

17.08 Audiology

17.08.01 Hearing Handicap Inventory for the Elderly

Overview:

The Hearing Handicap Inventory for the Elderly - Screening (HHIE-S) can be used to screen elderly patients for problems associated with hearing impairment. The instrument can be used together with hand-held audioscopes in primary care settings lacking audiometric facilities.

Question	No	Sometimes	Yes
Does a hearing problem cause you to feel embarrassed when you meet new people?	0	2	4
Does a hearing problem cause you to feel frustrated when talking to a member of your family?	0	2	4
Do you have difficulty hearing when someone speaks in a whisper?	0	2	4
Do you feel handicapped by a hearing problem?	0	2	4
Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?	0	2	4
Does a hearing problem cause you to attend religious services less often than you would like?	0	2	4
Does a hearing problem cause you to have arguments with family members?	0	2	4
Does a hearing problem cause you difficulty when listening to television or radio?	0	2	4
Do you feel that any difficulty with your hearing limits hampers your personal or social life?	0	2	4
Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?	0	2	4

Interpretation

- minimum score 0
- maximum score 40

HHIE-S score in study population	pretest probability of hearing	likelihood ratio (95% confidence)	post-test probability of hearing
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	impairment	interval)	impairment		
0-8	30%	0.36 (0.19 - 0.68)	13%		
10-24	30%	2.30 (1.22 - 4.32)	50%		
25-40	30%	12.00 (2.62 - 55.00)	84%		
HHIE-S score	sensitivity	specificity	positive predictive value	negative predictive value	test accuracy
> 8	72%	77%	58%	86%	74%
> 24	41%	92%	67%	78%	76%

References:

Lichtenstein MJ, Bess FH, Logan SA. Validation of screening tools for identifying hearing-impaired elderly in primary care. JAMA. 1988; 259: 2875-2878.

17.08.03 Screening Test for Hearing Impairment in the Elderly

Overview:

Elderly patients can be screened for significant hearing impairment by a simple free field voice test using 4 different levels in the loudness of the examiner's voice.

Test methodology

- The examiner stands behind the patient to remove the possibility of lip reading.
- The examiner then occludes the non-tested ear by gently occluding that ear's external auditory canal.
- The examiner asks the patient to repeat a set of 3 random numbers spoken by the examiner under different testing conditions.

4 sets of testing conditions are performed

(1) conversational voice at 6 inches

(2) conversational voice at 2 feet

(3) whispering voice at 6 inches

(4) whispering voice at 2 feet

Passing level: either

- The patient is able to repeat all 3 numbers correctly, or

- The patient is able to successfully repeat more than 50% over three triplet sets of numbers.

Failure to pass at each level of voice testing was considered a positive evidence for some degree of hearing impairment.

- The inability to hear a whispered voice at 2 feet was successful in identifying those patients likely to benefit from a hearing aid.

Validity in detection of significant hearing impairment	sensitivity	specificity	positive predictive value
failure to hear a whispered voice at 2 feet	100%	84%	92%
failure to hear a whispered voice at 6 inches	73%	100%	100%
failure to hear a conversational voice at 2 feet	47%	100%	100%

References:

Macphee GJA, Crowther JA, McAlpine CH. A simple screening test for hearing impairment in elderly patients. *Age Agng.* 1988; 17: 347-351.

17.08.04 Identification of the Type of Hearing Loss Based on the Patient's Description

Overview:

Certain features of a patient's hearing loss can help identify the probable type.

Types of hearing loss

- (1) conductive: lesions of the external (cerumen, etc.) or middle (otitis media, otosclerosis, etc.) ear
- (2) sensorineural: lesions to the cochlea, auditory division of the acoustic nerve, or both
- (3) central: lesions of the central auditory pathways (cochlear and dorsal olivary nuclear complexes, inferior colliculi, medial geniculate bodies, auditory cortex in the temporal lobes, and interconnecting afferent and efferent fiber tracts).

Feature	Conductive	Sensori-neural	Central
helped by loud speech	yes	no	no
helped by a quiet background	no	yes	yes
may be unilateral	yes	yes	no

affects certain frequencies only	no	yes	no
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Conductive hearing loss

- loud speech can be readily understood
- patients can hear speech in a noisy background better than in a quiet background

Sensorineural hearing loss

- the hearing levels for different frequencies are usually unequal
- patients may have difficulty hearing speech if there is background noise present
- patients may be annoyed by loud speech

Central hearing loss

- hearing of pure tones not impaired
- speech understood if it is clearly spoken in a quiet environment
- comprehension markedly deteriorates if there is background noise or competing messages

References:

Baloh RW. Dizziness, Hearing Loss and Tinnitus. FA Davis Company. 1998. Chapter 7: Evaluation of Hearing. pages 89-105. Table 6, page 90.