



KNOWLEDGE, ATTITUDES, AND PRACTICES RELATED TO COCHLEAR IMPLANT AMONG HEARING HEALTH PROFESSIONALS.

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ABSTRACT

A cochlear implant (CI) is designed to restore hearing in individuals with severe hearing loss or deafness who don't benefit from conventional hearing aids (Ravi et al., 2023). The success of CI largely depends on the knowledge, attitude, and practices of otolaryngologists, audiologists, and speech-language pathologists. **Method:** A cross-sectional survey was conducted among 120 professionals (30 each from otolaryngologist, audiologist, Speech language pathologist (SLP), and Audiologist & speech language pathologist (ASLP)) in Kerala, all with at least two years of experience, using a questionnaire. **Result:** All groups held positive attitudes toward CI. Otolaryngologists led in surgical practices, Audiologists in mapping, and SLPs/ASLPs showed variability in early intervention, affecting outcomes. **Conclusion:** Otolaryngologists excelled in all areas, while audiologists showed better practices than SLPs and ASLPs.

KEYWORDS : Cochlear implant, Knowledge, attitude, and practice, Otolaryngologists, Audiologists, Speech-language pathologist.

INTRODUCTION

Cochlear Implants (CI) are devices surgically inserted into the cochlea, stimulating the spiral ganglion of the auditory nerve to create a sensation of hearing (Valame et al., 2024). The CI convert sound into an electrical signal and transmits it directly to the hearing nerve, bypassing damaged parts of the auditory system (Sutton et al., 2025).

Cochlear implants have transformed the management of severe to profound sensorineural hearing loss, yielding substantial advantages for pediatric and adult populations (Copeland & Pillsbury, 2004). Healthcare professionals, including audiologists, SLPs, and otolaryngologists, must acquire comprehensive knowledge about cochlear implants to deliver effective and holistic care to individuals with hearing impairments. Maintaining up-to-date knowledge enables these professionals to advocate for CI patients, educate other healthcare providers, and ensure that families are well-equipped with the necessary information and resources for successful CI outcomes (ASHA, 2014).

However, research indicates varying levels of knowledge, attitudes, and practices among healthcare professionals regarding cochlear implants. Otolaryngologists generally demonstrate a positive attitude toward cochlear implants, with 81% acknowledging the importance of binaural hearing (Dutt et al., 2002). Audiologists also exhibit a positive attitude, with 65% having referred at least one client for a cochlear implant evaluation (Hogan et al., 2001). A study in North Carolina revealed that 79% of school-based SLPs felt they had little to no confidence in providing services to children with cochlear implants (Compton et al., 2008). A multidisciplinary approach involving otolaryngologists, audiologists, and speech-language pathologists is essential for maximising the benefits of cochlear implants for patients (Ertmer, 2002).

A study by Ravi et al. (2023) examined the understanding, perceptions, and methods of Indian otorhinolaryngologists regarding cochlear implants. The findings suggest that while these specialists generally demonstrate favourable attitudes and approaches towards cochlear implantation. Ayas et al. (2024) performed an extensive investigation into the expertise and techniques of UK audiologists concerning cochlear re-implantation. The results underscore the importance of audiologists' proficiency in ensuring positive outcomes for cochlear implant recipients.

otorhinolaryngologists across European countries and revealed that these specialists possess knowledge in each nation. In contrast, a 2015 cross-sectional and analytical study by Guerra et al. found that otolaryngologists, speech-language pathologists, and audiologists had a minimal understanding of cochlear implants. Babeu, 2016; Compton & Flynn, 2008 indicated that speech-language pathologists lacked the necessary knowledge and skills to work with cochlear implant recipients. A cross-sectional survey conducted by Hogan et al. (2001) on attitudes toward cochlear implants and related referral practices showed that audiologists held positive views of the devices, with 65% referring to at least one client for evaluation.

The available research has highlighted inconsistent levels of understanding of knowledge, attitude and practice regarding CI among healthcare providers. The studies on perceptions of otolaryngologists, audiologists, and speech-language pathologists in India are scarce, and no such studies have been conducted specifically in Kerala. The current study aims to investigate the knowledge, attitudes, and practices regarding cochlear implantations among otorhinolaryngologists, audiologists, and speech language pathologists in Kerala.

Method

The proposed cross-sectional questionnaire study involved: 1) 30 otolaryngologists, 2) 30 audiologists, 30 speech-language pathologists (SLP) and 30 audiologists & speech-language pathologists (ASLP).

Materials And Procedures

The study was conducted in two phases:

In the first phase, a questionnaire was developed to assess the knowledge, attitudes, and practices related to cochlear implants among otolaryngologists, audiologists, and speech-language pathologists in Kerala. It was based on a literature review and expert input, and validated by three experienced professionals. The final version included two sections: Part A for otolaryngologists and Part B for audiologists and speech-language pathologists, each containing 18 closed-ended and two open-ended questions on demographics, cochlear implant knowledge, surgical aspects, planning, eligibility, attitudes, and practices. In the second phase, the questionnaire was distributed online via Google Forms with an informed consent form.

D'Haese et al. (2017) examined the knowledge and beliefs of

Data were analysed using SPSS (version 27.0). Since Part A

and Part B of the questionnaire were tailored for otolaryngologists and audiologists/speech-language pathologists, respectively, responses were analysed separately to maintain relevance and validity across professional groups. Descriptive statistics summarised the data. The Wilcoxon signed-rank test assessed whether section scores exceeded 3, and the Kruskal-Wallis test compared scores among the three professional groups. When practice score differences were significant ($p < 0.05$), post-hoc comparisons were conducted using the Mann-Whitney U test with Bonferroni correction.

RESULT

1. To Assess The Level Of Knowledge, Attitude, And Practices About Cochlear Implants Among The Otolaryngologists-analysis Of Part A Of The Questionnaire.

Profession	Statistics	Knowledge	Attitude	Practice
Otolaryngologist	Mean	4.5	4.6333	4
	Median	5	5	4
	Std. Deviation	1.10641	1.24522	1.08278
	Minimum	3	2	2
	Maximum	6	6	5

Table 1 indicates the descriptive Statistics for Knowledge, Attitude, and Practice Scores of Otolaryngologists.

The mean knowledge score for otolaryngologists is 4.5, indicating that, on average, participants scored nearly 5 out of 6. The mean attitude score is 4.6, slightly higher than the knowledge score. 5. The mean practice score is 4, lower than both knowledge and attitude scores, indicating a slightly weaker performance in this area.

Profession	Statistics	Knowledge Score	Attitude Score	Practice Score
Otolaryngologist	Total N	30	30	30
	Test Statistic	253	342	299
	Standard Error	30.339	38.856	36.056
	Standardized Test Statistic	4.183	4.285	3.786
	p-value	<0.001	<0.001	<0.001

Table 2 indicates the Wilcoxon signed-rank test result of the Otolaryngologist.

For all three variables—knowledge, attitude, and practice—the p-values are highly significant ($p < 0.001$), indicating that the median scores for the profession "Otolaryngologist" are significantly greater than 3. This supports the assertion that participants in this profession generally excel across all three domains, with the strongest performance in knowledge and attitude and slightly lower performance in practice.

2. To assess the level of knowledge, attitude and practices about cochlear implants among the professionals working as audiologists, speech-language pathologists (SLP), and audiologists & speech-language pathologists (ASLP)-Analysis of Part B of the Questionnaire.

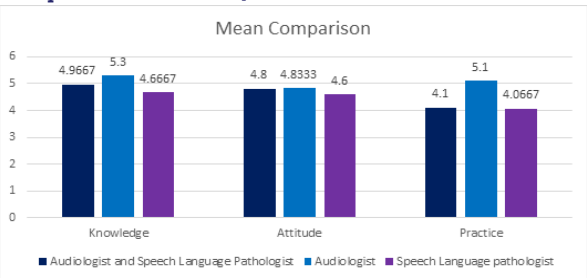


Figure 1 shows the mean comparison of ASLP, Audiologist, and SLP.

Figure 1 shows that the mean knowledge score for Audiologists and Speech-Language Pathologists is 4.97, indicating that, on average, participants scored nearly 5 out of 6. The mean attitude score is 4.8, slightly lower than the knowledge score, and the median is 5. The mean practice score is 4.1, lower than both knowledge and attitude scores. Figure 1 indicates that the mean knowledge score for Audiologists is 5.3, indicating that, on average, participants scored nearly 5 out of 6. The mean attitude score is 4.8, slightly lower than the knowledge score. The mean practice score is 5.1. Figure 1 shows that the mean knowledge score for Speech Language Pathologists is 4.6, indicating that, on average, participants scored nearly 5 out of 6. The mean attitude score is 4.6, and the median is 4. The mean practice score is 4.06, lower than both knowledge and attitude scores.

Statistic	Knowledge	Attitude	Practice
Total N	90	90	90
Test Statistic	5.78	1.178	13.737
Degree Of Freedom	2	2	2
p-value	0.056	0.555	0.001

Table 3 indicates the comparison of Scores between Professions Using Kruskal-Wallis Test.

The Kruskal-Wallis Test was conducted to compare the scores for knowledge, attitude, and practice among the three professions. The test statistic of knowledge scores indicates the p-value 0.056. As the p-value is greater than 0.05, there is no significant difference in knowledge scores among the three professions. The test statistic of attitude indicates the p-value of 0.555. Similarly, the p-value exceeds the significance threshold of 0.05, indicating no significant difference in attitude scores among the three professions. The Kruskal-Wallis Test indicated no significant differences in knowledge and attitude scores among the three professions. The test statistic for practice scores indicated the p-value of 0.001, which suggests that there is a significant difference in practice scores between the professions. Since the p-value for practice score was less than 0.05, post-hoc pairwise comparisons using the Mann-Whitney U test with Bonferroni correction were performed for practice scores. Post-hoc pairwise comparisons reveal that audiologists differ significantly from both "audiologist and speech-language pathologist" and "speech-language pathologist" in practice scores. However, no significant difference is found between "audiologist and speech-language pathologist" and "speech-language pathologist." These results suggest that variations in practice scores are primarily driven by differences involving audiologists.

DISCUSSION

From the results of the current study, Part A of the questionnaire identified that otolaryngologists exhibit overall excellence across the three domains of knowledge, attitude, and practice. Notably, they display exceptional performance in knowledge and attitude, with slightly lower performance in practice. A study among Indian otolaryngologists revealed overwhelmingly positive beliefs and practices regarding cochlear implantation (Ravi et al., 2023).

From the results obtained from Part B of the questionnaire, the data from the knowledge section of audiologists, SLPs, and ASLPs revealed adequate knowledge about CI, including government schemes, the role of audiologists in the operation theatre, mapping procedures, and troubleshooting. However, knowledge gaps were observed regarding the minimum age for bilateral cochlear implantation under the Kerala government scheme, which may impact the scheme's success and early intervention opportunities.

SLPs also demonstrated limited knowledge about upgrading CI, emphasising the need for professionals to stay updated. This finding is supported by Ward et al. (2018), who reported

similar knowledge gaps among SLPs in the state of Mississippi. The results of the attitude regarding CI among professionals in the roles of audiologists, SLPs, and ASLPs revealed that the majority of participants hold a positive attitude towards cochlear implantation. These findings are consistent with those reported by Hogan et al. (2001).

Given the potential variability in clinical practice patterns across the three professions, the results showed that audiologists tend to exhibit better practices compared to SLPs and ASLPs. Notably, the responses regarding early consideration of cochlear implantation revealed that SLPs and ASLPs do not always advocate for early consideration of cochlear implantation in treatment plans for children with profound hearing loss. This oversight may impact the developmental outcomes of these children.

CONCLUSION

Otolaryngologists demonstrated a strong understanding of cochlear implant candidacy, surgical techniques, and maintenance. Audiologists showed adequate knowledge about mapping, troubleshooting, and their roles in the operation theatre. However, gaps were identified in understanding government schemes for bilateral implantation and CI upgrading. SLPs and ASLPs exhibited knowledge about troubleshooting and early intervention but lacked awareness regarding CI advancements and eligibility criteria under state schemes.

All professional groups displayed predominantly positive attitudes towards cochlear implantation. Otolaryngologists strongly supported the use of cochlear implants for eligible candidates and emphasised the need for regular maintenance and adjustments. Audiologists, SLPs, and ASLPs demonstrated a positive outlook, which facilitated proper referrals and counselling, although some variability was noted in advocating early CI for children. Otolaryngologists excelled in surgical practices, including preoperative counselling, electrode array placement, and post-surgical follow-up, aligning with global standards. Audiologists exhibited better practices compared to SLPs and ASLPs, particularly in mapping and troubleshooting. SLPs and ASLPs, however, showed inconsistencies in early intervention practices, which could impact outcomes for children with profound hearing loss.

Participants identified key challenges to cochlear implantation in Kerala, including financial constraints, lack of awareness, high maintenance costs, and inadequate rehabilitation facilities. Otolaryngologists demonstrated exceptional performance across all domains, while audiologists showed stronger practices compared to SLPs and ASLPs.

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