of 37% in people aged 60 years and over who were screened audiometrically in the Netherlands.<sup>2</sup> In the United Kingdom, a prevalence in the elderly population is reported of up to 60% depending on definition and methodology.<sup>1</sup>

Because of the prevalence of deafness in the elderly and given the benefit that can be achieved by amplification, it has been argued that audiometric screening and the prescription of hearing aids should be a routine function of general practice.<sup>6</sup> In the United Kingdom, annual screening for sensory impairment is now a contractual obligation for those aged 75 years and over.<sup>7</sup>

In 1993, the European Year of the Elderly, the Irish College of General Practitioners undertook four studies of functional disability in patients aged 75 years and over. The projects involved 416 general practitioners and 2876 of their patients and examined hearing loss, visual impairment, mobility problems and incontinence. A fifth study examined the exposure of elderly people to violence and crime.

We report the hearing impairment arm of this project, the Irish National Care of the Elderly Study. The aim of the study was to determine the prevalence of hearing loss

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Submitted: 19th September 1997; accepted in revised form: 12th January 1998.

among the 75 years and over age group using a simple screening protocol that might be generalised to general practice in this country.

### Methods

The patients studied comprised a systematic random sample of those aged 75 years and over in volunteer general practices. A sample size of 560 was indicated on the basis of a national population in this age group of 162,845,<sup>8</sup> and a prevalence of 38% deafness in a pilot study involving 100 patients in ten practices in March 1993. A pragmatic decision was made to attempt to recruit 1000 patients of 100 geographically representative practices. Written invitation was made to each of 464 members of the Irish College of General Practitioners in practice in nine faculties (districts) of the College, chosen for regional and rural/urban representativeness. Ninety percent of Irish general practitioners are members of the College and the 98 doctors which agreed to our invitation to participate comprised 21% of the membership in the chosen faculties.

Each selected patient was examined during the month of October 1993, either as they presented for other reasons at the surgery (53%) or during a house call opportunistically or specifically to complete the study (47%). The first part of the screening examination consisted of the Abbreviated Mental Test.<sup>9</sup> This test is a ten-item shortened version of earlier tests for the assessment of cognitive function in routine geriatric practice. The test was first described in 1972 and validated among short-stay geriatric inpatients and is currently recommended by the Royal College of General Practitioners as part of the health check for over 75-year-old patients.<sup>7</sup> A score in the Abbreviated Mental Test of less than seven indicates the likelihood of dementia or confusion.

Following the Abbreviated Mental Test, a seven-item questionnaire was administered by the doctor to the patient or the carer, as appropriate. Questions were:

- Do you have difficulty hearing what is said to you by one person in a normal voice in a quiet room?<sup>7</sup>
- Have you ever worn a hearing aid?
- Do you wear a hearing aid regularly?
- Does your hearing aid help?
- Do you have difficulty hearing even with an aid?
- Have you had your hearing tested or your ears checked within the past year?
- If so, was that in the last month?

A single question about hearing loss had a sensitivity of 69% in an American study of nursing home residents, while a three-item questionnaire achieved 83% compared to audiometry.<sup>3</sup> These questions had been used and found intelligible and meaningful in the course of the pilot study.

The final component of the screening examination consisted of otoscopy to document the presence of occlusive wax, and a Whisper Test. Whisper test results are only report-

ed for patients with Abbreviated Mental Test scores of seven or more. The Whisper Test is performed by asking the patient to repeat a two digit number which is spoken in a whispered voice, in a quiet room, from a position six inches behind each ear in turn, with the opposite ear occluded.<sup>10</sup> The patient fails the Whisper Test if he/she is unable to repeat the number after two attempts with different numbers. The Whisper Test has been shown to have a sensitivity of 90% and a specificity of 80% compared to the gold standard of audiometry in a study of referred patients in the Netherlands,<sup>11</sup> whose authors recommended its use as a screening instrument.

Respondent general practitioners were also required to note whether detected hearing problems had previously been diagnosed and what actions, such as ear syringing, audiometry or referral were planned on the basis of the present examination. Data analysis was performed using EPI-INFO.<sup>12</sup>

### Results

Ninety-eight general practitioners in 89 practices, who had agreed to participate following written invitation, received questionnaire booklets for ten patients. Completed questionnaires were received from 68 general practitioners who returned booklets on 579 patients (85% of possible total). In some instances patients were not contactable during the study period and in others it is not known why subjects were not examined. Of the returned booklets, 99 were incomplete, leaving 480 suitable for analysis (71% of possible total). The mean age of respondents was 80 years (range 75-97 years.) Three hundred and thirty-one (69%) patients were female. Four hundred and twenty-two (88%) scored seven or more on the Abbreviated Mental Test. The results are summarised in table 1.

#### *Response to seven-item questionnaire*

One hundred and forty-three of the 480 patients (30%) said or were reported by their carer to have difficulty hearing a spoken voice in a quiet room. Seventy-eight patients (16%) had ever used a hearing aid. Of these patients, 51% used their aids regularly; 68% found it of benefit and 77% had residual difficulty despite it.

#### *Otoscopic examination*

Ninety-seven percent of patients had both ears examined. Occlusive wax was found in 27% of ears on the right and 26% on the left. Wax was present in 36% of ears failing the Whisper Test on the right and 33% on the left. The association between failed Whisper Test and occlusive wax was significant (Chi<sup>2</sup> test p=0.001.)

#### *Whisper test*

Of 422 patients who had an Abbreviated Mental Test score of seven or greater, 420 completed Whisper Tests in both ears. Seventy-three patients (17.4%) failed the test in both ears. Unilateral failure was found in 30 patients (7.1%) on the right and in 14 patients (3.3%) on the left.

When deafness was defined as either bilateral failed Whisper Test or self/carer report of difficulty hearing spoken voice in a quiet room, 146 of 420 patients (35%) were so diagnosed. Of these patients 76 (52%) were defined as deaf by questionnaire alone, 30 (20.5%) by Whisper Test alone and in 43 (29.5%) the methods agreed.

#### Yield

Of the 489 patients who were asked if their ears/hearing had been checked in the year preceding the study, 99 (20%) replied that they had been checked. Thirteen patients (2.6%) had been examined within the previous month. Neither group had significantly different results in Whisper Testing from the remainder of patients.

Completeness of response to items concerning the general practitioner's prior knowledge of detected hearing problems varied from 93-100%. In 40 (27.4%) of the 146 patients with bilateral failed Whisper Test or difficulty hearing a spoken voice in a quiet room, the examining general practitioner had no prior knowledge of the problem.

#### Planned interventions

The examining general practitioner indicated that one intervention was required for 180 (37.5%) of the 480 patients studied. In a further 24 (5%) and 5 patients (1%) respectively, two and three actions were proposed. Syringing to remove ear wax was indicated for 131 (27%) of patients and referral was planned to Audiometry in 41 cases (8.5%) and to an Ear Nose and Throat clinic in 36 (7.5%).

#### Discussion

This study was designed to measure the prevalence of hearing loss in the 75 year and older agegroup, using a simple screening protocol. We postulated that a high prevalence of hitherto undetected problems would argue in favour of formal screening or, at least in support of opportunistic case finding as part of routine practice.

Observer bias was inevitable with this study, in which unsupervised volunteer general practitioners acted as the investigators. This design was pragmatic and probably reflects the structure of any future screening or case-finding proposal in Ireland. The need to prevail on the goodwill of service general practitioners resulted in low response and the shortfall of randomised patients for whom booklets were completed. The fact that 47% of randomly selected patients were seen in their homes suggests that considerable effort was made to include patients.

The prevalence of deafness in our study was 30% as defined by the screening question. This compares with Wilson's figures of 39.5-55% for self-reported hearing difficulty in a random sample of patients aged 65 years and over in a Birmingham group practice and 30% complaining of deafness in Abutan's study of all patients aged 60 years and over in a single practice in Rotterdam.<sup>12</sup> Taking the result of the Whisper Test, our figure of 17.4% bilateral deafness appears to underestimate the likely prevalence of deafness when contrasted with these studies in

Table 1. Summary of results.

Result	Frequency (n)
All patients:	
Abbreviated Mental Test score <7	12% (58/480)
Self/Carer reported hearing difficulty	30% (143/480)
Occlusive ear wax on right side	27% (126/466)
Occlusive ear wax on left side	26% (121/466)
Abbreviated Mental Test ≥7:	
Bilateral failed Whisper Test	17.4% (73/422)
Failed Whisper Test on right side	7.1% (30/422)
Failed Whisper Test on left side	3.3% (14/422)

which audiometry was performed alongside screening questions, especially given the greater mean age in our group than in either of these other studies. In Abutan's study the prevalence of audiometrically defined hearing impairment was 42% (average loss ≥35dB in one or both ears), while Wilson using audiometry found a prevalence of 54.3% (average loss ≥35dB in better ear.) When patients failing the Whisper Test on one side only are also considered deaf, an additional 10.4% of the sample are so defined bringing the total figure to 27.8%, still below the prevalence we might expect from these other studies, which were conducted in similar settings.

We found that the Whisper Test identified fewer cases of possible deafness than the screening question and that the Whisper Test and the screening question agreed in only 43 of 146 cases (29.5%) identified as possibly deaf by either method. It seems that the Whisper Test, when applied in practice as a screening tool by general practitioners, does not have the high sensitivity expected from Eekhof's investigation.<sup>11</sup> It is likely that the problem with the Whisper Test relates to the variability of administration between observers. Thus the need to control the loudness of the whisper, mentioned as a caveat by Eekhof, precludes its use as a screening tool without closer supervision and training of observers than was possible in our study.

Our findings in relation to hearing aid use accord with the international literature. Sixteen percent of our sample had an aid compared with 10.6% in Wilson's study and with 8.3% in Sangster's study of all patients aged 65 years and over attending a Canadian practice over a three-month period.<sup>13</sup> Sangster also found that most patients with hearing aids required modification or replacement of their devices to ensure benefit. Were a screening programme to be established in Ireland, it would be crucial that adequate provision be made for the maintenance of devices and follow-up of users, given our finding that almost half those patients with hearing aids did not use them regularly and three quarters had residual difficulty despite the use of an aid.

Other service implications also flow from these results. Were a screening programme established there would be

a heavy demand on audiometry, Ear Nose and Throat clinics and supply of amplification devices. It is notable that there was no difference in the prevalence of hearing difficulty between those patients who reported having had a hearing check in the year preceding the study and those who did not. Although there appears to be considerable potential for case-finding or screening to uncover hidden hearing difficulty (27.3% of all detected problems in this study), it may be that general practitioners are unable to intervene effectively following such diagnosis. Some reassurance is afforded by the finding that six months after the present study 53% of possible referrals had taken place (S. Prosser unpublished data.)

In conclusion, we have found a significant level of undetected hearing impairment in the elderly patients of Irish general practitioners. The Whisper Test and the screening questionnaire produced a lower prevalence than expected from the literature, which suggests low test sensitivity and unsuitability as screening instruments in their own right. On the other hand, methods were applied following written guidance alone by 68 doctors and provided a clinically significant yield of previously undetected hearing problems. This indicates that these methods might be incorporated into routine practice as a means of case finding. Since this study has been completed, the Irish National Rehabilitation Board, which has the statutory responsibility for provision of audiometry, has agreed open access to audiometry for general practitioners, who previously had to refer patients through the ENT clinic. This in itself should encourage Irish general practitioners to adopt a proactive approach to seeking hearing problems in their elderly patients. ■

#### Acknowledgements

The authors would like to thank all the respondent general practitioners and their patients for their effort in completing this study. In particular we thank Dr J Keane, Dr N O'Cleirigh, Dr R Harris, Dr T Heffernan, Dr D Lombard, Dr C Power, Dr B Norton and Dr G Barrett who recruited and supported participants as Faculty Coordinators. We are grateful for funding for this study to the Foundation for Education and Research of the Irish College of General Practitioners and the Irish Department of Health. Finally our sincere thanks to the wonderful administrative staff at College headquarters, especially Carol White.

#### References

- 1 Wilson PS, Fleming DM, Donaldson I. Prevalence of hearing loss among people aged 65 years and over: Screening and hearing aid provision. *Br J Gen Pract* 1993;43(375):406-9.
- 2 Abutan BB, Hoes AW, Dalsen CL van, et al. Prevalence of hearing impairment and hearing complaints in older adults: A study in general practice. *Fam Pract* 1993;10(4):391-5.
- 3 Herlost KG, Humphrey C. Hearing impairment and mental state in the elderly living at home. *Br Med J* 1980;281:903-5.
- 4 Weinstein BE, Ventry IM. Hearing impairment and social isolation in the elderly. *J Speech Hearing Loss* 1982;25:593-9.
- 5 Wrigley M. Abuse of elderly people-pathological carers. *Ir Med J* 1991;84(1):31-2.
- 6 Hickish G. Hearing problems of elderly people. *Br Med J* 1989;299:1415-6.
- 7 Williams EI, Wallace P. Health checks for people aged 75 years and over. Occasional paper 59. London: Royal College of General Practitioners, 1993.
- 8 Fahey T. Health and social implications of population ageing in Ireland 1991-2011. Report 32. Dublin: National Council for the Elderly, 1991:96.
- 9 Hodgkinson HM. Evaluation of a mental test score for assessment of mental impairment in the elderly. *Age and Ageing* 1972;1:233-8.
- 10 Swan IRC, Browning GG. The whispered voice as a screening test for hearing impairment. *J Roy Coll Gen Pract* 1985;35:197.
- 11 Eekhof J, Bock G de, Laats J de, et al. The whispered voice: The best test for screening for hearing impairment in general practice? *Br J Gen Pract* 1996;46:473-4.
- 12 EPI-INFO version 5. A word processing, database and statistics system for epidemiology on microcomputers. Geneva: World Health Organisation, 1992.
- 13 Sangster JF, Gerace TM, Seewald RC. Hearing loss in elderly patients in a family practice. *Can Med Assoc J* 1991;144(8):981-4.