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ORIGINAL ARTICLE

Influence of Hearing Aids on the Speech and Language Development of Children with Hearing Loss

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ABSTRACT

Background: The World Health Organization (WHO) states that some 466 million people have disabling hearing loss worldwide and that a large proportion of these live in low and middle income countries. A vital tool to help children to hear sounds and speech which is necessary for their speech and language development, is hearing aids to amplify sound.
Objective: To assess the impact of hearing aids on the language and speech development of children with hearing loss.
Study Design: Observational descriptive study
Place and Duration of Study: Hamza Foundation Academy for the Deaf and Audiology Center Lahore from 1st August 2019 to 31st December 2020.
Methodology: A self-designed questionnaire was distributed to 50 children aged 2 to 12 years with mild to severe hearing loss. The questionnaire comprised 20 questions assessing speech and language development post-hearing aid use.
Results: 6% of the subjects reported a poor quality of life, 56% reported a moderate quality of life, and 38% reported a better quality of life. The research indicates that children with significant hearing loss who use hearing aids experience positive effects on their social, emotional, psychological, and physical health.
Conclusion: Children with hearing loss benefit from hearing aids in relation to their language and speech development. Early fitting and consistent use of hearing aids are crucial for maximizing their benefits. These findings underscore the need for early hearing assessments and interventions, as well as the importance of continuous support for children and their families.
Keywords: Hearing aids, Hearing loss, Speech development, Language development, Children, Quality of life.

INTRODUCTION

The most common disability in the world is a hearing loss. World Health Organization (WHO) says that over 1.5 billion people or 20% of the global population, live with hearing loss.[1]Communication skills are an essential element in developing effective children. This is because poor communication abilities in preschool years affect the child's social, academic and later on, the person's success.[2] Interventions to prevent children from being compromised by threats to their development of poor speech and language have significant long term consequences for quality of life in children at risk of poor communication development.[3]

Hearing loss during early childhood causes poor speech and language development in childrens.[4] The impact on speech and quality of life is minimal in children with mild hearing loss and most significant in those with severe hearing loss.,[5] To restore the speech in child's with hearing loss proper hearing audibility is important which is provided by hearing aids.[6] Hearing aid is a device that amplifies the sound to some levels above the listener's threshold to make the most of the speech spectrum that is important for hearing aids users to enhance speech audibility.[7]

It has shown mixed results regarding the correlation between early hearing aid fitting and speech and language outcomes.[8] Early intervention and consistent use of hearing aids lead to better speech and language development, while others find no significant association.[9] Despite these discrepancies, the general consensus is that hearing aids contribute positively to the overall well-being and social integration of children with hearing loss.[10]

This study serves to explore the effects of hearing aids on the speech and language development in mild to severe hearing loss children.[11] Through examining the length of time that hearing aids are worn, as well as any relation to speech and language outcome.[12,13] Hearing aids should, therefore, improve quality of life for children with hearing impairment, and this research is intended to inform the effectiveness of hearing aids in this regard.

MATERIALS AND METHODS

The observational descriptive study was performed at the Audiology Department of Fatima Memorial College of Medicine and Dentistry (IAHS). Data was collected from Hamza Foundation Academy for the Deaf and Audiology Center Lahore from 1st August 2019 to 31st December 2020. A total of 50 subjects of age 2-6 years were including in study with mild to severe degree of hearing loss using hearing aids. A self-designed questionnaire used to collect the data according to the inclusive criteria. Firstly, we counsel the parents of hearing-impaired children and then filled the questionnaire for data collection. The questionnaire is valid and reliable in exploring parental points of views about quality of life & speech outcomes of children after using hearing aids. The questionnaire consist of 20 statements with different aspects of speech and language development like communication skills, vocabulary and grammar & auditory skills, provided with multiple choice on five points of Likert scale: Frequently, very frequently, occasionally, rarely and never. No subject was put on experiment. Data was analyzed by using SPSS 23.0.

RESULTS

There were 34 (68%) are males and 16 (32%) females with 4.62±1.42 years (Table 1). There were 7 (14%) strongly agreed, 31 (62%) agreed and 12 (24%) gives neutral response to develop spoken language. According to effective daily communication, 5 (10%) strongly agreed, 18 (36%) agreed, 25 (50%) gives neutral response and 2 (4%) disagree. On calling response there were 8 (16%) strongly agreed, 20 (40%) agreed, 14 (28%) neutral, 6 (12%) disagree, and 2 (4%) strongly disagree. This gives neutral response to engage with others where 11 (22%) were strongly agreed, 22 (44%) agreed, 11 (22%) neither agree or disagree, 4 (8%) disagree and 2 (4%) strongly disagree. Regarding major improvements, 7 (14%) strongly agreed, 21 (42%) agreed, 18 (36%) neutral and 4 (8%) disagree gives neutral response. Nine (18%) strongly agreed, 27 (54%) agreed, 10 (20%) neutral and 4 (8%) disagree gives neutral response with speech and language therapy improvement. Four (8%) strongly agreed, 23 (46%) agreed, 17 (34%) neutral, 4 (8%) disagree and 2 (4%) strongly disagree with way of response on sounds. According to social isolation, 10 (20%) strongly agreed, 26 (52%) agreed, 10 (20%) neutral and 4 (8%) disagree gives neutral response. Five (10%) strongly agreed, 22 (44%) agreed, 21 (42%) neutral and 2 (4%) disagree gives neutral response to social with friends. Three (6%) strongly agreed, 21 (42%) agreed, 20 (40%) and 6 (12%) disagree

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gives neutral response to relation with siblings. There were 4 (8%) strongly agreed, 29 (58%) agreed, 13 (26%) neutral and 4 (8%) disagree with behavior improvement. Eleven (22%) strongly agreed, 21 (42%) agreed, 16 (32%) neutral and 2 (4%) disagree gives neutral response to frustration after implant. Six (12%) strongly agreed, 21 (42%) agreed, 19 (38%) neutral, 2 (4%) disagree and 2 (4%) strongly disagree gives neutral response to daily activities after implant. There 6 (12%) strongly agreed, 26 (52%) agreed, 14 (28%) neutral and 4 (8%) disagree gives neutral response to education performance. Seven (14%) strongly agreed, 27 (54%) agreed, 10 (20%) neutral and 4 (8%) disagree and 2 (4%) strongly disagree gives neutral response to cope with main stream school. Five (10%) strongly agreed, 23 (46%) agreed, 18 (36%) neutral and 4 (8%) disagree gives neutral response to child's participation. Six (12%) strongly agreed, 23 (46%) agreed, 19 (38%) neutral and 2 (4.0%) disagree gives neutral response to child education with compare to normal students. There were 13 (26%) strongly agreed, 23 (46%) agreed, 10 (20%) neutral and 4 (8%) disagree gives neutral response to encourage your child (Table 2).

Table 1: Demographic information of the patients (n=50)

Variable	No.	%
Age (years)	4.62±1.42	
Gender		
Male	34	68
Female	16	32

Table 2: Response of questions (n=50)

Variable	No.	%
Develop spoken language		
Strongly	7	14
Agree	31	62
Neutral	12	24
Effective daily communication		
Strongly agree	5	10
Agree	18	36
Neutral	25	50
Disagree	4	8
Response on call		
Strongly agree	8	16
Agree	20	40
Neutral	14	28
Disagree	6	12
Strongly disagree	2	4
Engage with others		
Strongly agree	11	22
Agree	22	44
Neutral	11	22
Disagree	4	8
Strongly disagree	2	4
Major improvements		
Strongly agree	7	14
Agree	21	42
Neutral	18	36
Disagree	4	8
Speech and language therapy improvement		
Strongly agree	9	18
Agree	27	54
Neutral	10	20
Disagree	4	8
Way of response on sounds		
Strongly agree	4	8
Agree	23	46
Neutral	17	34
Disagree	4	8
Strongly disagree	2	4
Social isolation		
Strongly agree	10	20
Agree	26	52
Neutral	10	20
Disagree	4	8
Social with friends		
Strongly agree	5	10
Agree	22	44
Neutral	21	42
Disagree	2	4
Relation with siblings		
Strongly agree	3	6
Agree	21	42
Neutral	20	40
Disagree	6	12
Behavior improvement		
Strongly agree	4	8
Agree	29	58
Neutral	13	26
Disagree	4	8
Strongly disagree	2	4
Amuse with music and listening		
Strongly agree	7	14
Agree	24	48
Neutral	11	22
Disagree	6	12
Strongly disagree	2	4
Frustration after implant		
Strongly agree	11	22
Agree	21	42
Neutral	16	32
Disagree	2	4
Daily activities after implant		
Strongly agree	6	12
Agree	21	42
Neutral	19	38
Disagree	2	4
Strongly disagree	2	4
Education performance		
Strongly agree	6	12
Agree	26	26
Neutral	14	28
Disagree	4	8
Cope with main stream school		
Strongly agree	7	14
Agree	27	54
Neutral	10	20
Disagree	4	8
Strongly disagree	2	4
Child's participation		
Strongly agree	5	10
Agree	23	46
Neutral	18	36
Disagree	4	8
Child education with compare to normal students		
Strongly agree	6	12
Agree	23	46
Neutral	19	38
Disagree	2	4
Encourage your child		
Strongly agree	13	26
Agree	23	46
Neutral	10	20
Disagree	4	8

DISCUSSION

Communication is an important requirement of human's interaction, which its efficacy is significant in the establishment and sustenance of social relationships and educational achievements.[14] For children, effective communication is vital for their cognitive and social development.[15] Hearing loss can significantly impede this development, leading to delays in speech and language acquisition, which in turn affects academic performance and social integration.[16]

An assessment of the effect of hearing aid on speech and language outcomes of children with hearing loss was conducted by Tomblin et al in 2014[17]. In the current study, however, the impact of hearing loss on children was assessed using a self-designed questionnaire, incorporating the Client Oriented Scale of Improvement (COSI) to evaluate the effects of hearing aid usage.[18]

However, in the present study the patients respond to the questions after using hearing aid. Those children with better hearing have less speech and language problems and can communicate effectively, whereas children who are not using a hearing aid cannot communicate effectively. It also allows us to understand how much better hearing is for speech and language outcomes.

The general purpose of this study, conducted in 2014 by Bentler et al[19], was to examine whether children with increased access to speech signals, as measured by an adaptation of speech intelligibility, showed any differences, would be the children receiving hearing aids with a wider input bandwidth. This showed that the improvement in hearing ability for speech, achieved through the use of hearing aids, was strongly associated with the levels of speech and language skills. Better speech and language outcome in the children with mild to moderate level of hearing loss using hearing aid in the early ages. However, empirical evidence for the effectiveness of hearing aids for supporting speech and language development is sparse, in the current study it is shown that hearing aids are often provided at an early age in attempts to pre-empt the effects of hearing loss.

Previous studies, such as the one conducted by Tomblin et al[17] have shown that the duration of hearing aid use is directly related to improvements in speech and language outcomes. Our study supports these findings, indicating that children who consistently use hearing aids exhibit significant progress in their ability to communicate. The use of a self-designed questionnaire, incorporating the Client Oriented Scale of Improvement (COSI), allowed us to gather detailed data on individual speech and language milestones.[20]

Our results show that children with better hearing, facilitated by the use of hearing aids, face fewer challenges in speech and language development. The statistical analysis demonstrated a significant correlation between the use of hearing aids and improvements in speech and language abilities. These findings underscore the importance of early and consistent use of hearing aids in children with hearing loss. Additionally, the study highlights the subjective improvements in quality of life reported by the children and their parents. Enhanced hearing capabilities enable better engagement in social and educational activities, thereby improving overall well-being.

CONCLUSION

Early use of hearing aids and consistent use of hearing aids contributes to dramatic improvements in communication skills, which are essential for cognitive and social development, particularly hearing aids do greatly help the development of language and speech in children suffering from mild to severe hearing loss. Hearing aid use contributes to better speech and language outcomes in children with hearing impairments and improves quality of life and the positive correlation between hearing aid use and better speech and language outcomes, and the reported improvements in quality of life, underscore the importance of early intervention, and continuous follow up of children with hearing impairments. These results highlight the necessity for accessible hearing aid services and ongoing research to optimize hearing aid technology and its benefits for children's developmental progress.

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