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QUALITY OF LIFE IN CHILDREN WITH COCHLEAR IMPLANTS: EFFECT OF IMPLANT AGE ON GENERAL FUNCTIONING

Medical Science

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ABSTRACT

Cochlear implant is the most wonderful invention of the 20th century. Since the mid-1980s, the cochlear implant has been used for children who have a profound hearing loss. In order to state the efficiancy of the implantation quality of life has to be evaluated. One of the important domain to assess QOL is general functioning. The aim of the study was to evaluate the effect of implant age on general functioning in children with cochlear implants. Parents of 60 cochlear implanted children participated in the study. The participants were divided into 2 groups based on their implant age. A questionnaire assessing the general functioning in children with cochlear implants was constructed and was administered to the target population after the pilot study. The results showed that there exist a significant difference between the two groups in terms of general functioning.

KEYWORDS:

Quality of life in children with cochlear implants, General functioning, Implant age

1. INTRODUCTION

Life is made meaningful by what we experience through our senses. The sense of hearing plays a key role in our awareness and safety and has some key advantages over our sense of vision. It has the effect of connecting us to and integrating us with our environment so that we become one with it. Also hearing is inevitable for the development of speech, language and communication skills through which social relations are formed and strengthened.

Reduced hearing acuity during infancy and early childhood interferes with the development of speech and language skills, because it is likely that the child will not receive adequate auditory, linguistic, and social stimulation required for speech and language learning, social and emotional development, and general functioning will be affected accordingly (**NIH, 1993).**

Consequences of hearing loss in a child's life can be primary and secondary. The primary and most devastating effect is the impact on verbal communication. The child will lose the information about the form, content and use of language. Secondary consequences are the affected educational, vocational, psychological and social wellbeing of the child, which can be collectively called as quality of life.

The earlier the hearing loss is identified and intervention begun, the more likely it is that the consequences can be avoided. The rehabilitation process includes the fitting of an amplification device and speech and language therapy. But most of the time, in the case of profound hearing impairment, the hearing aids fail to provide adequate input for the development of speech and language skills. In this case cochlear implants are introduced.

With cochlear implant surgery done early in life and with adequate language intervention given, the child can acquire normal or near normal speech and language skills and thus the quality of life can be improved.

To quantify the outcomes after implantation researchers use different measures. One important outcome measure is the measurement of quality of life.

The term quality of life (QOL) refers to the general well-being of individuals. One of the domains that contribute to QOL is General functioning, which evaluate how well the child is coping up with daily situations in life.

2. AIM OF THE STUDY

To study the effect of implant age on general functioning in children with cochlear implants.

3. METHODS

a. Participants

The participants were parents of 60 Malayalam speaking children within the age range of 0-10 years who underwent cochlear implantation. The subjects were selected based on their implant age and was divided into 2 groups depending on the implant age as follows:

- Group A - 0-2 years (n=30)
- Group B - 2 years and above (n=30)

Inclusionary Criteria

- Subjected to early identification prior to their chronological age of 6 months
- Amplification was provided for a minimum of 6 months' time period
- Undergoing regular intervention such as auditory verbal therapy.

Exclusionary Criteria

- Children with other known medical disabilities, cognitive impairment.
- Children who are bilaterally implanted.

The following table shows the details of participants included in the study.

Table 3.1 Demographic data of the participants

	No. of participants (n)	Mean Chronological Age (months)	Mean Implant Age (months)	Mode of Intervention
Group A	30	42.6	11.6	AVT – 76.6% SLT – 23.4%
Group B	30	59.6	29.5	AVT -66.6% SLT -33.3%

AVT - Auditory verbal therapy
SLT – Speech Language therapy

a. Procedure

The study proceeded in four phases.

- Questionnaire construction
- Pilot study of the questionnaire
- Data collection
- Statistical Analysis.

I. Questionnaire construction

A multiple choice questionnaire consisting of 10 questions, which reflect the general functioning in children with cochlear implants was constructed in Malayalam language.

A 3 point likert scale was used as the response scale, which includes,
2- the response is present always
1- the response is present sometimes
0-the response is completely absent.

ii. Pilot study

A pilot study of the questionnaire was carried out to check on the reliability and validity of the questionnaire. For this purpose the questionnaire was administered to 20 participants, 10 from each group. The results obtained were analyzed for reliability using Spearman-Brown Prophecy Formula using SPSS software version 16.0. The reliability coefficient obtained was 0.895 which means the test is highly reliable. As the test is highly reliable with coefficient greater than 0.81, it is valid also.

iii. Data Collection

Informed consent was obtained from the participants. They were informed about the purpose of the study, the interview questions and information regarding confidentiality. The questionnaire was administered by the researcher. For each participant, completion of the questionnaire lasted approximately for 10-15 minutes.

iv. Statistical Analysis

The two groups were compared to evaluate the significant differences. Statistical procedures such as Mean, Standard deviation, p–value (using Mann Whitney U test) were calculated in SPSS software.

2. RESULTS AND DISCUSSION

The results are discussed under the following headings.

1) Overall comparison of performance between parents of Group A and Group B
2) Comparison of the performance of the two groups in each question.

4.1 Overall comparison of Performance between Group A and Group B.

Table 4.1 Comparison of overall performance between Group A and Group B

General functioning related QOL	N	Mean	sd	p
Group A	30	14.96	1.64	0.001
Group B	30	19.5	0.92	

The mean value for group A is less than the mean value of group B which implies that the children with implant age less than 2 years performed poorer when compared to that of children with implant age greater than 2 years. Also the p value is 0.001 which shows that the difference is statistically significant. This shows that there is a remarkable effect of implant age exist on the outcome of cochlear implantation.

4.1 Comparison of the performance of the two groups in each question.

The following table describes the performance of Group A and B on each question.

Table 4.2 Performance of each group on each question.

		n	mean	sd	p
G1- Reliant on Implant	Group A	30	2.0	0.0	1.000
	Group B	30	2.0	0.0	
G2- Responds to name call	Group A	30	2.0	0.0	1.000
	Group B	30	2.0	0.0	
G3- Enjoys listening to music/watching TV	Group A	30	2.0	0.0	1.000
	Group B	30	2.0	0.0	
G4- Aware of traffic sounds	Group A	30	1.6	0.4	0.0001
	Group B	30	2.0	0.0	
G5- Coping in new situations	Group A	30	1.7	0.4	0.0001
	Group B	30	2.0	0.0	
G6- Communicates through telephone	Group A	30	0.66	0.4	0.0001
	Group B	30	1.9	0.3	
G7- Conveys telephone messages correctly to those at home	Group A	30	0.16	0.4	0.0001
	Group B	30	1.7	0.4	
G8- Enjoys going out and dine out with family	Group A	30	2.0	0.0	1.000
	Group B	30	2.0	0.0	
G9- Communicates in difficult to listen situations	Group A	30	0.86	0.3	0.0001
	Group B	30	1.9	0.3	
G10- Responds to sounds without being prompted	Group A	30	1.9	0.2	1.000
	Group B	30	2.0	0.0	

In question numbers G1, G2, G3 and G8 the mean value is not varied. Though there is a difference in the mean in question G10, it is not significant. The p value obtained for these 5 question is 1.00. That is no significant difference is there between the groups in skills like reliance on implant, response to name call, enjoying TV/music, dining out and response to sounds without prompting. But in question numbers G4, G5, G6, G7 and G9 there is a significant difference between the means of the groups and the p value obtained here is less than 0.05. So in these questions, the two groups differ significantly. That is, awareness of traffic sounds, coping with new situations, usage of telephone, communication in difficult to listen situations are better in Group B when compared to Group A.

This is supported by the study done by **Zait et. al (2015)** which found that the child's enjoyment of music, awareness of environmental sounds and the general wellbeing was increased with course of time after implantation. It also indicated that increased safety was another benefit as the children were able to respond to a warning shout or safety-related alarms/sirens.

In their study, **Archbold et al.,2008; Huttunen et al., 2009** stated that parents reported improved communication in the family, and also indicated that their children developed greater confidence, were more independent and majority of children were considered as independent as most children of the same age, being able to amuse themselves.

Stacey, Fortnum, Barton, and Summerfield (2006) have also reported improved social independence and general wellbeing after implantation. Their large survey of more than 400 implanted children was based on parental and teacher reports.

Schorr, Roth, & Fox, 2009 reported that children indicated significant improvement in QOL and Age at first use of amplification predicted perceived quality of life. This finding also supports the current study.

1. CONCLUSION

Hearing is a critical sense that is necessary for the development of communication skills and it is a critical factor which contributes to the quality of life of an individual. People who are deaf will have poor communication skills which will be evidently reflected in their quality of life.

The results showed that the general functioning related quality of life

of children with cochlear implants varied depending on the duration of implant. The following conclusions can be drawn:

- The mean scores of Group B were higher when compared to the scores at of Group A.
- The scores were better in children whose implant age is greater than 2 years when compared to the children with implant age less than 2 years.
- The present study provides information on how the general functioning, a domain of quality of life undergo change as the age and duration of cochlear implantation increases.
- This study states that implant age has a greater impact on General functioning related QOL in children with cochlear implants.

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