

## Influencing Factors the Quality of Life in the Children with Cochlear Implants

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### ABSTRACT

**Objective:** To assess the effect of cochlear implants on quality of life in the children.

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** CMH, Rawalpindi Pakistan, from Jul 2021 to Feb 2022.

**Methodology:** Forty-five children, aged 2-5 years, of either gender having cochlear implantation already and came for follow-up were included in the study. Children with Cochlear Implants: Parental *Perspectives* (CCIPP) questionnaire were used for data collection.

**Results:** Among 45 cases, mean age was  $4.29 \pm 0.73$  years. We found that the improvement in communication with the known people was 51.1%, and before cochlear implantation, the effectiveness of hearing aids was slightly low (26.7%). Social relations received the highest ratings (mean=3.33, SD=1.36), followed by Well-being (mean=3.22, SD=1.36) and effects of implantation (mean=2.89, SD=0.95). Of 45 children, 60% of parents were satisfied with the improvement in communication, 66.7% for general functionality and autonomy, 71.1% for well-being and happiness, 77.8% for social relations, 73.3% for education and 71.1% for effects of implantation. A strong correlation was found between function in general and self-confidence of the child ( $r=0.761$ ,  $p=0.001$ ), self-confidence and education of the child ( $r=0.720$ ,  $p=0.001$ ) and function in general of the child and effect of implantation ( $r=0.725$ ,  $p=0.001$ ).

**Conclusion:** The Cochlear implantation was effective for children in hearing, language understanding, self-reliance and educational conditions.

**Keywords:** Children, Cochlear Implant, Quality of life.

**How to Cite This Article:** Shah SBH, Ali M, Hakim A, Malik KZ, Niazi KO, Ahmed S. Influencing Factors the Quality of Life in the Children with Cochlear Implants. *Pak Armed Forces Med J* 2023; 73(3): 789-792. DOI: <https://doi.org/10.51253/pafmj.v73i3.8102>

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### INTRODUCTION

According to the World Health Organization, hearing loss is the most frequent sensory impairment, affecting an estimated 430 million people worldwide (WHO).<sup>1</sup> An increase in persons with significant hearing loss is predicted. Hearing loss affects 34 million children globally, with 0.9 per cent (1.4 million) living in the Middle East and North Africa.<sup>2,3</sup> This can substantially impact the children's social and academic performance, as well as their speech and language development. Children with significant hearing loss can benefit from cochlear implants (CI).<sup>4</sup> Multiple studies examined various outcomes, including speech perception, hearing, receptive and expressive vocabulary, social and academic functioning, and quality of life (QoL).<sup>5,6</sup>

Quality of life is one of the benefits of cochlear implants (QoL). It is characterized, for example, as an individual's appraisal of their present life status concerning their objectives, standards, and concerns in light of their existing circumstances.<sup>7</sup> Personal traits, physical health, mental health, social health, and

functional health all influence QoL.<sup>8</sup> Adults and children may both describe and analyze QoL, and it can also be assessed using a proxy for children with impairments.<sup>8,9</sup>

As a result, children with hearing loss have been able to articulate how several processes related to language and literacy acquisition (such as fluency in speech perception, vocabulary, and reading comprehension) impact their development patterns in typically growing youngsters.<sup>10</sup> Therefore, the study aimed to assess the effect of cochlear implants on the quality of life of children after receiving them. Parents of children with cochlear implants would benefit from this study since it would increase knowledge and educate speech and language therapists on improving the quality of life for these families.

### METHODOLOGY

The cross-sectional study was conducted at CMH, Rawalpindi, Pakistan, from July 2021 to February 2022. The study was approved by the Ethical Review Committee (ERC#:242/02/2022). The sample size was estimated using the WHO sample size calculator, by taking statistics of improved speech perception in noise at 12 months as 90%.<sup>10</sup>

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Received: 03 Feb 2022; revision received: 20 Dec 2022; accepted: 23 Dec 2022

**Inclusion Criteria:** Children aged 2 to 5 years, of either gender, having cochlear implantation already and came for follow-up were included in the study.

**Exclusion Criteria:** The study excluded participants with Auditory Neuropathy Spectrum Disorder (ANSD), auditory nerve hypoplasia, outer, middle, or inner ear malformation, and those who could not grasp the guidelines for the procedures presented in the study.

The sampling technique was non-probability consecutive sampling.

Parents of children gave informed written informed consent. Quality of Life (QOL) was measured using the validated and reliable *Children with Cochlear Implants: Parental Perspectives* (CCIPP) questionnaire,<sup>11</sup> which is a specialized instrument for the paediatric population who utilizes CI. The CCIPP is made up of 42 generic questions that are arranged into seven key QOL domains: Excellent communication depends on a variety of factors, including good interpersonal interactions and familial bonds, as well as good general functioning, self-reliance, implantation effects, and educational results. On a Likert scale, parents were asked to score their agreement with the assertions, ranging from highly agree to agree, neither agree nor disagree, and disagree to disagree strongly. Higher scores on the subscales imply a higher overall level of satisfaction with one's life. Hence, the average score of more than three was labelled as satisfied, less than, and equal to 3 as unsatisfied.

Statistical Package for Social Sciences (SPSS) version 24.0 was used for the data analysis. Mean and standard deviation were used for quantitative variables. Categorical variables were expressed as frequencies and percentages. Finally, Spearman's correlation was applied between the sub-domains of CCIPP. The *p*-value lower than or up to 0.05 was considered as significant.

**RESULTS**

Among 45 cases, the mean age of the children was 4.29±0.73 years. Most mothers were literate (64.4%)

and housewives (71.1%). We found that the improvement in communication with the known people was 51.1%, and before cochlear implantation, the effectiveness of hearing aids was slightly low (26.7%) (Table- I).

**Table-I: Baseline Characteristics of Enrolled Cases (n=45)**

Characteristics	n(%)
Age in years (Mean±SD)	4.29±0.73
<b>Gender</b>	
Male	25 (55.6)
Female	20 (44.4)
<b>Residence</b>	
Urban	27 (60)
Rural	18 (40)
<b>Literacy of Mother</b>	
Yes	29 (64.4)
No	16 (35.6)
<b>Employment Status of Mothers</b>	
Job holder	13 (28.9)
Housewife	32 (71.1)
<b>Improvement in Communication</b>	
Yes	23 (51.1)
No	22 (48.9)
<b>Hearing aids in CI</b>	
Yes	12 (26.7)
No	33 (73.3)

The mean ratings were greater than two on all seven subdomains of the CCIPP scale on a 5-point Likert scale. Social relations received the highest ratings (mean=3.33, SD=1.36), followed by Well-being (mean=3.22, SD=1.36) and effects of implantation (mean=2.89, SD=0.95).

Of 45 children, 60% of parents were satisfied with the improvement in communication, 66.7% for general functionality and autonomy, 71.1% for well-being and happiness, 77.8% for social relations, 73.3% for education and 71.1% for effects of implantation. Table-II shows the correlation between the sub-domains of the CCIPP scale. A strong correlation was found between function in general and self-confidence of the child (r=0.761, p=0.001), self-confidence and education of the child (r=0.720, p=0.001) and function in general

**Table-II: Correlation between Sub-Domains of CCIPP Scale (n=45)**

	Communication	Function in General	Self-Confidence	Well-being and Happiness	Social Relations	Education	Effect of CI
Communication	1	0.351	0.345	0.421	0.314	0.430	0.245
Function in general	-	1	0.761	0.447	0.589	0.610	0.725
Self-confidence	-	-	1	0.593	0.650	0.720	0.646
Well-being and happiness	-	-	-	1	0.503	0.616	0.568
Social relations	-	-	-	-	1	0.581	0.578
Education	-	-	-	-	-	1	0.624
Effect of CI	-	-	-	-	-	-	1

of the child and effect of implantation ( $r=0.725$ ,  $p=0.001$ ).

### DISCUSSION

In this cross-sectional study, 45 children aged 2 to 5 with cochlear implants were presented. Among 45 cases, the majority of the patients were males. The findings of the current research showed a resemblance to the previous study.<sup>12</sup> Additionally, most cases were from urban areas, and most mothers were literate and homemakers in the current study. The study found that Parental satisfaction was high based on parents' perceptions of their children's happiness, communication, and talkative natures. During this study, a significant shift occurred in the way people communicated with each other. Due to implementing the program, other studies have shown significant increases in communication skills, social interactions, and self-reliance.<sup>13-15</sup> In a similar study, parents indicated that calling their children was the most effective way to get their attention, making it simpler for the family to communicate.<sup>16</sup>

We found that the improvement in communication with the known people was 23(51.1%), and before cochlear implantation, effectiveness of hearing aids was slightly low 12(26.7%). Moreover, our findings indicated that social bonds, family well-being, within-family interactions, educational situations, and self-reliance are appropriate. This study was completed after implantation. Therefore, the children's speech quality is likely to have improved. Findings of another study highlighted that the vast majority of parents (68.9%) believe that their children are completely dependent on their implant. In one more study, interviews with young people with implants revealed a need for more knowledge regarding their implant systems.<sup>17</sup> After implantation, the child can fully participate in family life by speaking the same language as their siblings and grandparents.<sup>18</sup> For parents, education is still a big concern. However, many parents state that they are concerned about their child's future and believe they are behind other children of the same age. As a result of cochlear implantation, many people believe that their ability to attend regular school is a good indicator of their overall well-being. Because there are so many variables involved in the implantation and development of children with cochlear implants, it is natural for some variables to impact one group of children significantly but not another, which is why this and previous research yielded such a wide range of results.<sup>19,20</sup>

The majority of parents are satisfied with the implantation procedure's results. Once implanted, the child's social bond, a sense of family well-being, and a readiness to speak with their parents have been established. In order to get a clear picture of how a child uses the implant in everyday life, we need to look at the child's audiometric data. As a result, they are frequently used in conjunction with indicators of language proficiency and academic achievement.<sup>21</sup> Children with congenital deafness can attain speech and language abilities equivalent to their hearing classmates after cochlear implantation.<sup>22</sup> Parents must be patient since progress takes time, and many are anxious about their children's future education and self-sufficiency. For example, the speech and language pathologist plays an important role in each step of evaluation, therapy, improvement, improvement, improvement, and improvement.

### CONCLUSION

In this research, we concluded that cochlear implantation was helpful for children in hearing, language understanding, self-reliance, and educational conditions.

**Conflict of Interest:** None.

### Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SBHS & MA: Conception, study design, drafting the manuscript, approval of the final version to be published.

AH & KZM: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

KON & SA: Critical review, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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