



ABSTRACT

Introduction: The question about hearing status is common and often placed in epidemiological studies. In this work we compare the prevalence of self-reported hearing loss with the prevalence of hearing loss obtained from audiometric testing in a sample of the population of São Tomé and Príncipe.

Material and methods: We analyzed the data collected through a questionnaire on the perception of hearing applied in a clinical audiology assessment of patients in São Tomé and Príncipe. All patients were asked about their hearing status for each ear with the question: “Do you feel you have a hearing loss?”. We considered two classifications of hearing disability. We assessed the sensitivity, specificity and predictive value of complaints, based on audiometric tests carried out - tone pure audiogram and auditory brainstem response.

Results: From 721 queries performed, only 573 patients answered the question: “Do you feel you have a hearing loss?”. We obtained, according to the classification in the best ear, a sensitivity of 65% and specificity of 84%, with a positive and negative predictive value of 71.2% and 79.7% respectively, compared to the full range of audiometric tests. The prevalence of individuals with hearing complaints was 34.5% and of those who actually had hearing loss on audiometric tests was 37.9%.

Conclusions: Although audiometric evaluation remains the gold standard for hearing screening, the subjective perception of hearing loss continues to be a form of deafness identification and may be useful in epidemiological studies, especially in poor countries like São Tomé and Príncipe.



CONTACT

Cristina Carocha
Hospital CUF Infante Santo
Email: cristinacarocha@icloud.com
Phone: +351 917507165

INTRODUCTION

- About 5% of the world’s population has hearing loss (HL)¹
- HL is responsible for:
 - Social isolation
 - Depression
 - Low education
 - Low social productivity
 - Low quality of life
- Questions about one’s hearing are seldom included in questionnaires on large-scale epidemiological studies²
- Pure tone audiogram is the gold standard exam to estimate the prevalence of HL

PURPOSE

- Application of a question: “Do you think you have a hearing loss?” in a clinical inquiry during the audiology appointment within the Humanitarian Mission in São Tomé and Príncipe (“Health for All - specialities” project from a NGDO - IMVF)
- Validation of self reported question by audiometric exams:
 - Pure tone audiogram (PTA)
 - Auditory brainstem response (ABR)
- Study the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and accuracy of the self-reported question^{3,4}

METHODS AND MATERIALS

- Retrospective study of medical charts, from individuals that have been observed at the audiology appointment within the Humanitarian Missions in São Tomé and Príncipe
- Only individuals or caretakers who answered a self-reported question “Do you think you have hearing loss?” and had record of the hearing or electrophysiological threshold, were included
- Classification adopted was the classification of World Health Organization (WHO)¹
 - Hearing loss is a hearing threshold (mean value of 500, 1000, 2000 and 4000Hz air conduction thresholds) higher than 25 dB in the better ear.

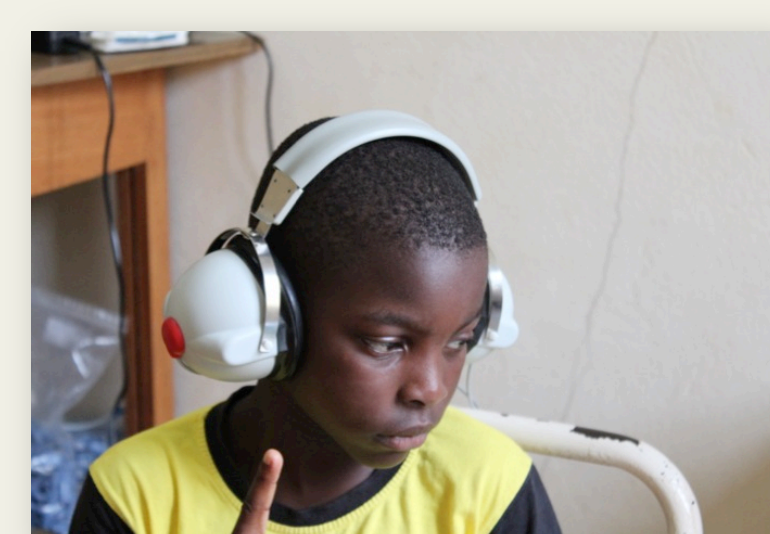


Figure 1. Child during PTA.

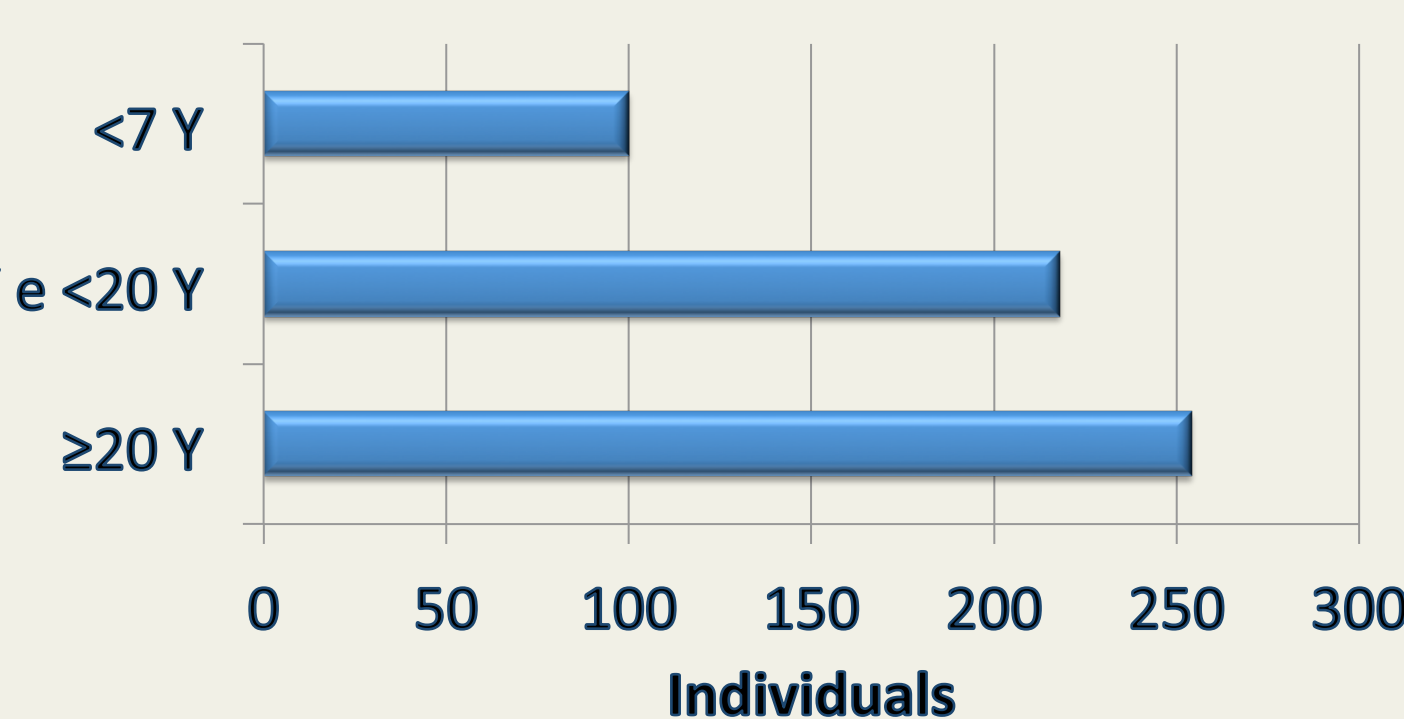


Figure 2. Child during ABR.

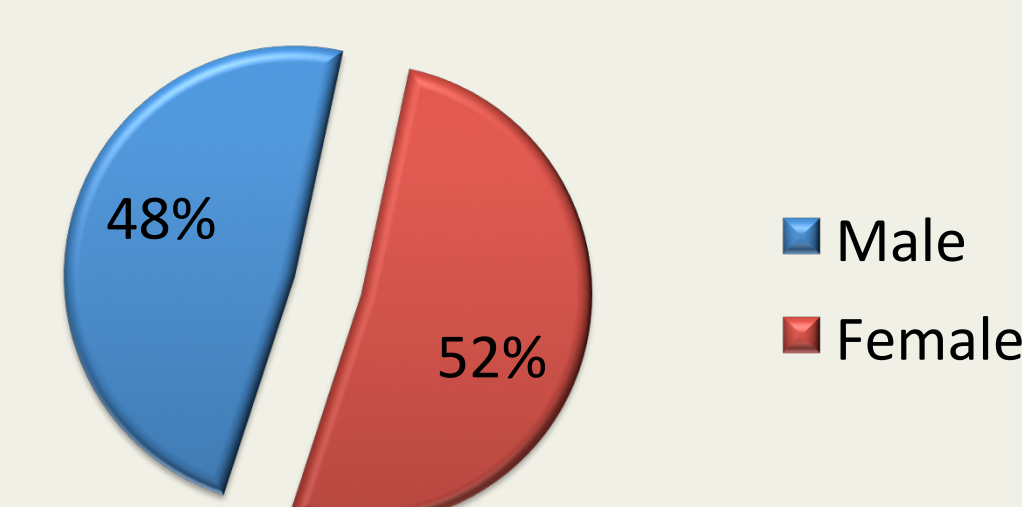
RESULTS

- Total of 573 individuals were analyzed
- Aged 1 to 83 years, mean age of 20.79 years, median age of 16 and mode of 7 years
- Audiological test validation:
 - Pure Tone Audiogram (PTA) – 81.2%
 - Auditory Brainstem Response (ABR) – 18.8%

Graph & Table 1. Distribution by age.



Graph & Table 2. Distribution by gender.



Graph & Table 3. Distribution by ear.

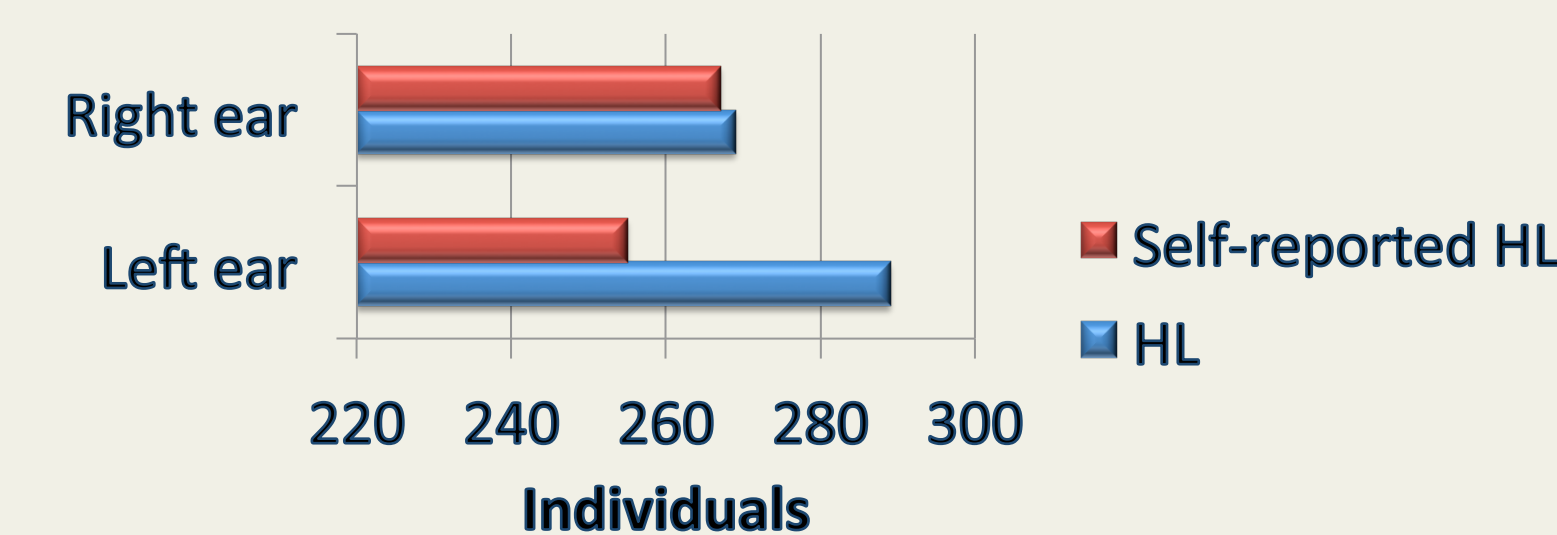


Table 4. Results in global sample.

	n	Prevalence		Diference	Sensitivity	Specificity	PPV	NPV	Accuracy
		Self-report HL(P _{SR})	HL(P _{HL})						
TOTAL	573	34,6%	37,9%	+3,3%	65,0%	84%	71,2%	79,7%	76,8%

DISCUSSION

- The female group revealed a higher sensitivity (68.72%) and specificity (84.62%) than the male group; the results from this study were similar to the one’s considering the best ear⁵. Probably because male underestimate HL
- In children, the answer to the question about hearing loss, based on the best ear is sometimes complicated⁵, resulting in a lower sensitivity (67.7%) but with a high specificity of 85.5%.
- As age increases, when evaluating the best ear, the sensitivity decreases and the specificity rises.
- The self-report of hearing loss in the older group was lower because it was hard to recognize one’s hearing loss as it is seen as a sign of ageing or, on the other hand, as the loss is gradual, there is no perception of the hearing loss^{6,7,8}.

CONCLUSIONS

- According to the WHO classification, the question “Do you think you have hearing loss?” has demonstrated to be efficient in identifying hearing loss but mainly normal hearing individuals within the population of São Tomé and Príncipe, becoming a useful question on hearing loss screening in this population.
- Although audiometric testing still remains as the gold standard, the subjective perception of hearing loss continues to be an important way of identifying hearing loss, especially in epidemiologic studies.
- In younger ages, where the tutor mostly gives the answer to the question, the self-report presents a high specificity despite the low sensitivity.

REFERENCES

- WHO. Deafness and hearing loss. WHO. 2013:1-5. Available at: <http://www.who.int/mediacentre/factsheets/fs300/en/index.html>. Accessed April 27, 2013.
- Sindhusake D, Mitchell P, Smith W, et al. Validation of self-reported hearing loss. The Blue Mountains Hearing Study. *Int J Epidemiol*. 2001;30:1371-1378. doi:10.1093/ije/30.6.1371.
- Zhu W, Zeng N, Wang N. Sensitivity, Specificity, Accuracy, Associated Confidence Interval and ROC Analysis with Practical SAS® Implementations K & L consulting services, Inc., Fort Washington, PA Octagon Research Solutions, Wayne. *NESUG Heal Care Life Sci*. 2010:1-9.
- MedCalc. Diagnostic test evaluation. :1-2. Available at: http://www.medcalc.org/calc/diagnostic_test.php.
- Marini a. LS, Halpern R, Aerts D. Sensibilidade, especificidade e valor preditivo da queixa auditiva. *Rev Saude Publica*. 2005;39(6):982-984. doi:10.1590/S0034-89102005000600017.
- Torre P, Moyer CJ, Haro NR. The accuracy of self-reported hearing loss in older Latino-American adults. *Int J Audiol*. 2006;45:559-562. doi:10.1080/14992020600860935.
- Nondahl DM, Cruickshanks KJ, Wiley TL, Tweed TS, Klein R, Klein BEK. Accuracy of Self-reported Hearing Loss. 1998:295-301.
- Valete-Rosalino CM, Rozenfeld S. Triagem auditiva em idosos: comparação entre auto-relato e audiometria. *Rev Bras Otorrinolaringol*. 2005;71(2):193-200. doi:10.1590/S0034-72992005000200013.