

# Emotional and behavioral difficulties among children and adolescents with cochlear implants

Maddiha Tufail<sup>1\*</sup>, Hafiza Munaza Hayat<sup>1</sup>, Atia Ur Rehman<sup>1</sup>, Munawar Ahmed Malik<sup>2</sup>, Farwa Batool Sabih<sup>1</sup> and Arshad Mehmood Naz<sup>3</sup>

<sup>1</sup>Department of Health Professional Technologies, Faculty of Allied Health Sciences, The University of Lahore, Lahore, Pakistan

<sup>2</sup>Department of Special Education University of Punjab, Lahore, Pakistan

<sup>3</sup>Mayo Hospital Lahore, Pakistan

\*madihatufailms@gmail.com

## Abstract:

In most industrial nations, the rate of pediatric cochlear implantation (CI) has improved to the point where it is now the biggest response to profound and, gradually more, severe babyhood deafness.

## Objective:

To find emotional and behavioral difficulties among children and adolescents with cochlear implants Centre Pakistan Cochlear Implant Program in Bahria Town Lahore.

## Methods:

It was a cross-sectional study with 68 children and adolescents with cochlear implants, (37 males and 31 females), participated. All participants were 6 to 17 years old and were using cochlear implants more than 2 years. Data were collected from parents or guardian of participants through the Strength and Difficulties Questionnaire parental or guardian version (4-17 years), from Audiology Centre Pakistan Cochlear Implant Program in Bahria Town Lahore. Data were analyzed by SPSS version 20.0. An independent sample t test was conducted to assess differences between male and female participants, p-value less than 0.05 was considered as significant.

## Results:

It was found that there was a significant difference in mean psychosocial difficulties, emotional problems and conduct problems among male and female children and adolescents with cochlear implants. But there was no significant gender difference in participants at hyperactivity, peer problems and prosocial behavior.

## Conclusions:

That male and female had significant difference in emotional and behavioral difficulties. Males had higher mean psychosocial difficulties and more emotional and conduct problems than females.

## Key Words:

Children, adolescents, cochlear implants, emotional and behavioral difficulties

## Introduction:

The auditory nerve is electrically stimulates by a prosthetic device and that device is called cochlear implant (CI).<sup>1</sup> To qualify for cochlear implant candidature, a child must have a profound (90db+) or severe-to-profound (75-90dB) sensorineural hearing failure in both ears and receives slight to no benefit from hearing aids.<sup>2</sup> In most industrial nations, the rate of pediatric cochlear implantation (CI) has improved to the point where it is now the biggest response to profound and, gradually more, severe babyhood deafness.<sup>3</sup> Hearing test for all newborns has sponsored by The Joint Committee on Infant Hearing, the purpose of committee is verifying hearing defeat earlier than the age of 3 months and start hearing treatment earlier than the age of 6 months.<sup>4</sup> Only cochlear implant is useful treatments for this form of hearing defeat, likelihood of the hearing development facilitated by cochlear implant and oral skills of hard of hearing children also improved by cochlear implant. In June 1990, Food and Drug Administration (FDA) permitted the use of cochlear implants in children, a proper revolt in the treatment of severe-profound, two-sided, and cochlear hearing defeat carried about

by this device cochlear implant.<sup>5</sup> Mostly 6 months after the device implantation, the first verbal productions were observed in response to communication with hearing people. The particular uniqueness of younger hearing children showed by these productions, age at which the implant surgery was done is responsible for this gap in productions.<sup>6</sup> A range of emotional and behavioral difficulties such as sadness, violent behavior, oppositional defiant disorder and conduct problems, and fewer constantly apprehension, somatization, and criminal behavior had been correlated with hearing impairment.<sup>7</sup> An individual with deprived sense of worth, undergo from sadness, experience stoppage of concern in societal, educational, and further life activities, and might reveal non-suicidal self-harm or substance abuse, showed the psychosocial issues with interiorly negative behavior. Children with psychosocial issues showed some negative observable behavior that might be aggressive, disobedient, extroverted or disorderly, and in general "act out" improperly.<sup>8</sup> Emotional and behavioral issues have been noticed frequently in young generation. Numerous younger children experience quietly to these issues because of in vain to correctly identification of these problems at their childhood period, and these issues seriously influenced the child development till adulthood. Typical growth of young generation influenced by these issues and create hurdle to fulfill their strengths.<sup>9</sup> Adolescence is frequently viewed as a hard period of time during human maturity, where a person goes through a considerable change in various aspects of their life. It is defined as the age in which bodily, mentally, communally and emotionally the major changes happen.<sup>10</sup> It is consideration that socially and emotionally the hardest troubles and conflicts occur throughout adolescence.<sup>11</sup> In spite the fact that most people those unable to hear or hard of hearing have no further physiological troubles than this hearing impairment, but they have elevated possibility of rising psychosocial problems than people with normal hearing. A variety of internalizing troubles, for example somatic complaints (e.g.,

head pain, abdomen pain, and faintness), sadness, or worry, are more frequently founded in adolescents those unable to hear or hard of hearing as compare in adolescents with normal hearing.<sup>12</sup> Most recently, psychosocial problems of cochlear implanted children and adolescents was got concentration.<sup>13</sup>

A comparative study conducted by Barker DH *et al.*, among a group of hard of hearing cochlear implanted youngsters and further sample of children with usual sense of hearing, and found that hard of hearing cochlear implanted children were comparable to those of children with normal hearing, in externalizing and internalizing behavior problems.<sup>12</sup> Huber M and Kipman U, resulted that mental health of hard of hearing cochlear implanted adolescents were similar to that the adolescents with normal hearing.<sup>14</sup> A recent study conducted by Anmyr L and his colleagues in 2015, they threw light on the same issue and found that cochlear implanted children had poor psychological health.<sup>13</sup> Another study conducted by Dammeyer J, concluded that the frequency of behavioral issues was three times greater in youngsters with implant surgery than in youngsters with usual sense of hearing.<sup>15</sup> Theunissen SC *et al.*, conducted a study and showed that hearing impaired and cochlear implanted children considerably had supplementary signs of psychopathy, proactive aggression, inattention and hyperactivity issues, oppositional defiant disorder, and behavioral issues than the children with normal hearing.<sup>16</sup> Bosdriesz JR and his co researcher conducted a study in 2018 and found that adults with cochlear implants was not inferior to the participants that had or had not sound amplified, at their psychosocial strength but emotional problem such as loneliness was lower in cochlear implanted adults than hearing impaired peers.<sup>17</sup> A study conducted by Ketelaar L and his colleagues, and they concluded that children with usual sense of hearing and cochlear implanted children were similar at the level of prosocial skills such as social competence.<sup>18</sup>

Niclasen J and Dammeyer J, in 2015 conducted a study and demonstrated that cochlear implanted children had higher problems on all Strength and Difficulties Questionnaire problem subscales compared to children with usual sense of hearing<sup>19</sup>. The purpose of the present study was to find out the emotional and behavioral difficulties between male and female children and adolescents with cochlear implants, using Strength and Difficulties Questionnaire parental or guardian version (for age 4-17 years).

### Methods:

68 participants (children and adolescents) with cochlear implants were included. Their age ranges were 6 to 17 years and duration (usage) of cochlear implants was more than 2 years. Purposive sampling and cross-sectional study design was used. Data were collected from parents or guardians through the Strength and Difficulties Questionnaire parental or guardian version, from Audiology Centre Pakistan Cochlear Implant Program in Bahria Town Lahore. Children and adolescents with physical and psychological disorder were not included in study. Data were analyzed through SPSS version 20.0. Both the descriptive and inferential statistics were used for the analysis and interpretation of data. An independent sample t test was conducted to assess differences between male and female participants on Strength and Difficulties Questionnaire. The significance level was set at  $p < 0.05$ .

### Results:

Out of 68 participants, 37(54.4%) were males and 31(45.6%) were females. 56 (82.4%) respondents were having age between 6-9 years, 8 (11.8%) were having age 10-13 years and 14 to 17 years old respondents were 4(5.6%). It is described in Table 1, that 36 (52.9%) respondents were 1 to 4 years old, 29 (42.6%) were 5-8 years old and 3(4.4%) were 9 to 12 years old at the time of implant surgery. 59 (86.8%) respondents were having 2 to 5 years of usage of cochlear implants and 9(13.2%) respondents were having 6 to 8 years of usage of cochlear implants, as shown in Table 1.

| Demographic Data   | Frequency | Percentage |
|--|-----------|------------|
| <b>Gender wise classification</b>  |           |            |
| Male   | 37        | 54.4       |
| Female   | 31        | 45.6       |
| Total  | 68        | 100.0      |
| <b>Age wise classification</b>   |           |            |
| 6-9 years  | 56        | 82.4       |
| 10-13 years  | 8         | 11.8       |
| 14-17 years  | 4         | 5.9        |
| <b>Classification of Respondents According to Age at Implant Surgery</b>   |           |            |
| 1-4 years  | 36        | 52.9       |
| 5-8 years  | 29        | 42.6       |
| 9-12 years   | 3         | 4.4        |
| <b>Classification of Respondents According to the Years of Usage of CI</b> |           |            |
| 2-5 years  | 59        | 86.8       |
| 6-8 years  | 9         | 13.2       |

**Table 1:** Demographic characteristics of Participants

Table 2 represents that there was significant difference in emotional and behavioral difficulties among males and females children and adolescents with cochlear implants. Males ( $0.68 \pm 0.131$ ) were having higher mean psychosocial difficulties score than females ( $0.63 \pm 0.091$ );  $p = 0.025$ . Males ( $0.38 \pm 0.35$ ) were having more emotional problems than females ( $0.33 \pm 0.23$ ),  $p = 0.009$ . Males ( $0.69 \pm 0.29$ ) were having more conduct problems than females ( $0.48 \pm 0.17$ ),  $p = 0.002$ . There was no significant difference in hyperactivity ( $p = 0.216$ ), peer problems ( $p = 0.860$ ) and prosocial behavior ( $p = 0.061$ ) among males and females children and adolescents with cochlear implants.

| Gender Difference on SDQ Mean Psychosocial Difficulties scores |        |    |      |       |         |
|--|--------|----|------|-------|---------|
| SDQ Scale  | Gender | N  | Mean | SD    | p-value |
| Mean Difficulties Score  | Male   | 37 | 0.68 | 0.131 | 0.025   |
|  | Female | 31 | 0.63 | 0.091 |         |
| Gender Difference on SDQ Emotional Problems Scale (Sub-scale)  |        |    |      |       |         |
| Emotional Problems   | Male   | 37 | 0.38 | 0.341 | 0.009   |
|  | Female | 31 | 0.33 | 0.223 |         |
| Gender Difference on SDQ Conduct Problems Scale (Sub-scale)    |        |    |      |       |         |
| Conduct Problems   | Male   | 37 | 0.69 | 0.285 | 0.002   |
|  | Female | 31 | 0.48 | 0.168 |         |



| Gender Difference on SDQ Hyperactivity Scale (Sub-scale)      |        |    |      |       |       |
|---|--------|----|------|-------|-------|
| Hyperactivity   | Male   | 37 | 0.79 | 0.24  | 0.216 |
|   | Female | 31 | 0.77 | 0.180 |       |
| Gender Difference on SDQ Peer Problem Scale (Sub-scale)       |        |    |      |       |       |
| Peer Problems   | Male   | 37 | 0.85 | 0.213 | 0.860 |
|   | Female | 31 | 0.93 | 0.197 |       |
| Gender Difference on SDQ Prosocial Behavior Scale (Sub-scale) |        |    |      |       |       |
| Prosocial behavior  | Male   | 37 | 1.59 | 0.317 | 0.061 |
|   | Female | 31 | 1.62 | 0.242 |       |

**Table 2:** Gender difference on Strength and Difficulties Questionnaire

## Discussion:

The purpose of the present study was to find emotional and behavioral difficulties between males and females children and adolescents with cochlear implants. The findings of current study were in accordance with the results of previous study that was conducted by Gustafsson BM *et al.*, and they concluded that boys were significantly more difficulties compared to girls on the total SDQ difficulties<sup>20</sup>. In the same way Polat F, described that in some accessible researches boys had elevated frequency of psychosocial issues<sup>21</sup>. In contrast De Giacomo and his associates performed a study to compare deaf cochlear implanted children to normal hearing children on their cognitive abilities, adaptive conduct, societal and emotional abilities, and they found no gender difference in the scores of strength and difficulties questionnaire.<sup>22</sup> Results showed that males had significantly more emotional problems than females that is consistent with results of the study conducted by Andersson G *et al.*, and they found that males with cochlear implants have more emotional problems such as anxiety and depression than females<sup>23</sup>. In current study males had significantly more conduct problems than females and similar results were found in a study conducted by Hintermair M, to observe psychosocial growth of cochlear implanted and hearing deficits youngsters, and found that boys show more conduct problems than girls.<sup>24</sup> In current study there was no gender difference in hyperactivity symptoms in cochlear implanted participants. This finding was accordance with

the Attention Deficits Hyperactivity Disorder literature in general population that males and females did not differ in subtypes (such as hyperactivity) of Attention Deficits Hyperactivity Disorder. However, this finding has not been reported in a population of deaf children with Cis.<sup>25</sup> In current study no significant difference of peer problems was found among males and females children and adolescents with CI. The results of the present study were in accordance with the results of previous study that was conducted by Wauters LN and Knoors H, to observe the societal integration of hearing deficits children with cochlear implanted children, and found that males and females did not differ in peer issues such as unsociable conduct and socially withdrawn behavior.<sup>26</sup> In current study there was no gender difference in prosocial behavior between male and female participants with cochlear implants, these results comparable with the outcomes of previous study that was conducted by Wiefferink and his colleagues, to examine the societal functioning in children with usual sense of hearing and cochlear implanted children and they found that there was no significant gender difference on societal functioning such as prosocial behavior.<sup>27</sup>

## Conclusions:

The present study revealed that male and female children and adolescents with cochlear implants have difference in emotional and behavioral difficulties. Males have higher mean psychosocial difficulties scores than females with cochlear implants. The findings further suggest that males face more emotional and conduct issues than the females with cochlear implants. But there was no significant gender difference in participants with cochlear implants, in hyperactivity, peer problems and prosocial behavior.

## References:

- 1- Moore BC. Cochlear hearing loss: physiological, psychological and technical issues. John Wiley & Sons; 2007 Sep 27.

- 2- Pisoni DB, Cleary M. Measures of working memory span and verbal rehearsal speed in deaf children after cochlear implantation. *Ear and hearing*. 2003 Feb;24(1 Suppl):106S.
- 3- Bat-Chava Y, Deignan E. Peer relationships of children with cochlear implants. *Journal of Deaf Studies and Deaf Education*. 2001 Jul 1;6(3):186-99.
- 4- Beadle EA, McKinley DJ, Nikolopoulos TP, Brough J, O'donoghue GM, Archbold SM. Long-term functional outcomes and academic-occupational status in implanted children after 10 to 14 years of cochlear implant use. *Otology & Neurotology*. 2005 Nov 1;26(6):1152-60.
- 5- Hauser PC, O'Hearn A, McKee M, Steider A, Thew D. Deaf epistemology: Deafhood and deafness. *American annals of the deaf*. 2010 Jan 1;154(5):486-92.
- 6- Schlumberger E, Narbona J, Manrique M. Non-verbal development of children with deafness with and without cochlear implants. *Dev Med Child Neurol* 2004; 46: 599-606.
- 7- Geers A, Spehar B, Sedey A. Use of speech by children from total communication programs who wear cochlear implants. *American Journal of Speech-Language Pathology*. 2002 Feb 1;11(1):50-8.
- 8- Poulton R, Moffitt TE, Harrington H, Milne BJ, Caspi A. Persistence and perceived consequences of cannabis use and dependence among young adults: implications for policy. *New Zealand Medical Journal*. 2001 Dec 14;114(1145):544.
- 9- Johnston C, Mash EJ. Families of children with attention-deficit/hyperactivity disorder: review and recommendations for future research. *Clinical child and family psychology review*. 2001 Sep 1;4(3):183-207.
- 10- Leigh I, Maxwell-McCaw D, Bat-Chava Y, et al. Correlates of psychosocial adjustment in deaf adolescents with and without cochlear implants: A preliminary investigation. *J Deaf Stud Deaf Educ*. 2009;14:244-59.
- 11- Brice P.J., Strauss G. Deaf adolescents in a hearing world: a review of factors affecting psychosocial adaptation. *Adolesc. Health Med. Ther*. 2016;7:67-76.
- 12- Barker DH, Quittner AL, Fink NE, Eisenberg LS, Tobey EA, Niparko JK, CDaCI Investigative Team. Predicting behavior problems in deaf and hearing children: The influences of language, attention, and parent-child communication. *Development and psychopathology*. 2009 May;21(2):373-92.
- 13- Anmyr L, Olsson M, Freijd A, Larsson K. Sense of coherence, social networks, and mental health among children with a cochlear implant. *International journal of pediatric otorhinolaryngology*. 2015 Apr 1;79(4):610-5.
- 14- Huber M, Kipman U. The mental health of deaf adolescents with cochlear implants compared to their hearing peers. *International journal of audiology*. 2011 Mar 1;50(3):146-54.
- 15- Dammeyer J. Psychosocial development in a Danish population of children with cochlear implants and deaf and hard-of-hearing children. *Journal of Deaf Studies and Deaf Education*. 2009 Sep 24;15(1):50-8.
- 16- Theunissen SC, Rieffe C, Kouwenberg M, De Raeve LJ, Soede W, Briare JJ, Frijns JH. Behavioral problems in school-aged hearing-impaired children: the influence of sociodemographic, linguistic, and medical factors. *European child & adolescent psychiatry*. 2014 Apr 1;23(4):187-96.
- 17- Bosdriesz JR, Stam M, Smits C, Kramer SE. Psychosocial health of cochlear implant users compared to that of adults with and without hearing aids: Results of a nationwide cohort study. *Clinical Otolaryngology*. 2018 Jun;43(3):828-34.
- 18- Ketelaar L, Rieffe C, Wiefferink CH, Frijns JH. Social competence and empathy in young

- children with cochlear implants and with normal hearing. *The laryngoscope*. 2013 Feb;123(2):518-23.
- 19-Niclasen J, Dammeyer J. Psychometric properties of the strengths and difficulties questionnaire and mental health problems among children with hearing loss. *Journal of deaf studies and deaf education*. 2015 Dec 28;21(2):129-40.
  - 20-Gustafsson BM, Proczkowska-Björklund M, Gustafsson PA. Emotional and behavioural problems in Swedish preschool children rated by preschool teachers with the Strengths and Difficulties Questionnaire (SDQ). *BMC pediatrics*. 2017 Dec;17(1):110.
  - 21-Polat F. Factors affecting psychosocial adjustment of deaf students. *Journal of Deaf Studies and Deaf Education*. 2003 Jul 1;8(3):325-39.
  - 22-De Giacomo A, Craig F, D'Elia A, Giagnotti F, Matera E, Quaranta N. Children with cochlear implants: Cognitive skills, adaptive behaviors, social and emotional skills. *International Journal of Pediatric Otorhinolaryngology*. 2013 Dec 1;77(12):1975-9.
  - 23-Andersson G, Freijd A, Baguley DM, Idrizbegovic E. Tinnitus distress, anxiety, depression, and hearing problems among cochlear implant patients with tinnitus. *Journal of the American Academy of Audiology*. 2009 May 1;20(5):315-9.
  - 24-Hintermair M. Parental resources, parental stress, and socioemotional development of deaf and hard of hearing children. *The Journal of Deaf Studies and Deaf Education*. 2006 Oct 1;11(4):493-513.
  - 25-Biederman J, Kwon A, Aleardi M, Chouinard VA, Marino T, Cole H, Mick E, Faraone SV. Absence of gender effects on attention deficit hyperactivity disorder: findings in nonreferred subjects. *American Journal of Psychiatry*. 2005 Jun 1;162(6):1083-9.
  - 26-Wauters LN, Knoors H. Social integration of deaf children in inclusive settings. *Journal of deaf studies and deaf education*. 2007 Jun 14;13(1):21-36.
  - 27-Wiefferink CH, Rieffe C, Ketelaar L, Frijns JH. Predicting social functioning in children with a cochlear implant and in normal-hearing children: The role of emotion regulation. *International journal of pediatric otorhinolaryngology*. 2012 Jun 1;76(6):883-9.