

Research Briefing prepared by Brian Lamb. If you have any suggestions for papers or research for future research summaries, please let me know at (brian@ciicanet.org).

CIs Improve language acquisition, educational outcomes and quality of life for young people.

Cejas I, Barker DH, Petruzzello E, Sarangoulis CM, Quittner AL. Cochlear Implantation and Educational and Quality-of-Life Outcomes in Adolescence. JAMA Otolaryngol Head Neck Surg. 2023;149(8):708–715. doi:10.1001/jamaoto.2023.1327

https://jamanetwork.com/journals/jamaotolaryngology/fullarticle/2806314?utm_campaign=articlePDF&utm_medium=articlePDFlink&utm_source=articlePDF&utm_content=jamaoto.2023.1329

Also commentary on the Paper;

Long-term Language, Educational, and Quality-of-Life Outcomes in Adolescents After Childhood Cochlear Implantation Karen A. Gordon; Blake C. Papsin; Sharon L. Cushing. JAMA Otolaryngology–Head&Neck Surgery Published on line June 29,2023.

There are few studies about the long-term outcomes of CIs on educational functioning or quality of life. The authors therefore set out to evaluate long-term educational outcomes and quality of life in adolescents over 13 years post implantation.

This longitudinal cohort study included 188 children with bilateral severe to profound hearing loss with CIs from the Childhood Development After Cochlear Implantation (CDaCI) study from hospital-based CI programs; a cohort of 340 children with severe to profound hearing loss without CIs from a nationally representative survey (National Longitudinal Transition Study-2; NLTS-2), and results from the literature of comparable children without CIs.

They measured adolescent performance of academic achievement (Woodcock Johnson), language (Comprehensive Assessment of Spoken Language), and quality of life (Pediatric Quality of Life Inventory, Youth Quality of Life Instrument–Deaf and Hard of Hearing).

They found that “Children with CIs had better academic performance compared with children without CIs with similar levels of hearing loss. The largest benefits were seen for children who received implants early (prior to age 18 months), who performed at or above age and gender norms for language and academic achievement. Similarly, adolescents with CIs reported better quality of life on the Pediatric Quality of Life Inventory compared with children without CIs. On a condition-specific measure (Youth Quality of Life Instrument–Deaf and Hard of Hearing), children who received implants early scored higher across all 3 domains than comparisons without CIs.”

The authors claim that this is the first study to evaluate long-term educational outcomes and quality of life in adolescents using CIs. They conclude that “This longitudinal cohort study showed better outcomes of CIs in terms of language, academic performance, and quality of life. While the greatest benefits were observed for children who received implants before age 18 months, benefits were

also noted for children who received implants later, providing evidence that children with severe to profound hearing loss with CIs can achieve at or above expected levels compared with hearing peers.”

The authors show that the research also supports early implantation to ensure the best results “with those children receiving CIs at earlier ages demonstrating the highest performance in reading and writing.” Importantly however the authors also note that “CIs should not be discounted for those who are identified late or pursue CIs at a later age or who have an additional disability.” As the “CDaCI included children who received implants up to 5 years old, including 15% with an additional disability as noted previously; these children consistently performed better on measures of academic achievement than the children followed up through the NLTS-2 database who did not use CIs.”

Implications for Advocacy.

This research represents a major advance in demonstrating the positive long terms effects of CI in improving language acquisition, educational outcomes and quality of life. The effectiveness of CIs for children in these areas has been questioned and this study adds to the growing evidence of their effectiveness across different areas of outcomes and wellbeing for children.

As the commentary on the research in same journal also notes results going forwards are likely to be even more positive; “There is reason to be optimistic about long-term outcome data still to come. Data enrolment for the CDaCI cohort began over 2 decades ago, and in the intervening period, much has changed. As examples, CIs have evolved to provide more targeted stimulation of the auditory nerves, telemetry systems that measure the interface between the CI electrode and the response of the auditory nerve population, and data logging systems to help monitor long term Outcomes in Adolescents After Childhood Cochlear Implantation and support consistent daily CI use. Moreover, the importance of bilateral input in early development has become clear with improved outcomes in children using bilateral CIs and bimodal devices”.

Another important consideration in the research was that children from both cohorts had poorer language and educational outcomes if they came from low-income households showing that we need to put the impact of CIs within a wider social setting when judging its utility and impact and which suggests that we need to ensure for low-income households that additional support is in place to make the most of the implant int terms of educational achievement.

This study provides very powerful evidence for advocates of the effectiveness in CIs in improving children’s acquisition of language, literacy better educational result and having a good quality of life. This adds to the arguments for early intervention where the best results are obtained and that invest in CI will save society money through improved outcomes for children including better quality of life as well as improved educational outcomes.

Reading achievement and deaf students with cochlear implants Connie Mayer & Beverly J. Trezek
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The study investigated the reading outcomes of a Canadian cohort of school-aged deaf learners with cochlear implants (CIs). The context for the study is that “recent research findings do indicate a positive shift in literacy outcomes for deaf students with CIs,” The aim of the study was to see if the

achievement of the CI users approached that of hearing age peers and identify demographic factors influencing performance.

The children represented a subset of 13 students with CIs from a larger sample of 70 deaf students in grades four through 12 educated in inclusive settings within a large school board in central Canada.

They found that the children with CIs performed within the low average range in all areas except for Phonological Awareness, which was in the low range; however, there was wide variability in scores across participants. This meant that “Given mean scores in the low average range, it would be expected that these students are able to manage most grade-level reading expectations, a point further supported by the fact that all study participants were being educated in the general education environment.”

This is in contrast to the outcomes historically achieved by deaf children before cochlear implants where the authors note that “According to the U.S. National Center for Special Education Research (U.S. Department of Education), median literacy rates of deaf high school graduates have remained consistently around the 4th grade level since the beginning of the twentieth century.”

Conclusion

The authors conclude that “the findings of this study, in concert with previous investigations, add to the growing body of research literature signalling a profound and unprecedented shift in the literacy outcomes for those deaf students with the most significant hearing loss. These improved outcomes stand in marked contrast to the outcomes historically achieved by this population of students and given the importance of literacy in the lives of deaf individuals at home, school, and work, cannot be overemphasized.”

Implications for Advocacy

This research adds to the significant and growing body of evidence that CIs improve the acquisition of language and therefore literacy. It is important to recognise that the findings that children are reaching a good level of literacy even if it is towards the lower end of the range on average still allows for successful functioning at a grade appropriate level and at levels significantly above what had been achieved without CIs in the past. Together with evidence cited in the study and the authors previous work in this area it helps to build a compelling case for the effectiveness of CIs for children’s literacy and therefore chances of achievement at school.

To access this research

<https://www.tandfonline.com/eprint/IRDTS8XTAQWT6FSVXPU2/full?target=10.1080/14670100.2024.2394313#d1e164>

Hearing Screening

The 77th World Health Assembly resolution calling for newborn screening, diagnosis, and management of birth defects: moving towards action in low-income and middle-income countries

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The authors are reflecting on the 77th World Health Assembly resolution calling for more health screening in Low- and Middle-Income Countries (LMICs).

They note that “The burden and mortality associated with birth defects are highest in low-income and lower-middle-income countries (LMICs). The increasingly high priority accorded to addressing this issue is reflected in the 77th World Health Assembly in 2024, where the resolution to accelerate progress towards reducing maternal, newborn, and child mortality in order to achieve Sustainable Development Goal targets 3.1 and 3.2 included an invitation to member states to consider implementing universal newborn screening, diagnosis, and management, and long-term care of children with birth defects.”

They argue that “LMICs should identify one or more relevant priority birth defects and begin national initiatives for integrating screening, diagnosis, and management of the prioritised conditions into routine health services.” Examples of successful programs including screening for hearing loss such as; “A programme in Kerala state in India universally screens newborns for visible birth defects, hearing... This programme supports comprehensive management, including surgery, postoperative care, and long-term follow-up.⁵ Sri Lanka screens all newborns for congenital hypothyroidism, critical congenital heart disease, and congenital deafness”

They conclude that “The proposed WHO framework will support the implementation of the World Health Assembly resolution. Widespread implementation of a comprehensive newborn screening programme will support further movement towards Sustainable Development Goal 3 and provide newborns, especially in LMICs, with the best opportunity for positive starts in life.”

Implications for Advocacy

This resolution provides support for advocates promoting new born hearing screening in LMICs and will have to give extra impetus to campaigns to extend screening at birth to include hearing loss especially in identifying congenital hearing issues that might need intervention with CIs.