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Original Article

Awareness of Health Professionals about Candidacy of Cochlear Implant

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ABSTRACT

Background: Cochlear implants serve as a transformative solution for individuals with sensorineural hearing loss, particularly benefiting children aged 12-24 months with bilateral profound deafness who find little to no benefit from traditional hearing aids. This advanced auditory technology converts acoustic signals into electrical stimuli, directly stimulating the auditory nerve and thereby providing an essential hearing function. The determination of candidacy for cochlear implants is a collaborative process involving ENT specialists, audiologists, and speech and language pathologists. These devices significantly impact the lives of profoundly deaf individuals by offering a means to access sound and develop communication skills, crucial for their integration into a hearing world.

Objective: To assess the awareness of health professionals about candidacy of cochlear implant.

Methods: This cross-sectional study was meticulously designed, adhering to standardized protocols for data collection and analysis to enhance the reliability and validity of findings. The research unfolded in various government and private hospitals across Lahore, focusing on a specific cohort of health professionals—ENT specialists and speech and language pathologists. A total of 55 participants, both male and female, aged between 29 to 52 years, were systematically selected through non-probability convenience sampling. The assessment of awareness among these professionals regarding the candidacy for cochlear implants was conducted using a carefully structured pediatric checklist. This tool encompassed multiple items directly relating to the core candidacy criteria, ensuring a comprehensive evaluation of professional knowledge and awareness. The analysis was performed using statistical methods appropriate for cross-sectional data, aiming to draw meaningful insights from the responses collected.

Results: The study's participant pool consisted of 24 ENT specialists (43.6%) and 31 speech and language pathologists (56.4%), highlighting a diverse representation of the field. Among these professionals, a significant discrepancy in awareness was observed. Those who had practical experience working in cochlear implant centers demonstrated a higher level of awareness, with nuanced understanding of both audiometric and speech-based candidacy criteria. Conversely, participants lacking this practical exposure showed considerable gaps in their knowledge, particularly in applying these criteria to pediatric cases. The numerical data revealed that only a fraction of the respondents could accurately identify all key candidacy indicators, underscoring the need for targeted educational interventions.

Conclusion: The findings of this study underline a palpable deficiency in the awareness and understanding of cochlear implant candidacy criteria among ENT specialists and speech and language pathologists. Despite the critical role these professionals play in the identification and management of potential implant candidates, a notable portion exhibited limited knowledge, especially in aspects beyond their immediate field of expertise. This gap was more pronounced among those without direct experience in cochlear implant centers, suggesting that hands-on involvement significantly contributes to a deeper comprehension of candidacy nuances. Therefore, there is an urgent need for comprehensive training programs and continued professional development opportunities to bridge these knowledge gaps, ensuring that all children who could benefit from cochlear implants are accurately identified and referred.

Keywords: Audiometry, Candidacy Criteria, Cochlear Implants, Cross-Sectional Study, ENT Specialists, Hearing Loss, Pediatric, Speech and Language Pathologists, Sensorineural.

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INTRODUCTION

Cochlear implants represent a pivotal advancement in medical technology, offering profound hearing restoration to individuals with severe sensory-neural deafness, particularly young children who derive limited benefit from traditional hearing aids (1). This transformative procedure involves the surgical insertion of a device that converts acoustic signals into electrical stimuli, directly engaging the auditory nerve (2, 3). Notably, cochlear implants comprise both external components, such as the microphone, speech processor, and transmitter, and internal components, including the receiver and electrode array embedded within the cochlea (4, 5).

The candidacy for cochlear implantation is meticulously determined by a multidisciplinary team, including ENT specialists, audiologists, and speech and language pathologists (6, 7). The criteria for implantation primarily focus on children aged 12 to 24 months who exhibit bilateral profound sensory-neural deafness and have not benefited significantly from hearing aids (8, 9). However, the window of candidacy extends up to 5 years of age. These implants are not only effective in restoring hearing but also play a crucial role in the development of the auditory pathway, facilitating language acquisition and speech perception (10, 11). It has been observed that implantation at an earlier age, particularly within the first year of life, yields outcomes closer to those of normal-hearing infants, underscoring the critical nature of timely intervention.

The impact of cochlear implants extends beyond the mere restoration of hearing; they significantly influence the social and educational development of profoundly deaf children (12). In instances of severe to profound sensory-neural hearing loss (SNHL), where traditional auditory amplification through hearing aids proves inadequate, cochlear implants offer a new lease on life (1, 13). These devices not only enhance the ability to hear but also foster improvements in speech and language skills, thereby contributing to better academic achievements, employment prospects, and overall quality of life (14). The effectiveness of cochlear implants in improving developmental milestones and educational performance is particularly pronounced when implantation occurs between the ages of 12 to 24 months (15).

This procedure bypasses the damaged hair cells within the cochlea by directly stimulating the auditory nerve fibers, a method that starkly contrasts with the amplification approach of hearing aids that rely on functioning hair cells (16, 17). The technology behind cochlear implants involves a complex system where sounds captured by the external microphone are processed and converted into digital codes by the speech processor (18). These codes are then transmitted to the internal component, which decodes the data and sends electrical signals to the electrode array, thus stimulating the cochlear nerve.

The rationale behind the study of cochlear implant candidacy among health professionals stems from the need to ensure that those with the requisite knowledge and expertise are making informed decisions about who qualifies for this life-altering procedure (19). Adequate awareness and understanding among healthcare providers about the candidacy criteria, potential benefits, and optimal timing for implantation are crucial (20). Early intervention, ideally before 12 months of age, is associated with superior outcomes in speech and language development compared to later implantation. As such, the education and training of healthcare professionals play a pivotal role in identifying candidates for cochlear implantation and guiding them through the process.

In summary, cochlear implants offer an invaluable solution for children with profound deafness, enabling significant gains in hearing, speech, and language development. The success of this intervention hinges on early and accurate identification of candidates by knowledgeable health professionals, underscoring the importance of comprehensive awareness and education in the field. As research and technology continue to advance, the potential for cochlear implants to enrich the lives of those with severe SNHL grows ever more promising, heralding a future where the barriers to communication and social integration for the profoundly deaf are increasingly surmountable.

MATERIAL AND METHODS

The research employed a cross-sectional study design, meticulously orchestrated to gauge the awareness among health professionals regarding the candidacy for cochlear implants. This investigation unfolded within the bustling medical hubs of Lahore, encompassing both government and private healthcare establishments. The locales for data acquisition included the renowned Children Hospital and Institute of Child Health, Ittefaq Hospital (Trust), Hameed Latif Hospital, and Farooq Hospital. These diverse settings ensured a comprehensive overview of perspectives across different medical practices.

The study spanned six months, commencing only after the formal endorsement of its synopsis, marking a critical phase in its execution. The methodology hinged on a non-probability convenience sampling technique, meticulously curated to assemble a

representative cohort of the target demographic. The calculated sample size comprised 55 health professionals, specifically ENT specialists and speech and language pathologists, who formed the nucleus of this inquiry. These individuals were meticulously selected based on a set of inclusion criteria, which mandated a minimum of three years of clinical experience in either a government or private hospital setting, irrespective of gender. This criterion aimed to ensure the respondents possessed a substantial depth of professional expertise, enhancing the reliability of the findings. Conversely, audiologists, general physicians, and psychologists were deliberately excluded from the study to maintain a focused and relevant participant pool.

The data collection process was executed with precision and sensitivity. Researchers visited the selected hospitals in Lahore, engaging directly with potential participants. Prior consent was a prerequisite, ensuring that all respondents were fully informed and agreeable to their involvement in the study. This ethical consideration underscored the respect for participant autonomy and the integrity of the research process. Following consent, the responses were meticulously gathered, capturing the insights of health professionals on the intricate subject of cochlear implant candidacy.

The instrument of choice for this endeavor was a checklist, specifically designed to probe the nuanced understanding of cochlear implant candidacy among the respondents. This tool facilitated a structured yet flexible approach to data collection, allowing for comprehensive insights into the perceptions and knowledge bases of the health professionals involved.

Upon the conclusion of the data collection phase, the amassed information underwent rigorous analysis using SPSS software, version 21. This statistical platform provided the means to decipher the complex datasets, translating them into coherent, actionable insights. The choice of SPSS for data analysis reflects a commitment to methodological rigor, ensuring that the conclusions drawn from the study are both robust and reliable.

In sum, the study was a meticulously planned and executed examination of health professionals' awareness regarding cochlear implant candidacy in Lahore. Through a methodical approach to sampling, data collection, and analysis, the research endeavored to uncover meaningful patterns and insights, contributing to the broader discourse on cochlear implantation and its implications for clinical practice.

RESULTS

Figure: 1

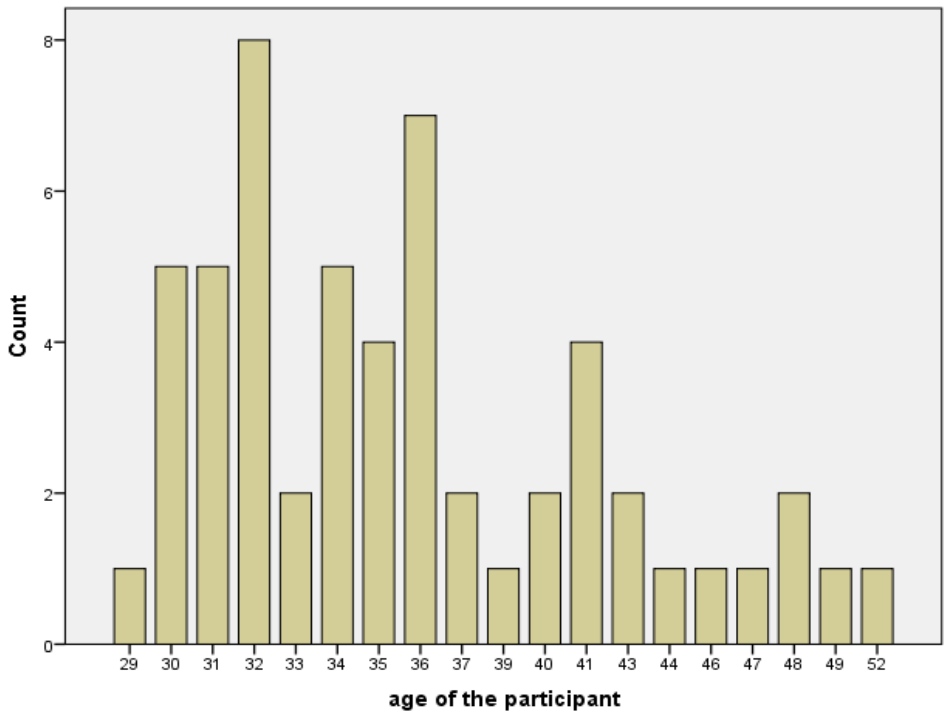

Figure: 1 showed age of the participants included in this study. Age range of the participants was from 29years to 52years.

Figure: 2

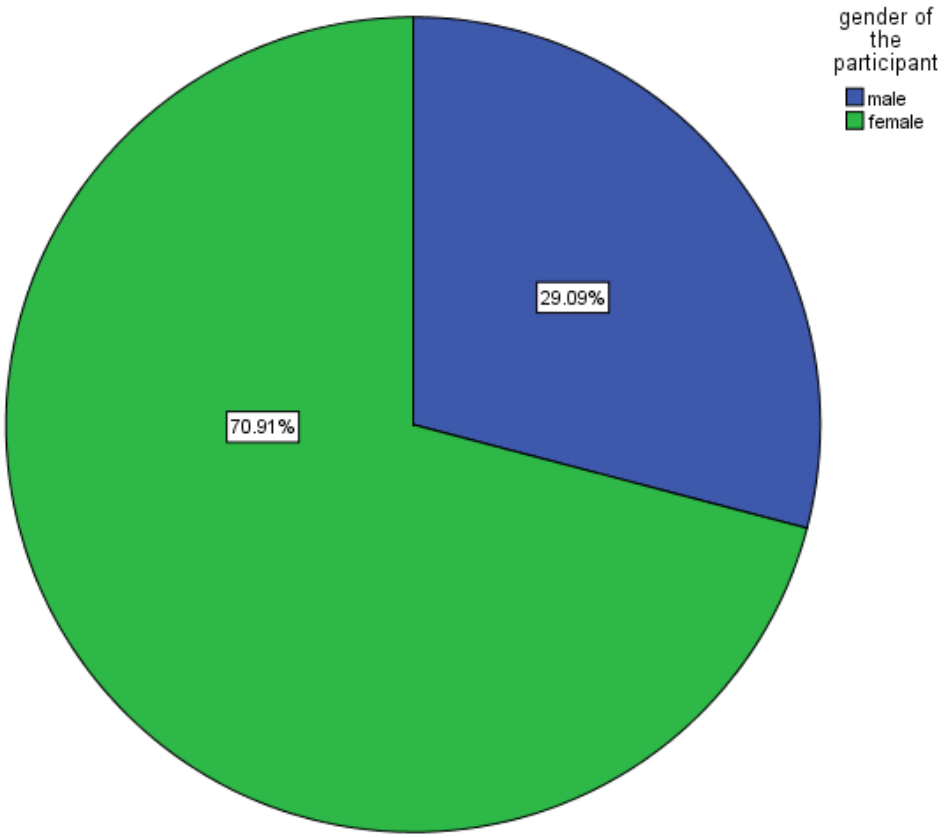

Figure:2 The above figure showed frequency distribution of gender participant include in study. There were 29.09% male and 70.91% female. Blue colour indicate male participants and green colour indicate female participants.

Figure: 3

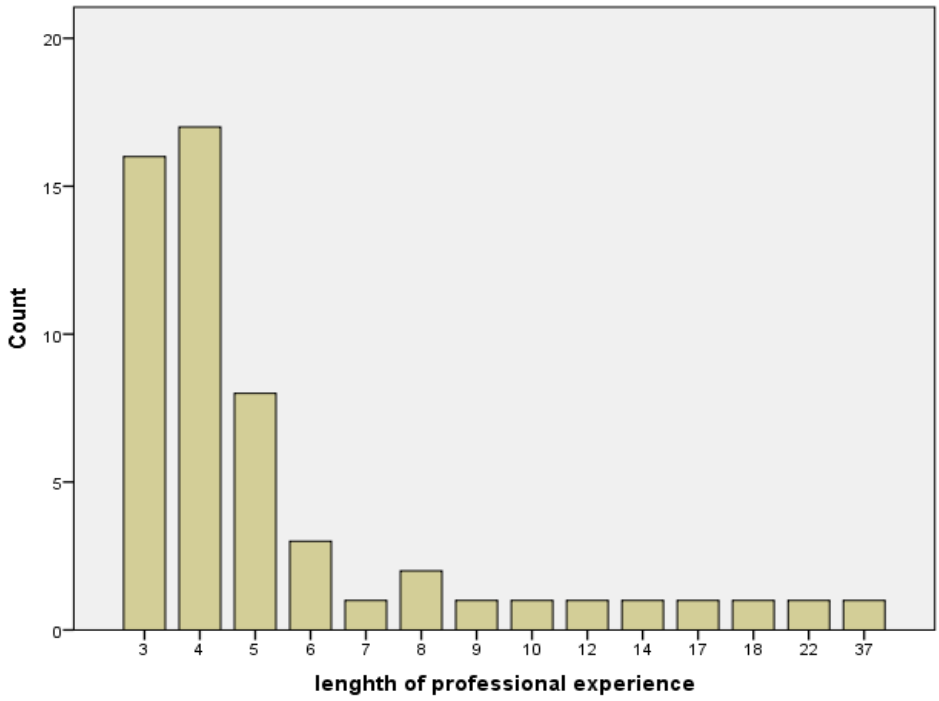

Figure 3: Showed length of professional experience included in study. Highest experience in this bar chart is 37years and least experience 3 year.

Table 1: Distribution of Health Professionals by Field of Work and Cochlear Implant Center Experience

Characteristic	Frequency (n=55)	Percent
Field of Work		
Speech-Language Pathologists (SLP)	31	56.4%
Ear, Nose, and Throat Specialists (ENT)	24	43.6%
Cochlear Implant Center Experience		
Yes	28	50.9%
No	27	49.1%

The table presents a detailed distribution of health professionals involved in a study, categorizing them into two main fields: Speech-Language Pathologists (SLPs) and Ear, Nose, and Throat (ENT) specialists. Of the total 55 participants, 31 are SLPs, accounting for 56.4% of the sample, while 24 are ENT specialists, making up 43.6%. Furthermore, the table divides these professionals based on their involvement with cochlear implant centers. Out of the total, 28 participants (50.9%) reported having worked in cochlear implant centers, whereas 27 participants (49.1%) indicated they had not. This distribution not only showcases the balance in professional roles among the participants but also reflects a near-equal division in their experience with cochlear implant centers, providing insight into the varied exposure and involvement of health professionals in the field of cochlear implantation.

Table 2: Awareness of Cochlear Implant Candidacy Criteria Among Health Professionals (N=55)

Criteria Description (N=55)	Agree	Disagree	Neutral	Observations about Awareness Level
Severe to profound hearing loss as candidacy criteria	49, (89%)	1, (<2%)	5, (10%)	Generally aware, but some disagreements suggest gaps in knowledge
Child's limited progress in speech/language skills as candidacy criteria	42, (76%)	8, (14%)	5, (10%)	Aware, but disagreements indicate need for further training
Lack of access to all frequencies for speech/language development as candidacy criteria	22, (40%)	6, (10.9%)	-	Mixed awareness, with some lacking understanding
Difficulty responding to name in quiet/noisy situations as candidacy criteria	16, (29.1%)	16, (29.1%)	-	Equally divided opinions suggest a lack of awareness
Delay in speech/language skills as candidacy criteria	16, (29.1%)	12, (21.8%)	-	Awareness present, but notable disagreements on criteria
Difficulty being understood by others as candidacy criteria	-, (0%)	18, (32.7%)	-	A significant lack of awareness indicated
Difficulty interacting/communicating with peers as candidacy criteria	14, (25.5%)	13, (23.6%)	13, (23.6%)	Awareness exists, but also notable indecision and disagreement
Delay in reading acquisition/fluency as candidacy criteria	15, (27.3%)	10, (18.2%)	11, (20.0%)	Some awareness, with disagreements and neutrality indicating gaps
Extra effort leading to listening fatigue as candidacy criteria	23, (41.8%)	13, (23.6%)	-	Majority aware, but significant disagreement exists
Frustration due to poor communication outcomes as candidacy criteria	-, (0%)	20, (36.4%)	-	Lack of awareness is predominant, despite some strong agreement

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Criteria Description (N=55)	Agree	Disagree	Neutral	Observations about Awareness Level
Dependence on visual cues for interaction as candidacy criteria	27, (49.1%)	5, (9.1%)	-	High level of awareness, with minimal disagreement

This table delineates the awareness levels among health professionals regarding cochlear implant candidacy criteria, correlating with the study's objective to assess this awareness. It reveals that a substantial majority (49, 89%) are well-informed about severe to profound hearing loss being a significant criterion, though a small faction (1, <2%) shows dissent, hinting at knowledge gaps. Similarly, a large portion (42, 76%) recognizes the importance of a child's limited progress in speech/language skills, yet disagreements (8, 14%) suggest the need for enhanced training. However, the table also highlights areas of divided opinion and significant unawareness, such as in understanding the candidacy related to difficulty being understood by others, where 18 (32.7%) disagreed, indicating substantial gaps in awareness. These findings underscore the nuanced understanding and discrepancies among professionals in identifying cochlear implant candidates.

Table 3: Field of work * AHPCC6 Crosstabulation

		AHPCC6					Total
		Strongly disagree	Disagree	Neutral	Agree	Strongly agree	
Field of work	SLP	3	11	2	11	4	31
	ENT	0	7	3	5	9	24
Total		3	18	5	16	13	55

Table showed that ENT specialist 9 participants strongly agree about If others (ex-family members, teachers, and neighbours) have difficulty understanding child speech can be considered as a candidate of cochlear implant.7 participants were disagreed. 3 participants were neutral. SLP's 11 participants were agree about candidacy criteria. 11 participants were also disagreed. 2 participants were neutral. Majority of SLP's were aware about candidacy criteria and ENT Specialist have little awareness about candidacy criteria of cochlear implant.

Table 4: Field of work * AHPCC10 Crosstabulation

		AHPCC10				Total
		Disagree	Neutral	Agree	Strongly agree	
Field of work	SLP	11	9	5	6	31
	ENT	9	3	4	8	24
Total		20	12	9	14	55

Table Showed that 8 ENT participants strongly agree as If the child show frustration due to poor communication outcomes at home, schools, or social settings can be considered as candidate of cochlear implant. 9 ENT participants disagreed, and 3 participants were neutral. They have adequate awareness regarding candidacy criteria of cochlear implant. SLP's 6 participants strongly agree. 11 participants disagreed, and 9 participants were neutral. They have inadequate knowledge about candidacy criteria.

DISCUSSION

The study set out to assess the level of awareness among health professionals, including ENT specialists and speech and language pathologists, regarding the candidacy criteria for cochlear implants (21). Utilizing a non-probability sampling technique, the research focused on individuals aged between 29 to 52 years, drawn from both government and private hospitals in Lahore. The primary tool for evaluation was a pediatric checklist designed to ascertain professionals' knowledge on a range of indicators that qualify children for cochlear implantation (22).

Findings from the study highlight a varied understanding of cochlear implant candidacy among the targeted professionals (23). Notably, while a significant number of ENT specialists and SLPs demonstrated an understanding of the criteria, discrepancies in responses indicated a partial knowledge gap (24). For instance, the majority acknowledged severe to profound sensory neural hearing loss as a key indicator for implant candidacy, yet there were occasional disagreements, signaling an incomplete consensus.

Additionally, responses to questions regarding speech perception and age-appropriate language skills suggested a similar pattern of broad, but not universal, awareness.

The study underscores an evident divide in the application of audiometric versus speech-based criteria for determining implant candidacy (25). Many ENT specialists appeared to rely predominantly on audiometric measurements, potentially overlooking critical speech and language development factors. This reliance on objective auditory assessments, while invaluable, may not fully capture the multifaceted needs of children with hearing impairments. Conversely, SLPs, though crucially involved in the speech and language development aspects of candidacy evaluation, also displayed varying degrees of familiarity with these criteria.

Comparative literature, such as the work by Ulrich Hoppe et al. (2023) provides a contextual backdrop against which these findings can be weighed (26). Hoppe et al.'s retrospective analysis aligns with the current study's revelations, reinforcing the notion that children not benefiting from hearing aids may show considerable improvement with cochlear implants. Vickers' international perspective on candidacy criteria further illuminates the disparities in assessment approaches across different countries, accentuating the localized preference for audiometric measures over speech-based evaluations within the Pakistani context.

However, the study is not without its limitations. The exclusive focus on professionals within Lahore may not encapsulate the broader national or global standards and practices. Furthermore, the reliance on self-reported data through checklists could introduce bias or inaccuracies in the representation of professionals' true understanding.

CONCLUSION

while the study reveals a foundational awareness among health professionals regarding cochlear implant candidacy, it also uncovers significant gaps in comprehensive knowledge and uniform application of criteria. These findings advocate for enhanced interdisciplinary training and education to bridge these gaps, ensuring a holistic approach to candidacy evaluation that aligns with both national and international best practices. Ultimately, fostering a deeper, more nuanced understanding of cochlear implant candidacy criteria among health professionals will enhance the quality of care for children with hearing impairments, ensuring that those who stand to benefit the most from cochlear implants are accurately identified and supported.

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