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COMPARISON OF SPEECH PERCEPTION BETWEEN MALE AND FEMALE CHILDREN WITHCOCHLEAR IMPLANTION

R. SUNDARESAN, Ph.D Research Scholar, PG and Research Department of Rehabilitation Science, Holy Cross College (Autonomous), Tiruchirappalli – 620 002
Dr. A. TURIN MARTINA, Research Supervisor and Associate Professor, PG and Research Department of Rehabilitation Science, Holy Cross College (Autonomous), Tiruchirappalli – 620 002

ABSTRACT- Cochlear Implant is one of the surgical amplification devices for two years old children and older with severe to profound hearing loss and in children 12-23 months of age with profound deafness. Speech perception is the auditory ability an understanding the language. The study was done in 240 cochlear implant children 4-8 years of age. This study is focusing on the comparison of speech perception in cochlear implant children among males and females. Simple and complex stories were used in phase and sentence levels as test material. The results reveal that there is no significant difference between males and females in speech perception. In 4-8 years old children there is no gender difference in speech perception. Future studies can be a focus on different age groups of children with cochlea implants.

Keywords: Speech perception, Cochlear implant, Male, Female

I. INTRODUCTION

Cochlear implants are electronic devices that contain a current source and an electrode array that is implanted into the cochlea; an electrical current is then used to stimulate the surviving auditory nerve fibers (Wilson, 2000). Before two decades the cochlear implants were available in single-channel only, nowadays available in several commercial levels, multichannel cochlear implants. In the initial periods, the FDA approved cochlear implantation to 2years old and above 2years old children. But now the FDA has approved the use of multichannel cochlear implants in prelingually deafened children as young as 12 months of age, and many children younger than 12 months of age have been implanted off protocol. Cochlear implants can be suggested for those having bilateral profound sensorineural hearing loss. regular follow-up is needed for cochlear implants. The impact of profound deafness varies depending upon the age at onset. The successful outcomes of cochlear implants will depend upon various factors. Age of onset, implant age, using bimodal, or using uni-model, regularly attending habitational training, Speech and language training, mapping, regular aided, the other associated conditions theses can consider as the primary factor for a successful outcome. Stimulation at home, parental child interaction, supportive family, socioeconomic background, and peer interaction are the factors consider might be secondary. The successful outcomes can be profile, by including the speech perception, intelligibility, language outcome, academic performance, the use of special educational and rehabilitative services, and the quality of life. The current study focusing on speech perception comparison between males and females among cochlear implant children. Studies are showing that early identification and early implantation, newborn hearing screening, as well as creating public awareness about childhood hearing loss, identification, and further management, will lead to good speech perception, language outcomes, academic performance, and the quality of life in children with a cochlear implant.

The study among children who had done universal newborn screening versus those who had not done universal newborn screening also showed similar results. The advantage of early screening and identification of hearing impairments involves the better diagnosis of the underlying ailment, early treatment, timely interventions for hearing loss, and access to cochlear implantation or devices (Sood&Kaushal, 2009). Past studies have proven that children who are implanted during younger ages achieve higher scores on different auditory performance and language tests after a given time of implant use (Suh et al 2009).

Speech perception is the ability to understanding the language. Usually, speech perception will be good in early cochlear implants children. If the cochlear implants were done during the critical period, the child's speech perception will be good. And other factors also important for good speech perception, one of the main factors is implant age. Studies were showing that children less than two years old who have undergone

cochlear implants will receive substantial benefits from a multichannel cochlear implant with no increase in risk when compared with older children (Susan BWaltzman, 1998).

According to Sarant, et al 2001, they have done a study to identify common factors affecting speech perception scores in children with cochlear implants. The results showed that a significant part of the variation in speech perception score is systematically related to audiological and environmental factors for each child. Similar studies were done to determine the presence of sex differences in cochlear implant outcomes. It's a retrospective study. The study was conducted in adults, with a mean age of 59.81±16.54 years and the mean duration of hearing loss was 26.33±18.54 years; there was no significant difference between men and women. Sex may play a role in early speech recognition outcomes after adult cochlear implantation.This current study aims to Speech Perception relation between males and females among the Cochlear Implant children. It's a cross-sectional study.

AIM OF THE STUDY

- To check the speech perception relation between males and females among the Cochlear Implant children.

OBJECTIVES OF THE STUDY

- To assess the significant difference between male and female children with cochlear implants and speech perception in story-1 of version-1 and version-2 in auditory mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-2 of version-1 and version-2 in auditory mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-3 of version-1 and version-2 in auditory mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-4 of version-1 and version-2 in auditory mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-1 of version-1 and version-2 in auditory-visual mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-2 of version-1 and version-2 in auditory-visual mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-3 of version-1 and version-2 in auditory-visual mode.
- To assess the significant difference between male and female children with cochlear implants and speech perception in story-4 of version-1 and version-2 in auditory-visual mode.

II. METHODOLOGY

Test material: The test stimuli were prepared by reviving the previous studies. The test stimuli were designed, which is consists of four simple stories. In each story, it has two versions, Version-1, and version-2. Version-1 is phase level and version-2 is sentence level. These simple four stories were designed by the research scholar.

Validation: Face validity was done by the search scholar. Content validation and construction validation were done by the three Speech-language Pathologists, two audiologists, two-habitational therapists, and two linguistic people were done the validation. And then final test stimuli were prepared and used for data collection. The test stimuli were four simple stories.

Population and Criteria:240 children with cochlear implants were included in this study, who undergone cochlear implant before the age of four. They should attend the auditory habilitation minimum of one year. The age range was 4-8 years of age. They should not have any other associated conditions, such as Autism, Intellectual disability, visual impairment, Attention Deficit Hyperactive Disorder, or any other sensory issues.

Data collection: The data collection was done at different habilitation centers in Tamil Nadu. The child's speech therapist or habilitation therapist has to present the test stimuli to the child. The child has to repeat the stimuli. The stimulus shouldn't repeat by the therapist. The child's responses were recorded and then rated. The same four stories were presented in both modes, auditory mode, and auditory-visual mode. 240 children were included in this study.

III. RESULTS AND DISCUSSION

In this current research, speech perception relation between males and females among the Cochlear Implant children on Auditory mode and Auditory visual mode for different simple stories in version-1 and version-2.

These responses were noted from 240 children with the cochlear implant, aged between 4 to 8 years. In 240 children 120 male children and 120 female children. The test stimuli were four simple different stories, which is having two versions. Version-1 phase level and version-2 sentence level. The responses were taken in two methods auditory and auditory-visual method. The date was tabulated in an excel sheet and the analysis was done by using SPSS. An independent t-test was performed.

Table-1: is showing the speech perception relation between males and females among the Cochlear Implant children on auditory mode for different simple stories in version-1 and version-2.

Stories	AuditoryMode	Gender	N	Mean	S.D	p-value
Story-1	Version-1	Male	120	7.14	2.68	0.62
		Female	120	6.97	2.65	
	Version-2	Male	120	3.19	2.35	0.34
		female	120	2.89	2.57	
Story-2	Version-1	Male	120	7.17	2.67	0.65
		Female	120	7.01	2.61	
	Version-2	Male	120	3.20	2.35	0.34
		Female	120	2.90	2.56	
Story-3	Version-1	Male	120	7.16	2.63	0.68
		Female	120	7.02	2.66	
	Version-2	Male	120	3.21	2.63	0.30
		Female	120	2.88	2.66	
Story-4	Version-1	Male	120	7.10	2.77	0.64
		Female	120	6.93	2.73	
	Version-2	Male	120	3.26	2.36	0.33
		Female	120	2.95	2.58	

From the above table, its clear that there is no significant difference in the mean score between male and female children with cochlear implant in the assessment test for speech perception in version-1 (p=0.62) and version-2 (p=0.34) for story-1, version-1 (p=0.65) and version-2 (p=0.34) for story-2, version-1 (p=0.68) and version-2 (p=0.30) for story-3 and version-1 (p=0.64) and version-2 (p=0.33) for story-4 in auditory mode. From the results, it is clear that there is no significant difference in the mean score between male and female children with speech perception in four stories of version-1 and version-2 in auditory mode.

Table-2: is showing the speech perception relation between males and females among the Cochlear Implant children on auditory-visual mode for different simple stories in version-1 and version-2.

Stories	Auditory Visual Mode	Gender	N	Mean	S.D	p-value
Story-1	Version-1	Male	120	8.64	3.09	0.53
		Female	120	8.39	2.96	
	Version-2	Male	120	4.36	3.09	0.39
		Female	120	4.00	3.38	
Story-2	Version-1	Male	120	8.55	2.98	0.70
		Female	120	8.40	3.00	
	Version-2	Male	120	4.36	3.09	0.39
		Female	120	4.00	3.38	
Story-3	Version-1	Male	120	8.61	3.05	0.57
		Female	120	8.39	2.96	
	Version-2	Male	120	4.36	3.09	0.39
		Female	120	4.00	3.38	
Story-4	Version-1	Male	120	8.59	3.07	0.58
		Female	120	8.37	3.01	
	Version-2	Male	120	4.35	3.10	0.39
		Female	120	3.99	3.39	

From the above table-2, its clear that there is no significant difference in the mean score between male and female children with cochlear implant in the assessment test for speech perception in version-1 (p=0.53) and

version-2 (p=0.39) for story-1, version-1 (p=0.70) and version-2 (p=0.39) for story-2, version-1 (p=0.57) and version-2 (p=0.39) for story-3 and version-1 (p=0.58) and version-2 (p=0.39) for story-4 in auditory-visual mode. From the results, it is clear that there is no significant difference in the mean score between male and female children with speech perception in four stories of version-1 and version-2 in auditory-visual mode.

IV. CONCLUSION

Speech perception is one of the measurable outcomes in children with cochlear implants. The major enhancing factor for speech perception is the age of implantation. Early implantation will give a better outcome in audition, language, and speech. According to Teresa YC Ching, et. al (2017). Studies are showing that the primary rehabilitative factor associated with good speech perception skill development was the educational emphasis on oral-aural communication.A well-fitted map, as evidenced by a wide dynamic range and optimal growth of loudness characteristics, contributed substantially to the child's ability to hear speech. The current study states that there is no significant difference between male and female children with speech perception in four stories of version-1 and version-2 in auditory and auditory-visual mode. Future studies can be the focus on different age range and complex test stimuli.

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