

Original Research Article

The Indian context: an investigative study of assistive listening device usage and experiences among hearing aid users

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ABSTRACT

Background: Assistive Listening Devices (ALDs) augment the functionality of hearing aids and cochlear implants, facilitating enhanced auditory communication for individuals with hearing impairment and potentially improving their life quality. The limited popularity of ALDs within the Indian context necessitates an investigation into the factors influencing their underutilization.

Methods: To address this, a survey assessing ALD awareness among Indian hearing aid users with at least one year of device usage was administered using a questionnaire. A total of 42 responses were collected and subjected to descriptive analysis.

Results: The findings of the study revealed a predominant willingness among hearing aid users to discover ALDs and their advantages in daily activities. A segment of the cohort was already conversant with ALDs, whereas a minor fraction showed reluctance towards acquiring additional information.

Conclusions: The obtained data indicates a requirement for further comprehensive research with a larger pool of data to understand the breadth of user dispositions and the motivation for the indifferent reception of ALDs in the Indian context.

Keywords: Assistive listening devices, Awareness, Hearing aids, Hearing loss, Quality of life

INTRODUCTION

Hearing impairment manifests itself in numerous forms. People with hearing difficulties might experience varying levels of hearing loss at distinct frequencies in each ear. The hearing loss pattern, hearing threshold configuration, and the severity of the hearing loss can all influence how sound is perceived by those with hearing impairment.¹ The primary concern for many with hearing loss is trouble comprehending speech, particularly in challenging listening environments. Sentential recognition abilities were found to significantly differ among hearing-impaired subjects (mild-moderate SNHL) compared to masked-normal listeners.² Studies indicate that noise and distance impact speech perception for

people with hearing impairments in noisy surroundings, and overall signal intelligibility decreases.³

Similarly, distance has a notable effect on hearing. Blazer et al discovered that students positioned 1.8 meters from the desired signal achieved 95% of speech recognition scores; however, scores declined to 60% when seated 7.3 meters away.⁴ This reduction in signal intensity due to distance can lessen speech perception and the intelligibility necessary for effective communication. In general, those with a hard-of-hearing condition require a 15 dB improved signal-to-noise ratio (SNR) to attain the same level of speech comprehension as individuals with normal hearing ability; but, the degree and nature of hearing loss must be considered.⁵

To address the challenges faced by hard-of-hearing individuals and enhance their auditory accessibility in challenging listening environments, the human mind has developed a diverse array of assistive listening devices (ALDs) or assistive technology that offer supplementary amplification and noise reduction when hearing aids fall short in facilitating optimal communication.⁶ Specifically, ALDs can bolster the effectiveness of hearing aids. Such ALDs encompass Roger microphones (FM systems from Phonak), TV connectors, partner/multi-mic, and phone clips, which considerably ameliorate the quality of life for those with hearing difficulties by alleviating their daily struggles and promoting better hearing experiences.⁷ In adverse listening situations, these ALDs assist hearing-impaired individuals by mitigating or cancelling unwanted noise, identifying speech sources, streaming through hearing aids, diminishing distance effects, and counteracting poor acoustics.⁸ As good auditory capabilities directly correlate with an enhanced quality of life particularly for individuals with a higher degree of hearing loss or those experiencing neural-originated hearing loss. It is imperative to effectively communicate the accessibility and potential benefits of ALDs to patients during the process of dispensing hearing aids. Though ALDs are not a novel concept and plentiful information regarding their advantages is readily available on manufacturers' websites, it is notably difficult in India to find hearing-impaired individuals utilizing such devices. For example, FM systems, infra-red systems, induction loop systems, alerting devices etc have been in use for a very long time. Although there is no data on the specific number of Indian users of ALDs, clinical observations indicate that these devices are not widely popular. A plethora of factors may contribute to their unpopularity-including lack of awareness, social stigma, cost constraints, and more. As people worldwide relish the merits of this remarkable innovation, it is crucial to explore why these devices remain scarcely employed within the Indian context. The objective of this study was to comprehend the perspectives of patients about these devices and their knowledge of ALDs. Additionally, the study also aimed at understanding hearing aid users' attitudes toward ALDs in India and why they are not as popular as it is in the Western world.

METHODS

The current study is a cross-sectional study that aims to understand the perspective of hearing aid users on assistive listening devices (ALDs). Informed consent was taken before recording the responses from the participants. Each participant was explained about the purpose of the study and the expected outcomes. Consent was taken from the patients before collecting their responses. The inclusion criteria for participants' selection were hearing-impaired individuals using amplification devices, adults above 18 years of age and knowledge of basic English.

The sample size was calculated using G*power software with an effect size of 0.5, a significance level of 0.05 with a confidence interval level of 95%, and an assumed power of 80% and the sample size needed for the study was calculated to be 29. In the study, we successfully collected data from a cohort of 42 participants, all of whom were experienced hearing aid users with at least one year of device usage. The study did not impose any restrictions on the upper age limit of the participants, allowing for a diverse age range within the sample population.

The survey consisted of 16 questions in total, an assortment of multiple-choice questions was prepared after carefully reviewing the existing literature. All the questions were reviewed and the content was validated by experienced professionals with at least five years of experience in the respective field of study. A prepared questionnaire was first used to carry out a pilot study to check for the difficulties that might arise while taking the survey post which the online survey was conducted in English for the duration of 2 months from the month of February 2024 to April 2024. To make the survey accessible to a larger mass, Google Forms (Google Inc., Mountain View, CA, USA) was chosen. The survey questionnaire was distributed using social media handles such as WhatsApp, Viber and Messenger to patients of different hospitals and clinics across South India with the help of audiologists at those centres. A few of the questionnaire was also forwarded via G-mail. The online survey was preferred as a time-saving means of reaching larger study groups. Analysis of the data was done question-by-question basis.

RESULTS

In this research study, we aimed to analyze the responses collected from a survey where participants were asked to rate their agreement or disagreement with a specific statement on ALDs and what would they want to do about it using a five-point Likert scale. Tables 1 and 2 summarize the frequency and percentage of responses obtained from 42 participants who are hearing aid users.

The survey results reveal a variety of perspectives and attitudes towards Assistive Listening Devices (ALDs).

For the first statement in the survey, a significant portion (21.43%) strongly disagreed with being unaware of ALDs, while the majority simply disagreed. Additionally, 21.43% of participants had a neutral stance on ALD awareness, and a considerable number 14.29% agreed and 11.9% strongly agreed that they did not know ALDs. When it came to the difficulty of independently operating current ALD technology, a significant number of respondents (45.24%) indicated a neutral attitude. Interestingly, a substantial number of responders (38.1%) disagreed with the statement, suggesting that current ALD technologies are not difficult to use independently. Only 4.76% of respondents agreed with the statement,

indicating that current ALD technologies are challenging to operate independently. When asked about the necessity of ALDs given that they spend most of their time at home, a sizable fraction of respondents (33.33%) had a neutral opinion. A similar percentage of respondents (33.33%) disagreed with the need for ALDs, implying that they do not consider them necessary even if they stay at home. Nonetheless, a smaller number of respondents

(14.29%) agreed with the need for ALDs. The importance of affordability was highlighted when respondents were asked about trying ALDs in the market if they are affordable. A significant proportion of respondents (64.27%) were inclined towards trying ALDs if they are affordable. Conversely, a smaller percentage of respondents (14.29%) expressed disagreement with the notion of trying ALDs if they are affordable.

Table 1: Impression of study participants on assistive listening devices (ALDS).

Statements	Options	Frequency of responses	Percentage
1a. I do not know about assistive listening device	Strongly disagree	9	21.43
	Disagree	13	30.95
	Neutral	9	21.43
	Agree	6	14.29
	Strongly agree	5	11.9
2a. I think the current ALD technologies are very difficult for me to operate independently.	Strongly disagree	5	11.9
	Disagree	16	38.1
	Neutral	19	45.24
	Agree	2	4.76
	Strongly agree	0	0
3a. I think I do not require ALDs as I mostly stay at home.	Strongly disagree	8	19.05
	Disagree	14	33.33
	Neutral	14	33.33
	Agree	6	14.29
	Strongly agree	0	0
4a. I think I will try ALDs in market if they are affordable.	Strongly disagree	0	0
	Disagree	6	14.29
	Neutral	9	21.43
	Agree	15	35.7
	Strongly agree	12	28.57
5a. I think managing an additional device(e.g. charging, additional connectivity/pairings) is difficult for me, due to my age.	Strongly disagree	0	0
	Disagree	8	19.05
	Neutral	5	11.9
	Agree	13	30.95
	Strongly agree	16	38.1
6a. I think people will assume that I am disabled if I use such devices.	Strongly disagree	11	26.19
	Disagree	17	40.47
	Neutral	4	9.52
	Agree	8	19.05
	Strongly agree	2	4.76
7a. I don't want to buy ALDs because it is compatible with expensive hearings aids and phone only.	Strongly disagree	2	4.76
	Disagree	15	35.71
	Neutral	22	52.38
	Agree	1	2.3
	Strongly agree	2	4.76
8a. I think I've not fully understood how exactly will ALD's help me.	Strongly disagree	3	7.14
	Disagree	9	21.42
	Neutral	7	16.67
	Agree	21	50
	Strongly agree	2	4.76
Grand total		42	100

Looking at the overall sentiment towards the subject matter, most respondents either agreed or strongly agreed

that managing additional devices along with hearing aids is difficult with age, accounting for 68.05% of all replies

but It's important to note that none of the responders strongly disagreed with the statement. However, when asked if they did not want to procure ALDs due to the stigma of disability attached to it, most respondents (66.66%) either disagreed or strongly disagreed. This indicates that a sizable portion of individuals do not feel positively towards that particular aspect of ALDs. Interestingly, when asked if they would not opt for ALDs

due to their compatibility issues with lower-end hearing aids, most respondents (52.38%) remained neutral, indicating that a sizable proportion of participants neither agreed nor disagreed. Finally, concerning cognizance of ALDs, the majority of respondents (50%) agreed with the statement that they indeed are not exactly sure how exactly ALDs can help them, demonstrating a general agreement among the participants.

Table 2: The action participants would take in light of their response to the prior statement on the first part of the questionnaire.

Follow-up Questions for the statements	Options	Frequency of responses	Percentage
1b. Based on your previous answer, kindly tell us what action you might take.	i. I want to learn more about ALD's	25	59.52
	ii. I can manage with hearing aid alone.	14	33.33
	iii. I don't want to learn about ALD's.	3	7.14
2b. Based on your previous answer, kindly tell us what action you might take?	i. I will watch informational videos and take help from my audiologist or family to operate it	25	59.42
	ii. I will look for simpler technology devices	9	21.43
	iii. I will manage without ALD's	8	19.05
3b. Based on your previous answer, kindly tell us what action you might take?	i. I think I can try ALD's	20	40.61
	ii. I may want to try ALD's in future	15	35.7
	iii. I don't think I will ever use it.	7	16.67
4b. Based on your previous Count answer, kindly tell us what action you might take.	i. I will invest if the devices are affordable	18	42.8
	ii. I may consider investing if the devices are affordable	17	40.47
	iii. I would still not consider buying it	7	16.67
5b. Based on your previous answer, kindly tell us what action you might take?	i. I will invest on it if its easy maintenance	23	54.76
	ii. I might consider it if its low maintenance	14	33.33
	iii. I will still not consider buying one	5	11.9
6b. Based on your previous answer, kindly tell us what action you might take?	i. I don't care about what others think and still go for it, if it helps me	35	83.33
	ii. I would be reluctant to go for it as I might feel embarrassed in public	4	9.42
	iii. I would not go for it because I feel I might look disabled	3	7.14
7b. Based on your previous answer, kindly tell us what action you might take?	i. I will buy it if its compatible with my hearing device and phone	24	57.14
	ii. I may think of buying it if its compatible with my hearing device and phone	10	23.80
	iii. I will not buy as it will not might not be compatible with all hearing aids and brands of phone	8	19.04
8b. Based on your previous answer, kindly tell us what action you might take?	i. I know how ALD's work and how it will help me	29	69
	ii. I am interested in understanding ALD's benefit in my daily life.	11	26.19
	iii. I am not interested in knowing about ALD's	2	4.76
Grand total		42	100

The survey results offer a comprehensive understanding of individuals' attitudes and preferences towards Assistive Listening Devices (ALDs).

A majority of respondents (59.52%) expressed their interest in learning more about ALDs, while a significant

portion (33.33%) believed that they could manage with a hearing aid alone. A small percentage (7.14%) showed no interest in learning about ALDs. These responses indicate diverse preferences and actions respondents might take concerning ALDs.

When asked about the steps they would take based on their previous answers regarding ALD technology, the majority (59.42%) indicated that they would watch informational videos and seek help from their audiologist or family members to learn how to operate ALD devices effectively. A significant portion (21.43%) expressed their intention to look for simpler technological devices, and a smaller percentage (19.05%) stated that they would manage without ALDs. On the prospect of trying ALDs, a significant percentage of respondents (40.61%) are open to trying them, and 35.7% indicated that they may consider trying ALDs in the future. A smaller percentage (16.67%) expressed a firm belief that they will never use ALDs. The affordability of ALDs also emerged as a significant factor influencing respondents' decisions. A combined percentage of 83.27% of respondents expressed a positive inclination towards investing in ALDs if they were affordable. Conversely, a smaller percentage (16.67%) maintained a negative stance, stating that they would still not consider buying the devices even if they were affordable. The ease of maintenance of ALDs also influenced respondents' willingness to invest in them. The majority (54.76%) indicated that they would invest in a product if it was easy to maintain, while 33.33% might consider it and a lower proportion (11.9%) would still not consider purchasing it.

Interestingly, the vast majority of respondents (83.33%) expressed a strong desire to pursue something that will benefit them, even if others might perceive them differently. A lesser proportion (9.42%) expressed hesitation due to cosmetic concerns, and 7.14% were concerned about appearing impaired. Compatibility with existing devices is another critical factor for respondents. The majority (57.14%) might consider purchasing the product if it is compatible with their hearing device and phone. However, 19.04% expressed concerns about compatibility with various hearing aids and phone brands. Conclusively, a majority of respondents (69%) expressed interest in understanding the benefits of ALDs in their daily lives. A smaller percentage (26.19%) stated that they already possess knowledge about how ALDs work and how they can be beneficial, but a small proportion (4.76%) indicated that they are not interested in knowing about ALDs.

DISCUSSION

Listening and communicating in various situations can be challenging regardless of your hearing loss and when communicating verbally, noise and speech do not pair well together. A lot of the time, we find ourselves in challenging listening situations where communication gets impaired due to multiple factors including noise, distance, room acoustics etc. Optimal communication in such an environment is even more challenging for individuals who are hard of hearing. So, to overcome such challenges assistive technologies were introduced. Assistive listening devices use technology to capture sound from the source and deliver it directly to the ear,

reducing the influence of distance, background noise, and reverberation⁹

As per the data presented in this study collected from 42 hearing-impaired users who are currently using hearing aids, it is evident that a significant number of hearing-aid users are unaware of such assistive technologies being available which can make their lives better in terms of communication. It's quite astonishing that despite many patients actively seeking information about medical tests and devices before consulting a professional, a significant number remain uninformed about ALDs. However, the silver lining is that the majority of hearing aid users are willing to learn more about these devices.

Even though the hearing aid and implantable device industries are making tremendous progress in terms of technologies with the incorporation of artificial intelligence it might still not be enough. For example, while new microphones improve the intelligibility of speech in noise, they provide little, if any, improvement in reverberant listening situations.¹⁰ These findings emphasize the importance of ALDs and of providing comprehensive information and personalized guidance to individuals with hearing impairments, allowing them to make informed decisions based on their unique needs and preferences.

Besides awareness, this survey aimed to understand the factors that could potentially be affecting the usage of these devices among patients and what solutions would they prefer to be applied to overcome such issues. A majority of the population with hearing loss in the world as well as India is the older age group above 60 years i.e. 67% in the country's capital, Delhi.¹¹ The majority of individuals likely to utilize Assistive Listening Devices (ALDs) are elderly, as they are particularly affected by presbycusis. This condition is marked by challenges in communication amidst noise, delayed central processing of auditory information, impaired sound localization, and hearing loss.¹² Along with auditory problems dexterity issues and forgetfulness also can be present. Thus, it has to be made sure that the assistive listening devices made are user-friendly and easy to operate given the fact that the users are mostly from higher age brackets who might have difficulty operating complex technologies. Along with that, the audiologist must involve the family who can help the patient with such a device and also inform the patient and the family regarding the websites consisting of informational usage videos on ALDs.

Earlier surveys also revealed that out of 7% Indian population only 0.5% address their hearing loss, which could mean they don't feel it's required.¹³ There are numerous factors as to why an individual would not go for hearing aids but one of the major factors is that they don't feel the need for it. The responses obtained from this survey denote the same but despite that, almost half of the study participants want to try the ALDs. Based on this information, one possible action that could be taken

is to provide more information on how ALDs can enhance communication and quality of life for individuals with hearing impairments. This could include educational materials, demonstrations, or even trials of different devices to help individuals make informed decisions about whether or not to try ALDs. It is important to respect individual preferences and choices when it comes to assistive technologies like ALDs. Providing accessible information and support can empower individuals to make decisions that best suit their needs and preferences. One other major factor that limits the purchase of hearing aids and ALDs everywhere in the world and more so in India is the cost. According to the 'State of Inequality in India' report conducted at the Institute of Competitiveness, 90% of the country does not earn even INR 25,000 per month but the cost of a digital hearing aid starts at around 15000 INR per unit and basic partner mic/multi-mic is priced around 20,000 INR.¹³ In a country where these devices are not covered under insurance or a national health care plan procurement likely gets hampered by the cost of the device.¹⁴ This underscores the potential impact that affordability can have on increasing adoption rates of these devices. Manufacturers and policymakers should strive to develop cost-effective options that cater to a wider range of individuals with varying financial capabilities in India and additionally, new national policies to incorporate such expenses can be proposed. By doing so, they can ensure equitable access to these devices and empower individuals with hearing impairments to enhance their communication abilities and overall quality of life.

In addition to the associated cost factor that seems to hinder the purchase and usage of ALDs, other factors that create an impact are the ease of maintenance and cosmetic concerns/taboos. These devices are powered by a battery that needs to be charged daily and fresh pairing has to be done while using it. Though these things sound easy, it might not be the case for the geriatric population due to the above-mentioned reasons. From the responses from the study, it can be inferred that the majority of the patients are willing to buy it if it is easy to maintain daily. On the other hand cosmetic concerns and taboos pose a major factor affecting procurement, there is a study which has discussed how hearing loss and the use of hearing aids are closely associated with ageism and perceptions of disability.¹⁵ On the positive side, while the majority of the study participants expressed a strong determination to pursue something that helps them, regardless of what others may think, others indicated a specific concern related to self-image and potential societal judgments and embarrassment. To minimize stigma, patients and their family needs to be educated on the importance of such devices and should be counselled to value benefit over social judgements.

While patients have various types of ALDs available from different manufacturers to choose from, the problem arises when these ALDs are not compatible across different hearing aids and might not be compatible with

all other devices like TVs, laptops or phones. The compatibility parameters of these ALDs can be considered rather complex. Manufacturers have technologies that might be common across all other brands like partner mic/multi-mic, phone clip, TV connector etc. except for a few features and names but all sometimes have devices that are unique to them example the Roger microphone is only available in Sonova brand. Most of the time the ALDs are only compatible with the same brand of hearing aids thus limiting its usage among other hearing aid brand users. Additionally, assistive listening devices are not compatible with all devices for example most of these ALDs are compatible only with iOS and not Android devices. These things are bound to raise concerns among patients purchasing hearing aids as upon shifting from one brand to another the purchased ALDs might not be compatible with the new device. This highlights the importance of ensuring broad compatibility to cater to a wider range of potential customers. In summary, based on the data obtained, it can be concluded that a majority of participants are likely to consider purchasing the product if it is compatible with their hearing device and phone. However, there is also a significant proportion who expressed concerns about compatibility limitations.

This study has few limitations. A larger pool of data would have resulted in a more comprehensive data set, facilitating a deeper understanding of the hearing aid users' attitude and perspectives towards the usage of assistive listening devices ALDs.

CONCLUSION

The objective of the study was to assess the attitudes of hearing aid users towards assistive listening devices (ALDs) and to identify their preferences regarding ALDs. Utilizing a structured questionnaire, we collected responses from 42 participants who had been using hearing aids for at least one year. The data revealed that, despite varying factors, the majority of users are open to learning about ALDs and recognizing their potential advantages in daily life. A subset of participants already demonstrated familiarity with ALDs, while a smaller proportion exhibited disinterest in further information. These findings suggest the need for a more detailed investigation to fully understand the range of attitudes and the motivations behind them.

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