

Screening for Hearing Loss in the Elderly

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Abstract

Background

Hearing loss is one of the most common physical impairments. Traditional screening techniques are inadequate. The Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) has been proposed as effective.

Objective

The aim of this study is to compare the value of the screening instrument (HHIE-S) with audiometric screening.

Results

Data were collected from 68 nursing home residents. Thirty four (50 per cent) of the patients failed both tests, while only 43 (63 per cent) failed the HHIE-S test. Thirty three (49 per cent) of the patients failed all; the cut-off value of greater or equal to 16 was 80 per cent sensitive and 95 per cent specific.

Conclusion

The HHIE-S questionnaire appears to be an appropriate test to use as a screening tool in nursing homes.

Key words

Hearing, Screening, Impairment, Clinimetrics

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Introduction

Hearing loss is among the most common physical impairments. The prevalence rate in the United States ranges from six per cent to 10 per cent of the adult population.¹ In adults between the age of 45 to 64 years, the estimates are 25 per cent.¹ In seniors it is very common, with a range of 31 per cent to 81 per cent among the healthy elderly.¹⁻⁴ It is the third most prevalent condition among adults over the age of 65 years.² Physicians usually conduct hearing screening in the very young⁵ and the very old.³

Hearing impairment has been linked with social isolation and psychological problems independent of physical health, socio-economic status and age.³ Depression, confusion, inattentiveness and negative behaviour are the main psychological problems.⁶⁻⁸ Social

isolation usually leads to a marked decrease in interpersonal communication.³ Poor hearing has also been linked to decreased performance on certain cognitive tests.⁹⁻¹¹

Only 11 per cent to 18 per cent of hearing impaired people actually receive assistance through amplification.^{12, 13} This disparity is due to many factors, including: many people accept their hearing loss, believing there is no effective treatment; others attribute it to the aging process; some deny its existence.¹⁴

Many physicians do not consider hearing loss a very important problem. Even when a patient complains of hearing loss, there is only a 50 per cent chance that he/she will be referred for assessment by a physician.⁷⁻¹⁴ Hearing loss is usually gradual and patients are unaware of the problem for a number of years. The U.S. prevention task force¹⁶ recommended elderly patients be evaluated for hearing loss.

Traditional screening techniques such as the “watch-tick” or the “whisper” test are inadequate.⁷ The Hearing Handicap Inventory for the Elderly-Screening Version (HHIE-S)²⁰ has been proposed as an effective screening tool in clinical settings.^{7,13,21}

The HHIE-S is a 10-item, self-administered questionnaire used to assess perceived functional limitations associated with hearing loss. It consists of five social or situational items and five emotional response items. It is derived from the original 25-item HHIE, which was designed specifically for the elderly. The score on the HHIE-S can be from 0 to 40, with a total score of 0 to eight constituting a pass, and 10 to 40 being considered as a failure.²²

The aim of this study was to compare the value of the screening instrument (HHIE-S)²³ with audiometric screening to determine whether HHIE-S can accurately identify patients with significant hearing loss.

Methods

All patients/residents at Ain WaZein Elderly Care Center were screened using HHIE-S and audiometry between 1998-1999. Ain WaZein Elderly Care Center is a community academic nursing home in the Chouf area of Lebanon. Data was collected from 68 patients. An interview was conducted with each patient in which the screening questionnaire was administered to assess his or her hearing status, ability to hear in common listening situations, and functional limitations associated with hearing loss. The Hearing Handicap Inventory for the Elderly-Screening Version²³ was used as a questionnaire in this validation study. The assessment also included an otoscopic examination. Patients with impacted cerumen were referred for ear lavage before audiometric assessment.

Test equipment consisted of Madson OB822 clinical audiometer and a Bel-Tone 114 audiometer. Pure tone air-conductive thresholds were established at 250, 500, 1000, 2000, 4000 and 8000 Hz using the procedure for threshold determination recommended by the American Speech-Language Hearing Association.²⁵ Functional hearing status was determined on the basis of pure tone average across 500, 1000 and 2000 Hz in the better ear. This reflects the hearing level through the range of frequencies of speech, and is a good assessment of the perceived functional ability of the individual.^{26,27}

For the purpose of this study, a patient's hearing was considered normal if the pure tone average was ≤ 25 dB and impaired if the pure tone average was >25 dB. The data was analyzed by calculating the sensitivity values for the interview questions according to standard practice. The Chi-square statistic was used to test all comparisons.

Results

The average age of the patients was 79 years (standard deviation 4.6). Two thirds of the residents were women and one third were men. There was no statistically significant correlation based on age or sex. Table 1 shows distribution of patients by hearing status based on pure tone.

Thirty four (50 per cent) of the patients failed both tests, while 43 (63 per cent) failed the HHIE-S (Table 2). To evaluate the questionnaires more precisely, sensitivity and specificity were calculated (Table 3). Compared to audiometry, the HHIE-S with a cut-off value of 10 was 83 per cent sensitive and 67 per cent specific. Positive Predictive Value (PPV), Negative Predictive Value (NPV) and likelihood ratios are also shown in Table 3. A cut-off value of 16 or greater gave a sensitivity of 80 per cent and specificity of 95 per cent.

Discussion

The screening tools used in this study were chosen on the basis of their ease of administration as well as their reported validity. After testing the HHIE-S against differing definitions of hearing loss, Lichtenstein et al,²⁸ concluded that it was a valid test for detecting hearing impairment in elderly patients regardless of the definition used. If the cut-off value of HHIE-S was increased to 14, the specificity increased, but the sensitivity decreased.

The ideal screening program for hearing loss needs to be quick, easy and inexpensive to administer. The tests used need to be high in sensitivity, specificity and predictive value. The HHIE-S at a higher cut-off value fits the above criteria. However, the question arises, Why should all patients not be routinely tested with an audioscope, rather than using a questionnaire?³

The argument for this is that even though the audioscope could be used on a regular basis by support staff, many nursing home facilities do not have pure tone audiometry, and even if they do, they do not calibrate them regularly or have the sound levels of examination rooms tested or personnel available to screen all patients. Therefore, a self-administered questionnaire with appropriate sensitivity, specificity and predictive values, which could be routinely completed by patients, would satisfy the need for a test that is inexpensive and acts as an easy screening tool.

Conclusion

Hearing impairment in the elderly is very common. It is often ignored and poorly managed. It is apparent from this study that the HHIE-S may be a useful screening tool for hearing loss. Using the HHIE-S will make hearing screening a simpler and more

effective routine procedure for physicians to perform. Accordingly, hearing problems will become easier to detect, record and manage.

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Table 1. Distribution of patients by hearing status based on pure tone averages across 500, 1000 and 2000 Hz in the better ear. (n=68)

Hearing Level	Pure Tone Average (dB)	Patients (%)
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Normal	0-25	38.2
Impairment		
Mild	26-40	36.7
Moderate	41-55	17.6
Moderately severe	56-70	5.8
Severe	71-90	1.4
Profound	90+	

Table 2. Distribution of patients who failed one, two, or all screening tests.

TEST	No (and%) of patients (N=68)
HHIES	43 (63)
Audioscope test	26 (42)
HHIES and Audioscope test	34 (50)

Table 3. Measurement Properties of the The Hearing Handicap Inventory for the Elderly-Screening (HHIE-S)

	Sensi tivity	Speci ficity	PPV	NPV	LR+	LR-
HHIES	83	67	79	72	2.5	0.25

HHIE-S 10 and greater is considered positive