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# Prognostication in Hearing Impairment: Perspectives from Audiologists and Speech Language Pathologists

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## Keywords

Audiologist; Prognosis; Confidence; Hearing impairment.

## Introduction

When a child is diagnosed with hearing loss, parents must make numerous considerations, including which style of communication to use for the sake of their child. As many as 90% of Deaf or Hard of Hearing (HHH) are born to hearing parents, and many of them are suddenly pushed into a world they have never known before [1]. Due to the critical age of language development, parents must typically make decisions sooner rather than later on whether to have their child become auditory-verbal through the use of a cochlear implant or to implement Sign Language and become entrenched in Deaf culture [2]. Making appropriate decisions necessitates a certain amount of self-assurance. A parent must gather information from large number of sources and analyze all possible ways of communication and results for their child in order to be confident in their decision. Following a diagnosis of hearing loss, Fitzpatrick et al. [3] identified numerous areas that parents felt crucial. Audiological assessment and therapy, social support, coordinated services, group support with other parents, and access to relevant information were among them. There is no one-size-fits-all solution for deciding which style of communication a child should utilize; it varies from case to case and is determined by what works best for the family. Language problems in children with hearing loss may occur from delaying the choice of communication method.

It is vital for parents to know that their child's audiologist is doing all possible to offer them with all of the resources and information they need to aid their child. Gilliver et al. [4] looked at 40 parent accounts of what it was like to have their child diagnosed with hearing loss. The study focused on the emotional and factual assistance that their child's audiologist gave. They discovered that about half of the parents complained about "a perceived lack of information supply". Many parents claimed that the audiologist only gave them a single pamphlet, prompting them to search the internet for more early intervention and communication choices for their child. "Parents expressed a need for more information than they had gotten," according to the study [4]. Another study done by Dor & Adelman, 2018 assessed how parents felt about receiving news of their child's hearing loss and audiologists provided the diagnosis, in order to see whether there were any improvements that could be made to the current process. Receiving the diagnosis elicited negative feelings of anxiety, melancholy, and trouble believing the diagnosis, according to the parents' accounts. When giving bad news, the audiologists expressed concern and fear, but they felt confident in their ability to communicate the diagnosis. The audiologists believed that they had not been trained particularly in this area and that they had rather learned it through experience. Both parents and audiologists agreed that the diagnosis should be delivered by an audiologist in a professional manner.

All speech pathologists and audiologists must first earn a Bachelor's degree in Audiology and Speech Language Pathology (BASLP) before being accepted into masters or doctoral programs and obtaining a license to practice, learning about their perspectives on signed and spoken language interventions can add to the limited research that already exists. In addition, when studies that has studied on how the professionals deliver prognosis information to the children has been done on communication disorders like aphasia, similar studies on hearing loss and what these professionals think about the Deaf community, Deaf personhood, and Deaf culture is limited in Indian context. Audiologists receive counseling training as part of their graduate studies; yet, research has demonstrated that audiologists find it difficult to counsel [5,6]. The degree to which students are equipped to effectively counsel caregivers depend on the training provided by different graduate

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schools [7]. Rehabilitation of hearing-impaired individuals is a team approach, therefore the information provided and guidance given by all the professionals involved is crucial. Apart from audiologists, speech-language pathologists are also involved in decision making and improving communication of deaf or hard of hearing individuals, especially children. Gulati (2018) calls deaf children's incomplete language acquisition an "epidemic" that has a global impact on their social, emotional, and cognitive development. Children's incomplete language acquisition due to a lack of adequate language input is known as "language deprivation," which occurs when a child does not establish a competent first language during early childhood [8]. Speech-language pathologists, whose goal in deaf education is to provide effective speech and language therapies for deaf children and their families, are concerned about this epidemic [9].

A study investigated and compared the attitudes of university students enrolled in ASL and a Deaf culture course, and explored other factors which influenced their attitudes toward deaf people. Students enrolled in a Deaf culture course claimed a stronger awareness of Deaf culture than those enrolled in ASL courses, according to the findings. Other factors that influence attitudes toward deaf persons include course style, academic major, and motives for attending ASL classes. Students who took an ASL course for a modern language credit had more negative views and perspectives about deaf individuals than students who attended the course for a program requirement. The findings imply that including Deaf culture and deaf people in the ASL curriculum can help deaf individuals develop positive attitudes and cultural understanding, which can lead to professional collaboration [10]. Another study that used an online survey to gather data on undergraduate COMD students' perceptions toward ASL, spoken English, and Deaf culture. Students who had completed aural rehabilitation and/or audiology had significantly more spoken English treatments prioritized. Students who had taken an ASL class had much more favorable attitudes of Deaf culture. Understanding how COMD students perceive ASL, spoken English, and Deaf culture might help enhance acceptance of signed languages and Deaf culture in the speech-language pathology and audiology professions. So far varied studies have been done to gather perspectives of ASLPs about signed versus spoken language and the way counselling is done by these professionals. It is important to investigate how these perspectives builds over their professional journey.

When a child is diagnosed with hearing loss, parents must evaluate a variety of factors, including which communication style to use for their child's benefit. ASLPs are important in determining treatment options and prognosis for children with hearing impairment. Various research has been conducted to gather ASLPs' viewpoints on signed versus spoken language, as well as how these professionals provide prognosis. It's crucial to look into how their viewpoints differ between students and professionals. Thus, the study aimed to compare the experiences of undergraduate, postgraduate and working professionals in providing a prognosis to children with hearing impairment using case scenarios and self-assessment data. Additionally, the authors have also compared perspectives of audiologists and speech language pathologists in providing prognosis.

## Method

A descriptive cross-sectional study was conducted on working ASLPs as well as Undergraduate (UG) and Postgraduate (PG) students of Speech and Hearing. The researchers used convenient sampling to distribute the final version of the questionnaire, which was created as an e-survey in the form of Google forms and circulated across several social networks. The UG students who were third or fourth year were eligible to fill the survey. PG students who responded to the survey were either pursuing Masters in Audiology or Speech-Language Pathology. The working professionals had a minimum of two years of working experience.

A total of 48 ASLPs (Mean age =23.6; (SD)=2.68) responded to the survey whose demographic details are shown in Table 1. The investigators examined all the responses to the questionnaire after which they were homogenously divided into three groups a) Professionals b) Post Graduate groups and c) Undergraduate groups consisting of 16 participants each.

**The questionnaire was divided into two sections:** Objective and subjective. The rationale for using both subjective and objective questions is to gather perspectives from ASLPs in the form of opinions and evaluate their performance when real life case examples are simulated. The case examples were designed in such a way that it can reflect what clinicians would face in a day-to-day Indian scenario. Case details included age of the child, degree of hearing loss, communication status, IQ, socioeconomic background and Audiological evaluations administered. The objective questions assessed the confidence of participants in providing a prognosis to people with hearing impairment. The responses to these questions were gathered on a three-point Likert scale, with 0 indicating never, 1 indicating sometimes, and 2 indicating always. The responses to these questions were converted to numerical form using Microsoft Excel and analyzed using IBM Statistical Package Social Sciences (SPSS) version 25.0 (SPSS Inc., Chicago). Descriptive statistical procedures such as frequency and percentages were measured based on the type of queries being addressed.

Meanwhile, for subjective questionnaires, three case examples linked to hearing impairment were utilized to elicit clinical responses from the participants. Validation of all the questions was done by three ASLPs having a working experience of minimum five years. The suggestions and feedback given were incorporated in the final version of the questionnaire. The participants were asked to offer a subjective response to the prognostic factors they would focus on when counselling the children. A thematic analysis was used to examine these subjective questions with open responses. The goal of the thematic analysis was to look at characteristics that are significant when forming a prediction as well as factors that are important when presenting prognostic information. To create codes directly from the responses, an inductive technique was applied. The responses were reviewed several times before coding to familiarize with the data. After that, pertinent extracts from the responses were recognized and given a code name that reflected the meaning expressed in the data extract. Each code was assigned to a factor associated with prognosis formulation or delivery. The codes were grouped into categories and subcategories based on similarity and relatedness after first coding.

Themes were created to reflect the most general level of code categories. The themes were finalized by comparing aggregated excerpts inside and across codes, as well as reviewing the coding with respect to the entire dataset. The aggregate code count from their constituent lower-level codes was used to calculate code count frequencies for each theme, category, and subcategory. Based on the code counts, each level of coding was sorted by frequency. This led to a total of 16 extracts being identified which is listed in Table 2. The frequency of these identified themes was calculated from the

responses to these subjective questions using Microsoft excel.

Furthermore, these themes were narrowed down into three global themes which include: a) Patient-related variables b) Clinician-related variables and c) Other variables.

To guarantee consistency, the first author coded the data, which was then independently examined by the other two authors, who checked for coding consistency and theme development.

**Informed consent and ethical guidelines:** The research followed the ethical guidelines put forth by the institutional board of the All-India Institute of Speech and Hearing (AIISH). By completing out a google form question, all participants expressed their informed consent.

## Results

For analysis, data were exported from Google Forms to Microsoft Excel. Two types of data were collected: Qualitative and Quantitative. The responses of participants to three case scenarios were analyzed qualitatively using thematic analysis. The ten objective questions related to the confidence of participants in providing a prognosis were analyzed quantitatively. SPSS 26 software was used to enter quantitative data. To summarize demographic data, descriptive statistics were employed. The Kruskal–Walli's test was used to see if there were any significant differences in rating replies across three groups i.e., Undergraduate students (UG), Postgraduate students (PG) and, Working Professionals (WP). 0.05 was the alpha significance level. Because of the skewed distributions and ordinal data, non-parametric tests were utilized.

### Quantitative data

Kruskal Wallis H test was used to compare the responses between groups for ten objective questions (Table 4). It was found that there was no significant difference for nine questions out of ten among the three groups. Except for one question, regarding the use of resources while providing a prognosis to children and caregivers, the professionals scored the highest followed by postgraduate students and undergraduate students. The mean ranks of all groups for each question is mentioned in (Tables 3-5).

**Table 1:** Participant characteristics.

| Variable | Percentage (n=48) |
|---|---|
| **Age** | |
| <20 | 4.17 |
| 20-25 | 58.33 |
| 25-30 | 35.41 |
| 30-35 | 2.09 |
| **Level of Experience** | |
| <2 years | |
| 2-5 years | 60.4 |
| 5-10 years | 39.6 |
| **Qualification** | |
| BASLP | 33.2 |
| PG Audiology | 16.7 |
| PG SLP | 16.7 |
| Professional Audiologist | 16.7 |
| Professional SLP | 16.7 |
| **Work setting** | |
| Clinic | 4.1 |
| Hospital | 14.6 |
| Institute | 81.3 |

**Table 2:** Themes and extracts.

| Themes | Extracts |
|---|---|
| Clinician- related variable | Early identification and intervention |
| Patient-related variable | Language stimulation |
| Clinician- related variable | Hearing aids, AVT and Speech language therapy |
| Clinician- related variable | Cochlear implant education |
| Patient-related variable | Age, critical period and neuroplasticity |
| Patient-related variable | Parental involvement, home training, choice of intervention |
| Patient-related variable | Genetics and familial history |
| Clinician- related variable | Nonverbal communication (sign language, AAC) |
| Other variable | Accessibility to services and government schemes |
| Patient-related variable | Inclusion, and quality of life. |
| Patient-related variable | Support groups and cases examples, meeting similar cases |
| Patient-related variable | Intelligence Quotient (IQ) |
| Patient-related variable | Degree and cause of hearing loss |
| Patient-related variable | Socioeconomic background |
| Clinician-related variable | Total communication |
| Patient-related variable | Comorbidities |

### Qualitative data

Based on the responses obtained, various local themes were identified which were deemed important factors while providing a prognosis. The local themes were derived from the initial extracts as a result of coding the frequency of each extract. A total of 16 local themes were identified as mentioned in the table. The local themes were further grouped into three global themes i.e., patient-related variables, clinician-related variables and, other variables. Frequency distribution of themes mentioned as part of participants' responses was done for all the groups. Postgraduates and Working Professionals groups were further divided into Audiologists and Speech-language pathologists. For all the three case examples, the highest frequency is found for hearing aids, auditory-verbal therapy and, speech-language therapy. The lowest frequency was observed for support groups and case examples (case example 1), degree and cause of hearing loss (case example 2) and, socioeconomic background (case example 3).

Also, a pattern was observed in the response between Audiologists and Speech-language pathologists. Nineteen audiologists and ten speech-language pathologists have mentioned audiological options such as counselling caregivers regarding the use of hearing aids, cochlear implants whereas seventeen speech-language pathologists and eight audiologists have emphasized for total communication and non-verbal communication. Overall, more audiologists preferred to educate caregivers regarding use of devices such as hearing aids, cochlear implants and more speech-language pathologists' preferred communication over speech methods such as total communication, alternative and augmentative communication and sign language.

## Discussion

The purpose of this research was to collect descriptive data from

**Table 3:** Mean ranks across categories.

| Objective questions | Categories | N | Mean Rank |
|---|---|---|---|
| Q1 | UG | 16 | 21.41 |
| | PG | 16 | 27.16 |
| | Working professionals | 16 | 24.94 |
| | Total | 48 | |
| Q2 | UG | 16 | 26.88 |
| | PG | 16 | 22.75 |
| | Working professionals | 16 | 23.88 |
| | Total | 48 | |
| Q3 | UG | 16 | 22.38 |
| | PG | 16 | 26 |
| | Working professionals | 16 | 25.13 |
| | Total | 48 | |
| Q4 | UG | 16 | 23.38 |
| | PG | 16 | 23.38 |
| | Working professionals | 16 | 26.75 |
| | Total | 48 | |
| Q5 | UG | 16 | 18.59 |
| | PG | 16 | 26.72 |
| | Working professionals | 16 | 28.19 |
| | Total | 48 | |
| Q6 | UG | 16 | 20.81 |
| | PG | 16 | 26.34 |
| | Working professionals | 16 | 26.34 |
| | Total | 48 | |
| Q7 | UG | 16 | 23.25 |
| | PG | 16 | 24.13 |
| | Working professionals | 16 | 26.13 |
| | Total | 48 | |
| Q8 | UG | 16 | 17.16 |
| | PG | 16 | 27.47 |
| | Working professionals | 16 | 28.88 |
| | Total | 48 | |
| Q9 | UG | 16 | 26.06 |
| | PG | 16 | 21.44 |
| | Working professionals | 16 | 26 |
| | Total | 48 | |
| Q10 | UG | 16 | 22.03 |
| | PG | 16 | 26.03 |
| | Working professionals | 16 | 25.44 |
| | Total | 48 | |

undergraduate BASLP students, postgraduate students, and working professionals in the field of audiology and Speech language pathology. The study aimed to provide an insight into clinician's attitudes and practice, as well as a path for future study aimed at developing best-practice standards for complicated and demanding field of aural rehabilitation. Using case histories, the authors also attempted to compare the viewpoints of audiologists and speech language pathologists on deaf culture. This study also assesses students and expert's confidence in offering prognosis to children with hearing impairment.

Treatment efficacy is a broad umbrella phrase that can refer to a variety of specific topics, including (a) treatment effectiveness, (b) treatment efficacy, and (c) treatment effects [11]. The objectives of the treatment goals and eventually the treatment efficacy could be as varied and diverse as the population of children with hearing impairment. Aural Rehabilitation treatments involve a wide range of techniques, including auditory and lip-reading skill training (Sensory and perceptual skill development), language development (regardless of the type of communication mode), speech-production skill development, academic success, and social-emotional growth. These therapeutic goals can be achieved throughout the lifespan of a child with hearing loss, from infancy and preschool (early intervention) to youth and adolescence, when long-term outcomes become the focus. Two key difficulties surrounding treatment are crucial throughout the child's development: The choice and continuing use of, or progress with, a communication mode and a sensory aid or aids [12].

## Case 1

For the first case, the responses from all the groups were inclined to counselling about audiological managements that are available. As the child had normal Intelligence Quotient (IQ), the prognosis counselling included explaining about the use and importance of Fitting Hearing aids followed up by continuous Auditory Verbal Therapy (AVT) and Speech language therapy with particular importance given to critical period and neuroplasticity and in long term, the quality of life. If at all the progress through hearing aid isn't sufficient all the groups were in unison in counselling about Cochlear Implants too. For language development, the time from birth to five years is often referred to as the "critical phase" [12].

Limited possibilities to "overhear" information from a variety of input sources leads to a lack of redundant auditory experiences, which has poor effects for language rule creation, world knowledge, and vocabulary development. Thus, hearing loss can be better managed when detected and rehabilitated earlier that ultimately results in improved outcomes for children. Infants with persistent congenital and early-onset hearing loss who are diagnosed and treated before the age of six months have better language results than those who are diagnosed later [13]. Even with the best rehabilitation, children who are detected late may never catch up in terms of intellectual, social, and emotional development to their hearing peers. Since the child is already five years old the management not only needs to be swift but also continuous. However, keeping into account these individuals are from an area with little audiological facilities available and have a poor socioeconomic background too, the process of aural rehabilitation can take both a physical and economic toll on the family. This in turn could lead to a sparring or even discontinuous therapy that could seriously impact the efficacy of the aural rehabilitation process. To overcome this the responses from all the groups placed emphasis on home training and parental involvement. It has been suggested that an intervention approach that prioritizes family ties and develops parental self-efficacy may result in higher rates of follow-through, more early intervention involvement, and improved outcomes for children with hearing loss [14]. Thus, with copious home training and parental involvement and follow ups the child could benefit from aural mode of rehabilitation.

For this, the responses from all the groups placed importance

**Table 4:** Results of Kruskal Wallis H test.

| | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 | Q7 | Q8 | Q9 | Q10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Kruskal-Wallis H | 1.806 | 1.079 | 0.849 | 0.737 | 5.696 | 2.789 | 0.461 | 8.828 | 1.467 | 0.958 |
| df | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Asymp. Sig. | 0.405 | 0.583 | 0.654 | 0.692 | 0.058 | 0.248 | 0.794 | 0.012 | 0.48 | 0.619 |

**Table 5:** Frequency distribution of themes for each case example.

| Themes | Case 1 | | | | | Case 2 | | | | | Case 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UG | PGA | PGS | PA | PS | UG | PGA | PGS | PA | PS | UG | PGA | PGS | PA | PS |
| Early identification and Intervention | 2 | 1 | 1 | 2 | 1 | 4 | 3 | 0 | 1 | 3 | 1 | 0 | 1 | 1 | 1 |
| Language stimulation | 5 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 |
| Hearing aids, AVT, SLT | 12 | 12 | 8 | 8 | 2 | 11 | 9 | 10 | 8 | 4 | 8 | 8 | 9 | 5 | 3 |
| Cochlear implant education | 6 | 5 | 2 | 3 | 0 | 2 | 4 | 3 | 4 | 1 | 0 | 6 | 3 | 4 | 1 |
| Age, critical period and neuroplasticity | 6 | 3 | 5 | 5 | 4 | 9 | 4 | 6 | 2 | 3 | 0 | 1 | 3 | 1 | 1 |
| Parental involvement, Home training, choice | 5 | 1 | 3 | 2 | 3 | 1 | 1 | 0 | 2 | 2 | 5 | 6 | 6 | 6 | 3 |
| Genetics and familial history | 1 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Non-verbal communication | 4 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 0 | 4 | 2 | 6 | 1 | 3 |
| Accessibility to services and government schemes | 7 | 3 | 7 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Inclusion, and quality of life. | 4 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 0 | 3 | 1 |
| Support groups and cases examples | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| Intellectual quotient | 1 | 0 | 4 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Degree and cause of hearing loss | 4 | 0 | 2 | 1 | 1 | 1 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Socioeconomic background | 2 | 1 | 3 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total communication | 1 | 1 | 2 | 3 | 3 | 3 | 0 | 0 | 2 | 2 | 4 | 2 | 1 | 2 | 2 |
| Comorbidities | 0 | 0 | 0 | 0 | 0 | 4 | 2 | 4 | 1 | 5 | 0 | 0 | 0 | 0 | 0 |

on different government schemes and accessibility to services. Even though cochlear implant may be the best management option for similar cases that match the CI candidacy criteria, implanting these children in underdeveloped nations remains a difficult undertaking, since the expense of an implant is a deterrent for many of them. As a result, many state governments have begun to cover cochlear implants completely through their Chief Ministers Comprehensive Health Insurance Schemes. This unique program has been of immense help, with a substantial number of congenitally deaf children aged under six years obtaining free implants and progressing to normal speech and language development, allowing them to enter mainstream schools, thanks to rigorous habilitation. One of these programs is the Government of India's Assistance to Disabled Persons scheme (ADIP) for a cochlear implant program, which has more than 130 centers performing implant surgery under its Ministry of Social Welfare. Hence despite the cost of the implant or the overall aural rehabilitation being deterrent, these schemes can be of significant help to cases like this who have a poor socioeconomic background. However, Jeyaraman [15], revealed inadequate funding for CI and CI accessory maintenance and replacement, CI companies' inadequate monitoring of device failures, and the very young age of children undergoing cochlear implantation as the challenges to these schemes. Thus, some responses also involved counselling which were mostly undergraduates, about non-oral modes of communication like Sign language that could be of more functional benefit to the child. Likewise, other groups responded their counselling would mention about total communication for this child to be a suitable rehabilitation option. Hearing aids with suitable gain or CI clearly allow children who use sign language to hear and, as a result, encourage speech development with just a minor age delay [16]. Also, when technical problems hinder the proper use of the HA or CI, which unfortunately happens far too often, sign language can be a crucial tool for communication [17].

Majority of the respondents mentioned audiological options such as fitting hearing aids and providing auditory verbal therapy more than total communication considering age, diagnosis and communication status of the child. Few undergraduates have pointed that sign language or non-oral modes of communication could be used to support the child's communication needs.

## Case 2

For the second case the responses from all group for prognosis was focused on the comorbid condition of the child which could potentially hinder with the rehabilitation options particularly with Cochlear Implant. Though the child was an excellent candidate for Cochlear Implant, the responses were doubtful to recommend this management option due to the heart condition. Thus, most UG group, and PG group as well as the professional group majorly recommended hearing aid to be a viable option for the child. In fact, the child can actually do quite well with regular speech and

listening training while wearing a hearing aid as well. Moreover, they responded that they'd recommend the child to other professionals to get clearance for cochlear implant if at all the family of the child were willing to pursue it. Many studies have shown the benefit of performing cochlear implant on various anatomic and physiologic disorders [16,18-21]. Typically, any symptoms that may suggest a syndromic etiology for the hearing loss should be explored in a kid with sensorineural hearing loss.

Cardiac co-morbidities can affect cochlear implantation in a variety of ways, ranging from mild intra-operative difficulties to life-threatening complications. Pre-operative, intra-operative, and postoperative care issues must be addressed by a capable in-house cardiologist [22]. There have been many instances where they have successfully performed CI in different heart conditions from various syndromic congenital conditions to individuals implanted with artificial heart [6,21-26]. One of such common heart conditions that contradicts Cochlear Implant is cardioversion. It is a technique that restores a normal heart rhythm to an irregular heartbeat and is not indicated for individuals with CIs. This is due to the possibility of cochlear tissue damage and permanent implant damage. If cardioversion cannot be avoided in Cochlear implant children, starting at the lowest energy level (50 J) and removing the sound processor during the treatment is strongly suggested [6,27]. However, despite slight variations in the electrical threshold and comfort level of the CI electrodes, electrical defibrillation showed no major effect on CI function [27]. Similarly, a heart condition that is closely associated with hearing loss is the Jervell and Lange-Nielsen syndrome which is more likely if there is a family history of syncopal episodes or unexpected death at a young age. Severe sensorineural hearing loss is inherited with a cardiac conduction impairment in this autosomal recessive disease [28]. Thus, a cautious approach to rule out any comorbid condition by recommending to other related professionals for clearance and explaining the same to the caregiver would essentially be the right step to rehabilitation for this case.

Considering the comorbidities of the child, hearing aid was mentioned as a viable option by majority. Cochlear implant seemed to be a contraindication for cardiac abnormality, therefore its use has not been recommended for this case. In this case too, audiological options were favored as opposed to total communication.

### Case 3

The third case was an interesting case of deaf culture versus aural rehabilitation. Listeners with profound loss are more likely to be labelled as deaf. Furthermore, in recent years, severe-to-profound hearing loss has been viewed in one of two ways: (a) within a traditional medical/disability framework, in which children with hearing loss are viewed as having a deficit in comparison to children with normal hearing; and (b) within a cultural framework, in which deaf children are viewed as being part of a group, all of whose members share a common language (American Sign Language) and a common culture, and use a distinct term, Deaf to describe their feature in common.

Although, the child seemed of perfect age for any aural mode of rehabilitation, the family's belief in deaf culture could be a potential hassle in the outcome of this form of rehabilitation. This was addressed profusely by responses from all the group too that without familial support the aural rehabilitation program will bear no fruit. In aural intervention programs, aligning treatments with parents' expectations and preferences could be a key factor of success. Despite the recent surge in these programs, little attention has been paid to parents' perspectives on their requirements following the diagnosis of hearing loss and the service models required to meet those needs [3]. Process variables such as the quality of professional-parent relationships and the sense of efficacy of parents have been highlighted as potential critical factors in obtaining affirmative results [29,30]. Particularly in this case more efforts need to put into counselling and motivating them about selecting an appropriate rehabilitation mode. Fitzpatrick et al. [3] reported that all families agreed that parent interaction was a valuable addition to the services offered through traditional health care channels. However, in the end it is the decision of parents to select the type of rehabilitation. In this regard, the responses of Audiologists and SLPs differed clearly in that most audiologists were of the opinion to integrate the child to an aural mode of rehabilitation after motivating and explaining about the advantages of this type of rehabilitation to child. Whereas SLPs on the other hand were of the opinion to counsel the parents about pros and cons of the different types of rehabilitation (Oral *vs.* Non oral) and leave the decision of selection on the parents even if it was a non-oral form. For success of aural rehabilitation, high-quality therapy and audiology services, well-coordinated care with communication between participating experts, and continued simple access to up-to-date information are clearly key aspects of services from the perspective of families across the system. Parents' preferences may help to better engage families in the care process, resulting in improved developmental outcomes [12,30]. Children with profound hearing impairments are frequently associated with poor speech intelligibility; nevertheless, experience with multichannel cochlear implants appears to have a good relationship with overall speech intelligibility [31]. Children with cochlear implants that employ auditory-oral communication rather than total communication appear to have better speech intelligibility [20,32]. Explaining about pros and cons of both modes of rehabilitation would be a feasible way to ensure success in improving the quality of life of these individuals. When fitted early the child can gain valuable experience in the domain of hearing which integrated along with non-oral mode of communication can be a feasible solution.

A distinct observation was made for this case for the way audiologists and speech language pathologists differed in their prognosis providing skills. Although the child met the criteria to benefit from audiological treatment modes, considering the family's beliefs and expectation was deemed more important, which was to let the child be a part of deaf culture.

In response to the objective questions, there was no significant difference among the three groups for all questions except one, which assessed the use of resources while providing a prognosis to Childs and caregivers. The working professionals used higher number of resources followed by postgraduate and undergraduate students. For other questions, all three groups demonstrated high confidence in providing prognosis. A similar study was recently conducted to learn more about pediatric audiologists' perceptions, training, and confidence in counselling. Pediatric audiologists from all around the country and with varied levels of experience responded to the poll [5]. The findings imply that counselling training may influence skill implementation in practice; audiologists who had taken a counselling course reported utilizing counselling skills more frequently than those who had not. Since counselling skills are closely related to prognosis providing skills, important insights can be derived from the above findings.

To summarize, all three groups demonstrated high confidence in providing prognosis to Childs with hearing impairment and provided extensive list of factors to be explained to the Childs for the case scenarios. Although a bias was observed in audiologists suggesting audiological options and speech language pathologists emphasizing on total communication, treatment methods should be individual specific, taking into consideration their overall development, family needs and expectations, and personal goals.

## Conclusion

Audiologists and Speech Language Pathologists (ASLPs) differ in how they forecast auditory rehabilitation outcomes, the prognostic information they provide, and how they communicate prognosis. The current methods for forecasting aural rehabilitation prognosis rely on expertise and professional judgement. The current findings may provide insight into ASLP attitudes and perspectives about deaf culture and confidence in providing prognosis to individuals with hearing impairment, as well as a path for future study aimed at developing best-practice standards for this complicated and demanding field of aural rehabilitation. There are few limitations to this study. The sample size may not be adequate enough to generalize the findings to a large population. Future research should emphasize on training ASLPs about oral and non-oral modes of communication and their efficacy so that both professionals are able to achieve a consensus while providing prognosis to Childs. Other professionals such as ENT specialist, physician, and pediatrician may also be involved as they are crucial part of the management team.

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