Perception and management of a self-fitting hearing aid

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Introduction

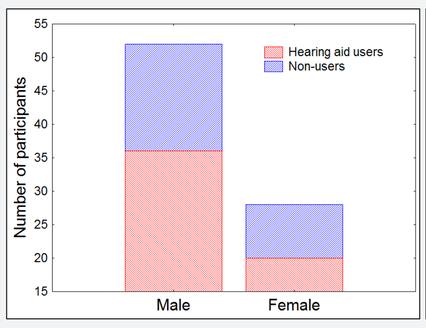
NAL is currently investigating if a 'self-fitting hearing aid' (SFHA), a device that users can program themselves without the need for audiological or computer support, is a viable solution for populations who have unreliable access to an audiological infrastructure. These populations include people living in developing countries and people living in remote, underserviced areas of large developed countries, such as Australia, USA, and Canada.

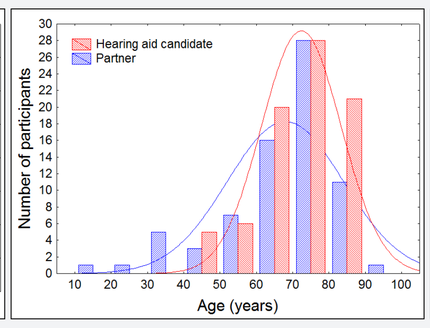
The SFHA incorporates an in-situ adaptive measurement of the user's hearing thresholds, to which an onboard prescriptive algorithm is applied to determine an appropriate amplification characteristic. The final product may be delivered in parts (a hearing aid body, different length tubes, different size instant-fit tips, and a battery), that the user needs to assemble before starting the fitting process.

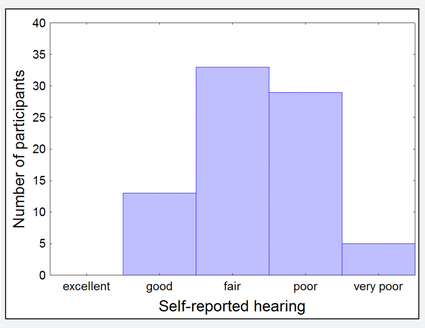
The aim of this study was to investigate the perception of a SFHA and the management of the assembling task among older hearing-impaired adults in a developed country.

Methodology

Eighty hearing-impaired people participated with a partner. The profile of the participants are shown below. Independent variables used in the following analyses include age, gender, occupation, hearing aid experience, vision, cognition (MoCa), and health literacy (S-TOFHLA).



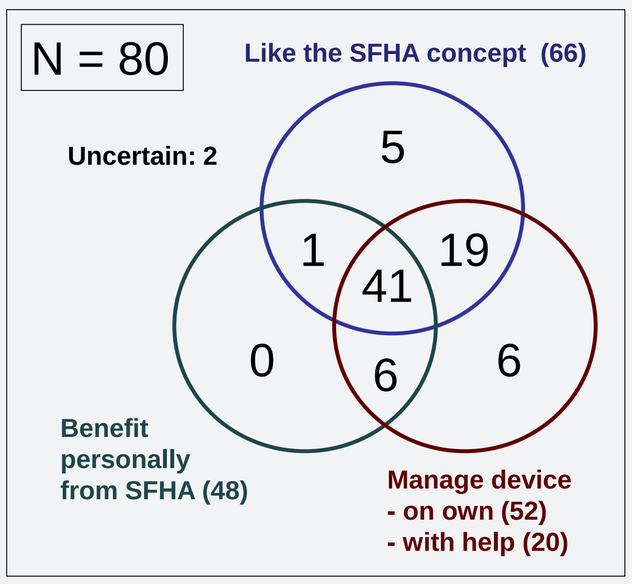




Perception

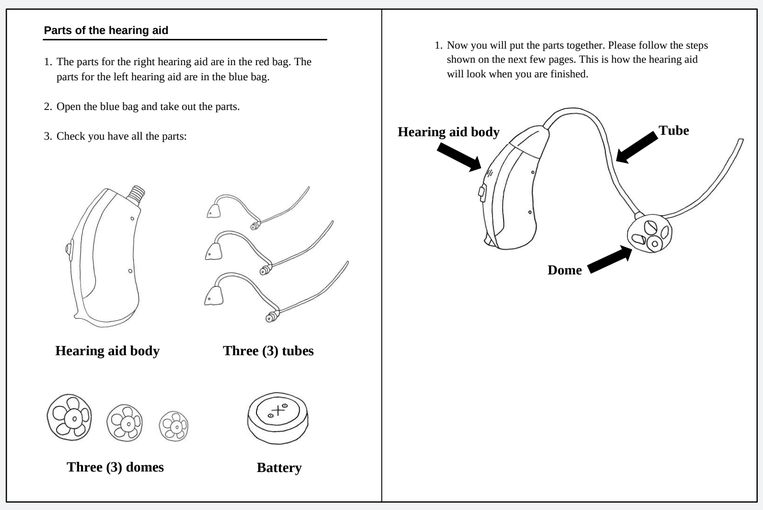
Participants were introduced to the SFHA concept and then completed a questionnaire. The perception of the concept was predominantly positive.

Self-adjustment, convenience, and independence were the most cited reasons for personal benefit and general advantages, which included lower cost. Disadvantages included preference for professional guidance, inferior outcome, and contraindication by cognitive and/or dexterity impairment.

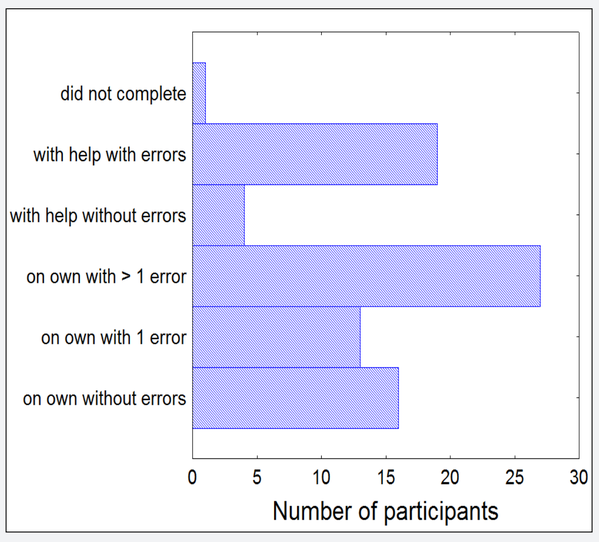


Management

Participants were provided with hearing aid parts. Following instructions devised using best practice design principles for older adults, they were guided to select appropriate size tubes and domes, assemble the parts, insert the device into the ear, and press a button to start the in-situ audiometry.



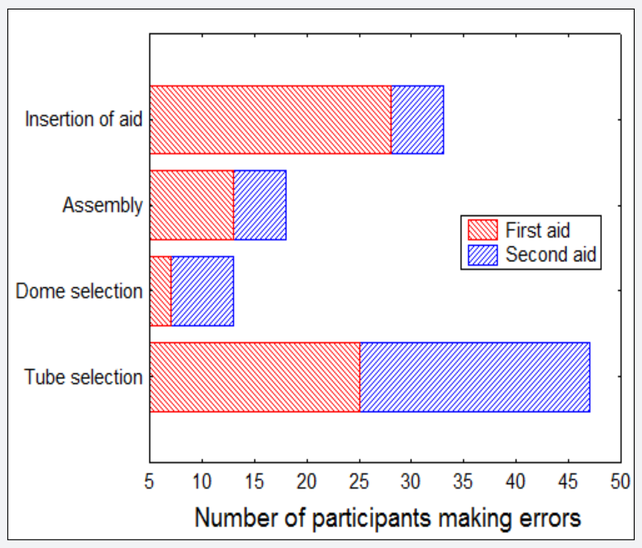
Of the 80 participants, 79 completed the assembly task; 70% did so on their own, while 25% correctly followed the instructions (no errors).



Males with a high health literacy score and cognitive function were more likely to complete the task *on own* ($F_{3,74} = 6.1$; $p < 0.0009$; 74%).

Females with a high health literacy score were more likely to complete the task *accurately* ($F_{4,55} = 7.5$; $p < 0.0001$; 80%).

Errors were mainly related to the selection of the right length tube (little difference between 'medium' and 'long'), and the insertion of the first device (incorrect placement of dome and/or concha lock). It is anticipated that both types of errors can be reduced with revised instructions.



Conclusion

Among older, hearing-impaired adults in a developed country, the concept of a SFHA was generally well received. The design and reading level of the instructions will likely determine the success of a SFHA in both developed and developing countries.