Efficacy of Hearing Aid Orientation on New Digital and Analog Hearing Aid Users

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Abstract

Background and Objective: *Clinical experience indicates audiologists typically spend at least 15–20 min for a hearing aid orientation (HAO). Audiologists demonstrate the viewpoint that the information disseminated during an HAO is important for patients to learn and remember in order to use hearing aids effectively and independently. The present study was an investigation of new hearing aid users' ability to remember the information presented in a typical HAO session. The aim of the study was to compare between new analog and digital hearing aid users for recognition of the hearing aid orientation.*

Method: *In the present study, 57 subjects within the age range of 35 to 65 years were selected for administering the Hearing Aid Knowledge Inventory (HAKI; Reese, 2001) after hearing aid orientation.*

Result: *Result showed that the digital hearing aid users were better oriented towards the program, showing greater percentage of people following the prescribed procedure for hearing aid maintenance and proper utilization compared to analog users.*

Conclusion: *From the present findings we can conclude, that the socio-economic status of the hearing aid user might be playing an important role in gaining hearing aid knowledge as the analog user mostly belongs to lower socio-economic status with intellectual inefficiency than the digital hearing aid user.*

Key Words: *HAKI, HAO, Analog, Digital, Hearing aid users*

Introduction

A major area in the scope of practice for audiologists involves educating patients in the use and care of hearing aids.[1] This instruction has been a tool of the profession since the birth of aural rehabilitation following World War II. Clinical experience indicates audiologists typically spend at least 15–20 min during a hearing aid orientation (HAO) disseminating information regarding hearing aid use and care, troubleshooting tips, and expectations and limitations of hearing aid use. By this process, audiologists demonstrate the viewpoint that the information disseminated during an HAO is important for patients to learn and remember in order to use hearing aids effectively and independently. To study how patients learn and remember HAO information, it is instructive to examine how scientists in other areas of health care have approached the task of measuring the ability to remember health care information. Research shows that patients' ability to retain information presented by their health care providers are often limited, with 40%–80% of the information forgotten.[2-4] This wide range of research outcomes is a result of the differences in methodologies used in the various studies. Factors that appear to affect patients' memory ability include the following: the amount of information provided to the patient, the organization and clarity of information provided, the use of written information and pictorial cues, characteristics of the information provider, and the type of memory task used. With regard to the amount of information provided, research data indicate that as the amount of information provided increases, the ability to remember decreases. For example, Ley (1989) studied patients' recall of information presented during a general medical consult.[4] Patients who were given 10 statements recalled 34% of that information. Patients who were given 16 statements performed significantly lower than the 10-statement group, recalling only 28% of the information provided. Shapiro et al. (1992) found that physician affect played a critical role in patient recall.[5] Another important consideration in

patients' ability to remember health care information is the type of memory task used—that is, recognition, probed recall, or free recall. In a recognition task, the patient has to select the correct information from among several options. In a probed recall task, the patient has to recall the information but there is some type of supportive cue available. In a free recall task, the patient has to remember without retrieval cues. To exemplify the difference between recognition, probed recall, and free recall, consider the HAO. An example of a recognition task is completion of the multiple-choice item ''your hearing aid battery size is: (a) 10, (b) 312, (c) 13, or (d) 675.'' If the task were probed recall, the question would be: ''what is the size of the battery for your hearing aid?'' With a free recall task, the patient would be expected to include battery information in response to ''Tell me everything you know about using and taking care of your hearing aid.'' Since it is customary for clinical audiologists to relay a large amount of new information regarding hearing aids to first-time users, it is important from an evidence-based practice perspective to know what and how much patients remember from the HAO. The present study was an investigation of new hearing aid users' ability to remember the information presented in a typical HAO session. The aim of the study was to compare between new analog and digital hearing aid users for recognition of the hearing aid orientation. The objective of the study were to profile the concern of the different hearing aid users towards the orientation program, to find the percentage of subject following the prescribed correct procedures recommended by the audiologist during the orientation program and to profile the recalling ability of first time hearing aid users.

Material and Method

Participants: In the present study, 57 post-lingual hearing loss subjects (40 males and 17 females) within the age range of 35 to 65 years (mean age of 43.6 yrs) were selected for administering the Hearing Aid Knowledge Inventory (HAKI; Reese, 2001)[6]. All participants were native-born Hindi and Bengali speakers with no evidence of global cognitive impairment as determined by review of medical charts. They had normal or corrected-normal vision and good manual dexterity by self-report, and no charted evidence of life-threatening disease or psychiatric involvement. Modified mini-mental scale for cognitive function test was administered on all participants to rule out any cognitive dysfunction. Among total 57 subjects, 41 participants were using programmable digital hearing aid (GN Resound/Siemens/Phonak), whereas 16 participants were using analog behind the ear (BTE) hearing aid (GN Resound/ Siemens/ Phonak). Among the analog BTE users 43% were using GN hearing aids, 25% were Siemens users, and rest 31% were using phonak. Similarly among digital hearing aid users, 39% were using GN Resound, 39% were using Siemens and rest were using phonak hearing aid. Among 41 users of programmable digital hearing aid, 29 participants with moderate to severe sensorineural hearing loss were having behind the ear (BTE) and the rest 12 subjects were using Completely In the Canal (CIC) & In The Canal (ITC) hearing aids, who had mild to moderately severe sensorineural hearing loss. The remaining 16 analog behind the ear (BTE) hearing aid users were having hearing loss within the range of moderate to profound sensorineural hearing loss. Subjects who preferred digital hearing aid were mostly from good socioeconomic status (monthly income of Rs. 30000 INR and above), whereas the subjects who preferred analog hearing aid were mostly from poor socioeconomic status (monthly income of Rs. 10000 to 20000 INR). HAKI scored were obtained for all subjects. After, obtaining the HAKI scores, a comparative study was done between the digital and analog users.

Procedure

Fitting of the hearing aid and Hearing aid orientation were given by same audiologist. All the programmable hearing aid fitted using NAL-NL1 for subjects using digital hearing aid. For both group (digital and analog), audiologist ensures best fitting method for good outcomes in terms of performance of the client. A comparison was made based on those users (digital and analog hearing aid) who were following the prescribed procedure of hearing aid orientation program with those users who were not following the procedures provided by the respective audiologists during the program. The domain of content for the test was specified as the information provided at an HAO for an adult receiving hearing aids from the various audiologic settings. This includes: (a) hearing aid landmarks; (b) proper cleaning, storage, and repair procedures; (c) battery use and ordering; (d) general use; and (e) expectations and limitations of hearing aid use. The other major consideration was the selection of the item format-that is, recognition, probed recall, or free recall.

To assess memory of HAO content, a multiple choice questionnaire was administered (HAKI; Reese, 2001) [6]. The Hearing Aid Knowledge Inventory (HAKI; Reese, 2001) measures recognition memory for hearing aid use and care information that is relayed during the HAO and considered important for patients receiving hearing aids for the first time.[6] The HAKI consists of 35 multiple-choice items. Each item on the HAKI is worth 1 point. Possible scores range from 0 to 35, with higher scores indicating greater recognition of hearing aid use and care information. These questionnaires were translated in to Hindi and reverse translation was carried out make sure that the meaning of the content remains the same. These translated questions in Hindi and Bengali were proofread by a native speaker of Hindi as well as having knowledge of English too. Later, same questionnaire was used for the participants under close supervision of audiologists. Oral informed consent was taken from all participants. The data was analyzed using SPSS (version 17), along with descriptive statistics, percentages and proportions of the study subjects, in context to a particular response.

Result

There was no significant difference between ages of both group.

Hearing Aid Landmark: The list of information covered in Hearing Aid Knowledge Inventory (HAKI) which were given during hearing aid orientation program included the following important domains like landmarks i.e. microphone position and function etc. was suggesting that among the 16 analog behind the ear(BTE) respondents, only 37% preferred the correct procedures for checking microphone position and function, and for obtaining instructions provided by the manufacturer went through the information provided by the audiologists and the rest 73% were unable to realize the significance of serial number provided by the manufacturer and most of them were even unaware of the color codes of the hearing aids for respective directions i.e. red for right and blue for left ear. Whereas, among the 41 programmable digital hearing aid users only 35% followed the correct procedures for obtaining proper microphone position & function and utilized the information provided by the manufacturer, and the rest 55.33% were not following the instructions provided during hearing orientation program.

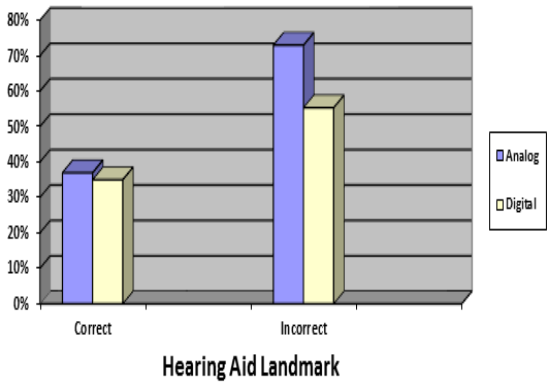

Fig. 1: Hearing Aid Landmarks

Battery use and ordering: The information regarding hearing aid batteries including the color & size, removal of tab before placing battery in hearing aid, inability to close if battery is upside down, removal of batteries when not in use and the other information's like repairing strategies and lasting revealed that only 60% of the analog (BTE) users utilized the above mentioned instructions adequately, and the rest 40% were not following them properly. On the other hand, digital programmable hearing aid users showed quiet similar results where 50% followed them properly and the rest 50% showed improper usage of hearing aid batteries.

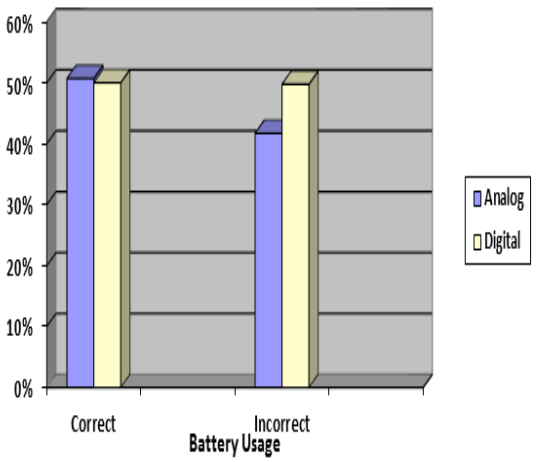

Fig. 2: Battery usage

Information regarding Acoustic Feedback Oscillation: The feedback produced by the hearing aids is not uncommon to us, therefore the main causes for its occurrence are provided during

hearing aid orientation program like it occurs when hand is held against the hearing aid or while using telecoil switch, and also its presence during jaw movement suggests that it has not been fitted properly. About 14.33% analog hearing aid users knew the probable reasons for feedback but most of them about 85% were unknown to the exact cause for occurrence of feedback. Programmable digital hearing aid users showed better understanding for feedback related issues where 61% were well aware and the rest 39% required more information regarding feedback.

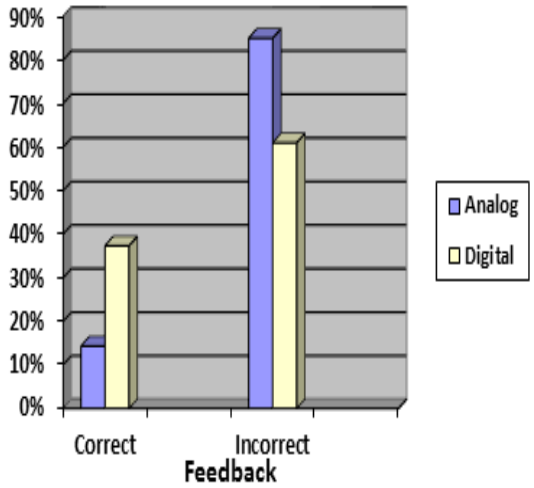

Fig. 3: Feedback

Proper Cleaning and care of hearing aid: Hearing aids are very delicate gadgets requiring special attention towards there cleaning and care where issues like accumulation of wax in receiver tube causing hearing aid problem, and proper means of cleaning & storage were assessed and compared among the two types of users. In the present study, the findings showed good number of analog hearing aid users which is about 54.66% knew the right means for care and maintenance of hearing aid. Nevertheless 44.88% were still lacking in this regard. For programmable digital hearing aid users 48.37% participants were following the instructions than the rest 49% participants used their own ways for cleaning.

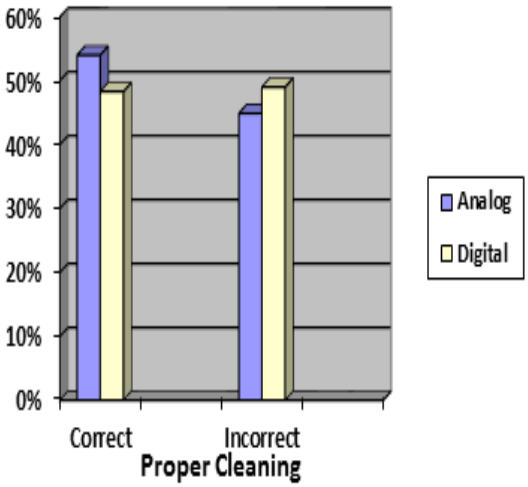

Fig. 4: Proper Cleaning

Expectations from hearing aid: The part of the questionnaire which dealt with the expectations of the hearing aid users i.e. hearing aid will make listening easier etc. revealed that 60% were having very higher expectation and the rest 40% had expectations from the hearing aid within its limit. The digital hearing aid users showing correct notion about the aid were 45% whereas remaining 55% were unable to understand its capabilities.

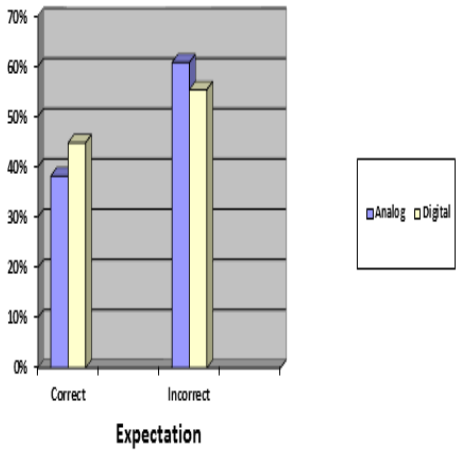

Fig. 5: Expectations

Limitations of hearing aid: Similarly the limitations of the hearing aid as explained during the orientation program were partially unknown to analog users where only 30% were not expecting that the hearing aid will help them to listen better in noise but the rest 70% were unknowingly expecting the same. Among digital hearing aid users also similar findings were observed, where only 20%

were not expecting that the hearing aid will help them to listen better in noise but the rest 80% were expecting the same.

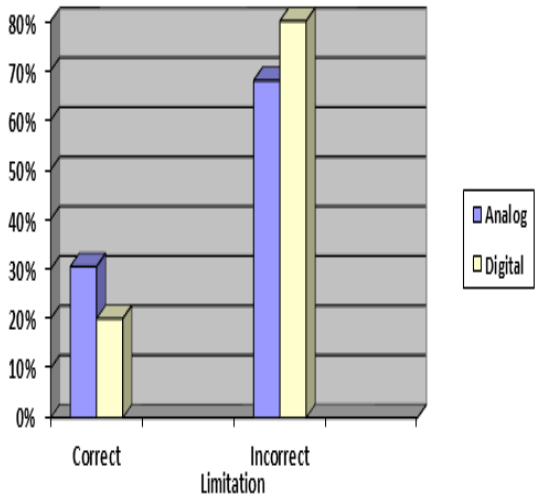

Fig. 6: Limitations

Trial period: The trial period for analog users showed that about 37% were involved in reading the information provided by audiologists for the proper adjustments of hearing aid and wore hearing aid regularly but the remaining 62% participants needed more counseling during the orientation program. Similar results were obtained for digital users, where 67% followed the instructions rest 32.7% required help of the audiologists in understanding the relevant information regarding the adjustment of hearing aid.

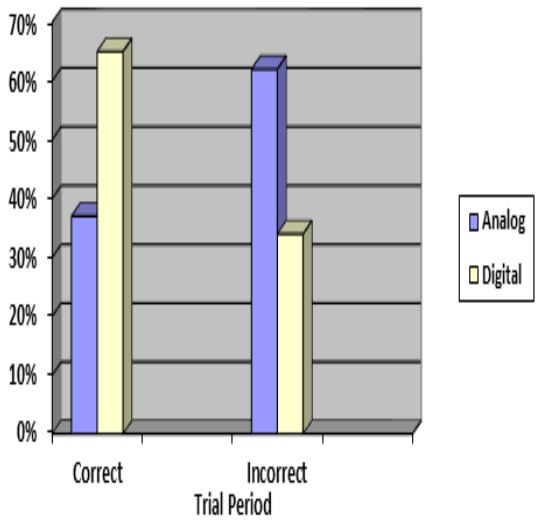

Fig. 7: Trial period

Discussion

It is widely accepted that the capacity to acquire and remember information in adulthood decreases with age.[7] It was somewhat surprising that age did not emerge as a significant factor in ability to recognize HAO information in this analysis. In the present study our findings were suggesting better recalling ability of the digital hearing aid users (CIC, ITE, and BTE) compared to analog hearing aid users. This difference in recognition ability might not be due to age difference, as recognition memory is not as affected by age as free recall.[8] This outcome even does not support the contention of Baltes and Lindenberger (1997),[9] suggesting differences in cognitive functioning, by brain-based changes in sensory functioning causes recalling deficit. As all our subjects were not having any kind of cognitive deficit. Among the programmable digital behind the ear (BTE) respondents, only 37% preferred the correct procedures, rest 73% were unable to realize the significance programmable digital hearing aid. Only 50.71% of the analog (BTE) users utilized the instructions adequately, and the rest 41.71% were not following them properly. On the other hand, digital programmable hearing aid users showed quiet similar results where 50% followed them properly and the rest 49.75% showed improper usage of hearing aid batteries. About 14.33% analog hearing aid users knew the probable reasons for feedback but most of them about 85% were unknown to the exact cause for occurrence of feedback. Programmable digital hearing aid users showed better understanding for feedback related issues where 61% were well aware and the rest 37.33% required more information regarding feedback. About hearing aids cleaning & storage showed good number of analog hearing aid users which is about 54.66% knew the right means for care and maintenance of hearing aid. Nevertheless 44.88% were still lacking in this regard. For programmable digital hearing aid users 48.37% participants were following the instructions than the rest 49% participants used their own ways for cleaning. About the expectations of the hearing aid users i.e. hearing aid will make listening easier etc. revealed that 60.8% were having higher expectation and the rest 38.2% had expectations from the hearing aid within its limit. The digital hearing aid users showing correct notion about the aid were 44.8% whereas remaining 55.36% were unable to understand its capabilities. About the trial period for analog users 37% were involved in reading the information given by audiologists for

the proper adjustments of hearing aid and wore hearing aid regularly but the remaining 62% participants needed more counseling during the orientation program. For digital users were 67% followed the instructions rest 32.7% required help of the audiologists in understanding the relevant information regarding the adjustment of hearing aid. So we can explain this difference in recalling ability for recognition of hearing aid orientation based on assumptions like the socio-economic status of the hearing aid user might be playing an important role in gaining hearing aid knowledge as the analog user mostly belongs to lower socio-economic status with intellectual inefficiency than the digital hearing aid user. Analog hearing aids are basically low cost hearing aid with limited cosmetic appeal drawing very little attention from its users may also account for the disorientation of its users as compared to digital hearing aid user. The digital hearing aids are very delicate, complicated devices and requires efficient dexterity from its users, making there users very much concerned about its usage whereas analog hearing aids requires limited attention.

Kemker and Holmes in 2004 demonstrated the benefit of both pre- and post-fitting hearing aid orientation (HAO) sessions.[10] This study also showed that HAO counseling is helpful in expediting hearing aid benefit and satisfaction through the education of our clients and that this benefit and satisfaction is age dependent as measured by the Glasgow Hearing Aid Benefit Profile. A study done by Reese and Hnath in 2005[11] taken a sample of 100 older adults completed a multiple-choice test of hearing aid knowledge immediately following the (hearing aid orientation) HAO and 1 month later. Result showed that participants recognized 74% of the information immediately following HAO and 78% at 1 month. Hearing loss was associated with declining recognition for hearing aid use and care information immediately following HAO, whereas prior knowledge was associated with successful recognition. Participants who recognized more HAO content immediately also remembered more at 1 month.

In the present study, after administration of Hearing Aid Knowledge Inventory (HAKI) we obtained mixed results. We can conclude from the above findings that the digital hearing aid users were better oriented towards the program, showing greater percentage of people following the prescribed procedure for hearing aid maintenance and proper utilization compared to analog users. The study of memory for HAO content in an audiologic clinic accounts for the cognitive abilities and experience that directly affect task performance.[12] But in the present study subjects had no such history of cognitive deficit, so the overall finding accounts for the differences in the signal processing ability of the hearing aid. Suggesting that the digital hearing aid (CIC, ITE, BTE) users were more oriented towards the prescribed procedure recommended during the orientation program and from the present findings we can conclude, that the socio-economic status of the hearing aid user might be playing an important role in gaining hearing aid knowledge as the analog user mostly belongs to lower socio-economic status with intellectual inefficiency than the digital hearing aid user. Analog hearing aids are basically low cost hearing aid with limited cosmetic appeal drawing very little attention from its users may also account for the disorientation of its users as compared to digital hearing aid user. The digital hearing aids are very delicate, complicated devices and requires efficient dexterity from its users, making there users very much concerned about its usage whereas analog hearing aids requires limited attention.

Conclusion

Present study indicates that the digital hearing aid users were better oriented towards the program, showing greater percentage of people following the prescribed procedure for hearing aid maintenance and proper utilization compared to analog users.

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