An Electroacoustic Analysis and Satisfaction Study of an Inexpensive Over-the-Counter (OTC) Hearing Aid

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INTRODUCTION

Hearing loss affects approximately 34 million people in the United States, but hearing aid adoption rates have historically remained low at 24%\(^1\). One major factor for this finding is that the average cost of a single hearing aid stands at $1904\(^2\), and insurance coverage for hearing aids is approximately 30% (excluding VA fittings\(^3\)). Numerous medical studies have linked untreated hearing loss in the elderly with a higher risk of social isolation, depression, anxiety, and symptoms consistent with Alzheimer’s dementia\(^3,4\).

PURPOSE

The objective of this study is to evaluate a novel, inexpensive (<$200) over-the-counter hearing aid with regards to its electroacoustic properties and also to test the hearing aid on patients with mild to moderately-severe hearing loss to evaluate their perceived benefit using validated questionnaires.

The community benefit of this study will be to study a low-cost hearing aid option for the millions of Americans that would benefit from hearing amplification but currently are foregoing it due to cost considerations.

MATERIALS AND METHODS

The MDHearingAid\(^\circ\) was evaluated using a Fonix 6500c Hearing Aid Analyzer, measured according to the American National Standards Institute (ANSI) S3.22-1996 hearing aid specification standard (ANSI, 1996). The measurements included saturated sound pressure level curve, high-frequency average full-on gain, frequency response, total harmonic distortion, equivalent input noise level, and input-output curve.

Then the aid was tested on a group of 9 test participants with mild to moderately-severe hearing loss that were unwilling to purchase a custom hearing aid due to cost considerations. They were asked to wear the device for a minimum of 30 days and complete self-reported surveys: International Outcome Inventory – Hearing Aids (IOI-HA)\(^5\) and Satisfaction with Amplification in Daily Living (SADL)\(^6\).

RESULTS

The MDHearingAid\(^\circ\) met gain and output targets previously described in the literature\(^2\). All 9 participants completed the study. The device met the range of norms for all 7 items in the IOI-HA and for 3 of the 5 categories of SADL.

DISCUSSION

Despite significant evidence supporting medical, social, financial, and emotional benefit of wearing hearing aids, adoption has been historically low. 76% of non-users point to financial constraints as a primary cause. Prior studies have shown that inexpensive hearing aids can provide similar self-reported benefit scores to expensive, conventional hearing aids\(^8\). Parving found a lack of difference in benefit and satisfaction scores between low-cost hearing aids and higher cost digital hearing aids in a study with 14,325 respondents\(^9\).

The MDHearingAid\(^\circ\) resulted in a favorable technical specifications and user satisfaction scores in a cohort of patients with mild to moderately-severe hearing loss. Affordable hearing devices provide a potential opportunity for greater numbers of persons with hearing loss to access amplification and reap the medical, social, and emotional benefits from improved communicative abilities.

CONCLUSIONS

The low-cost MDHearingAid\(^\circ\) was found to be electroacoustically adequate and a reasonable low-cost solution to meet the needs of those value- and cost-conscious patients with up to moderately-severe hearing loss who were not using amplification via a custom hearing device due to cost considerations. Further development and investigation of these instruments is warranted, to provide enhanced rehabilitation outcomes for elderly persons with hearing impairment.

REFERENCES

1. MarkTrak VIII, Sergei Kochkin, PhD
2. The Hearing Loss Experience Survey by S. Kochkin, 1995