Review: the whispered voice test is accurate for detecting hearing impairment in children and adults

Pirozzo S, Papinczak T, Glasziou P. Whispered voice test for screening for hearing impairment in adults and children: systematic review. *BMJ* 2003;**327**:967.

Q Is the whispered voice test accurate for detecting hearing impairment in children and adults?

METHODS

Data sources: Medline, EMBASE/Excerpta Medica, and Science Citation Index (to June 2002); the web (for unpublished theses); reference lists; and authors.

Study selection and assessment: 2 reviewers independently selected cross sectional studies in any language if they evaluated the whispered voice test; the reference test, audiometry, was given to $\geq 80\%$ of participants; and sensitivity and specificity were reported (or calculable).

Outcomes: sensitivity and specificity.

MAIN RESULTS

8 English language studies were included. 4 studies included 256 adults (age range 17–96 y). The prevalence of hearing impairment ranged from 26–61%. 3 studies used similar techniques for the whispered voice test and a 30 dB positivity threshold for hearing impairment by audiometry (sensitivity 90% or 100%, specificity 80–87%). 1 study used a different technique for the test and a 40 dB positivity threshold; the results were reported such that overall sensitivity and specificity could not be calculated. At a sensitivity of 90%, the specificity was 70% (table). 4 studies included 716 children (age range 3–12 y). The prevalence of hearing impairment ranged from 9–31%. All studies used slightly different techniques for the test, and positivity thresholds ranged from 20–35 dB (sensitivity 80–96%, specificity 90–98%) (table).

CONCLUSION

The whispered voice test is accurate for detecting hearing impairment in children and adults.

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Commentary

Screening for hearing impairment in older age groups is recommended,¹ although the benefit of screening children during the first 4 years of life has not been established.² One screening method is the whispered voice test, the subject of this systematic review by Pirozzo *et al.*

The methodological quality of the studies included in this review was modest: only 2 of 8 studies met all quality criteria. Studies in children had the poorest quality. The specificity and sensitivity were high in all 8 studies despite the use of 6 different techniques. For the paediatric population, the sensitivity was lower, risking failure to identify hearing loss in some children.

The whispered voice test is a simple and accurate screening tool. The recommended standardised procedure for conducting this test is to have the examiner stand an arm's length behind the seated client. After exhaling, the examiner whispers a combination of numbers and letters as the client gently occludes one of their auditory canals with a finger while rubbing the tragus in a circular motion. The client is asked to repeat the sequence, and hearing is considered normal if the client responds correctly. If the client responds incorrectly, the test is repeated using a different number/letter combination. The client "passes" if able to correctly repeat 3 of the 6 numbers or letters.

An area of concern is the reliability of the test. Variation in the loudness of the whisper and clinician failure to exhale before whispering can lead to variable results in the same patients when administered by different clinicians. None of the studies were done in primary care settings, and the clinicians were specialists rather than primary care practitioners. The results are particularly relevant to clinicians working with elderly populations. Further research is required to evaluate the use of the test in primary care settings and with children.

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1 Patterson C. Prevention of hearing impairment and disability in the elderly. In: *Canadian Task Force on the Periodic Health Examination. Canadian Guide to Clinical Preventive Health Care*. Ottawa: Health Canada, 1994:954–63. <http://www.ctfphc.org>

2 Butler CC, van der Linden MK, MacMillan H, *et al.* Screening children in the first four years of life to undergo early treatment for otitis media with effusion. *Cochrane Database Syst Rev* 2003;(2):CD004163.

Diagnostic characteristics of the whispered voice test for detecting hearing impairment*

Number of participants	Age (y)†	Sensitivity (95% CI)	Specificity (CI)	+LR	–LR
101	57	100 (96 to 100)	87 (80 to 92)	7.7	0
62	81	100 (95 to 100)	84 (71 to 92)	6.4	0
62	≥ 55	90 (82 to 95)	80 (68 to 89)	4.6	0.12
31	76	90‡	70‡	—	—
197	5	96 (82 to 99)	92 (87 to 95)	11.6	0.04
141	7.2	90 (69 to 97)	90 (84 to 94)	9.1	0.12
177	3–12	80 (68 to 88)	96 (91 to 98)	19.5	0.21
201	3–7	83 (61 to 94)	98 (95 to 99)	38.1	0.17

*Diagnostic terms defined in glossary.

†Age is reported as mean or range.

‡Specificities were given for 2 sensitivities (80% and 90%); unable to calculate CI or LR.