International Journal of Pediatric Otorhinolaryngology 79 (2015) 1490–1499

Contents lists available at ScienceDirect

International Journal of Pediatric Otorhinolaryngology

journal homepage: www.elsevier.com/locate/ijporl

Hindi language tool for assessing pediatric cochlear implant recipients

Ruchika Mittal [a,1,*], Anoop Raj [b,2], W.V.B.S. Ramalingam [c,3]

[a] Army Hospital (R&R) Delhi Cantt, 110010, India
[b] Head of the Department of ENT Maulana Azad Medical College and Associated Lok Nayak Hospital, New Delhi, 110002 India
[c] Senior Consultant & Head of the Department BL Kapoor Super Speciality Hospital, Pusa Road, Rajendra Nagar, New Delhi 110005, India

ARTICLE INFO

Article history:
Received 15 April 2015
Received in revised form 21 June 2015
Accepted 24 June 2015
Available online 8 July 2015

Keywords:
Cochlear implants
Assessment tool
Hindi language
Pediatric

ABSTRACT

Introduction: Presently, in India, western material is mainly used for the assessment and planning of habilitation activities for paediatric cochlear implant (CI) recipients. There is no assessment material available in Hindi. Therefore, the present study aimed to develop a parental questionnaire to assess auditory, speech and language skills of paediatric CI recipients in Hindi language for the age range of 3–7 years.

Method: Most commonly used assessment material/curricula used in Indian cochlear implant clinics and primary school Hindi language teachers were consulted during the development of the parental questionnaire. The developed questionnaire was then given to the parents of 50 normal hearing, Hindi speaking children in the age range of 3–7 years, five experienced speech and language pathologist working in the field of paediatric CI and to the same primary school Hindi language teachers who were consulted in the beginning to validate the content of the questionnaire. Based on the feedback from parents, personal observations and views from other professionals, the questionnaire was modified to incorporate the suggestions and the questionnaire was finalized. The final questionnaire has three subtests (1, 2 and 3) to assess auditory, language and speech skills of the CI recipients respectively.

The final questionnaire was given to the Hindi speaking parents of 50 CI recipients in the age range of 3–7 years who fulfilled the eligibility criteria. Both the parents were asked to fill the final questionnaire together in the clinic at 0 (switch-on), 1, 6 and 12 months post switch-on of the implant.

Result and discussion: All the cochlear implant recipients could be evaluated by the questionnaire and none of the recipient scored zero on the questionnaire at any time interval. The developed questionnaire had shown high reliability and internal consistency producing alpha values of 0.9201, 0.7425 and 0.9311 for the subtest 1, 2 and the entire questionnaire respectively. The alpha value was not calculated for subtest 3 as it was a rating scale and not much variation was noticed in this section.

1. Introduction

Cochlear implant constitutes to be one of the most important treatment options for people with severe to profound hearing impairment. In the last two decades, there has been an increase in the number of children with severe to profound hearing impairment undergoing cochlear implantation. The increase can be attributed to numerous benefits of the cochlear implantation in children, which may include overall improvement in auditory development [1], language growth and improved speech production [2] and greater speech intelligibility [3].Christiansen et al. [4] reported that parents are largely motivated for a cochlear implant by a desire for their children to develop audition and spoken language.

Jeyaraman [5] stated that for a successful cochlear implant program regular assessment is essential to ensure accountability and evidence-based practices, to gather feedback concerning curriculum decisions and to provide valuable information to parents/caregivers about the rate of their child's development. Presently, we are dependent on English material for assessment, setting goals and planning habilitation activities for cochlear implant recipients (CI) recipients [5]. There is no assessment

* Correspondence to: M-37 C Rajouri Garden, New Delhi, 110027, India. Tel.: +91 9810961266.
E-mail addresses: ruchikamittal07@gmail.com (R. Mittal), dr.anoopraj@gmail.com (A. Raj), wvbsr2001@gmail.com (W.V.B.S. Ramalingam).
[1] Tel.: +919810961266.
[2] Tel: +919811315507.
[3] Tel: +919811910977.

http://dx.doi.org/10.1016/j.ijporl.2015.06.036
0165-5876/

material available in Hindi language to monitor the progress of CI recipients. In India, 4 out of every 1000 children born have severe to profound hearing loss [6]. The mean age at which hearing loss is confirmed is around 3.4 years in India [7]. The number of children receiving the cochlear implant in India is increasing day by day [8]. Children with cochlear implants in Northern India take auditory habilitation in Hindi language with Hindi being the national language of India. Jeyaraman[5] also stated in her study that lack of trained professionals, lack of well-outlined habilitation program, non-availability of standardized assessment tools in Indian languages are some of the very basic challenges in the clinical practice of the pediatric cochlear implant programs in India. It requires a substantial effort to adapt and validate a test in another language. Issues hindering adaptation include differences in use of gender, tense, word order and in the number of meaningful monosyllables versus bisyallables [9].

Fenson et al. [10] stated that parents always notice any new development that occurs in their child. Parents eagerly await their child's first words. Parents have been found to know considerably more about their child's language than the experts. However, there has been a reluctance to use parental report as the primary basis for assessment. The limitation most frequently cited is the inability of the parents to provide an accurate report. Furthermore, natural pride and failure to critically test their own child may cause parents to overestimate their child's ability. Nevertheless, these criticisms may be due to the faulty way of obtaining parental report than to the actual content of the report. Brachmaier et al. [11] pointed out that though parental based assessments are subjective; they are reliable source of information for child's development. He also stated that though parental report assessments can be questionnaires, diaries and parental interviews based, parental questionnaires are most popular and well accepted method of assessing children. Percy-Smith [12] also mentioned that parents are valid reporters of their child's auditory, as well as speech-and-language development.

Therefore, the present study was aimed to develop a parental questionnaire for paediatric CI recipients in the age range of 3–7 years in Hindi language to assess auditory, speech and language skills.

2. Materials and methods

2.1. Development of the questionnaire

Some of the most frequently used assessment tests/curricula in the cochlear implant clinics of India listed in Table 1 were referred during the development of the questionnaire. Three primary school Hindi language teachers were also consulted to know the vocabulary and the language skills of the young children and also to account for the normal sequence of development of Hindi language. The developed questionnaire was given to the parents of 50 normal hearing and Hindi speaking children in the age range of 3–7 years, five experienced speech and language pathologist working in the field of paediatric cochlear implant and also to the three primary school Hindi language teachers who were consulted in the beginning to validate the content of the questionnaire. It was found that the questionnaire was lengthy, some statements were difficult for the parents to understand and it also had some repetitions. Based on the feedback from parents, personal observations and views from other professionals, the questionnaire was modified to incorporate the suggestions and the questionnaire was finalized (Appendix A).

Table 1
Assessment tests/curricula frequently used in Cochlear Implant clinics of India.

a	Early speech perception test for profoundly hearing impaired children [18]
b	Speech Intelligibility Rating (SIR) [19]
c	Evaluation of Auditory Responses to Speech (EARS) [20]
d	Categories of Auditory Performance (CAP) [21]
e	Glendonald Auditory Screening Procedure (GASP) [22]
f	Integrated Scales of Development [13]
g	Meaningful Auditory Integration Scale (MAIS) [23]
h	3-Dimensional Language Acquisition Test (3D-LAT) [24]
i	Meaningful Use of Speech Scale (MUSS) [25]
j	Linguistic Profile Test–Hindi [26]
k	Mac Arthur Communicative Development Inventories [10]
l	Peabody Picture Vocabulary Test–Fourth Edition (PPVT-4) (Dunn and Dunn, 2007) [17]
m	Receptive Expressive Emergent Languages Scale [27]
n	St. Gabriel's Curriculum–Second Edition [28]

2.2. Characteristics of developed parent questionnaire (Appendix A)

Subtest 1 has 12 questions to assess the auditory skills of CI recipients. Each question has three options (always, sometimes and never). The questions evaluate the child's routine for wearing the cochlear implant, his ability to detect and discriminate sounds, differentiate between speech and non-speech sounds, to understand common sentences with or without lip reading and also the child's ability to do telephonic conversation.

Subtest 2 (Table 2) assess the language skills of the child. It is divided into six parts (A–F).Part A includes eleven adapted listen to learning sounds [13]. These sounds are most relevant and widely used with children in northern India during post implant habilitation. These sounds are associated with objects like for dog BOW BOW, Cat MEOW MEOW. Learning to identify, understand and use these sounds is fun for the child and also an important step in language development. These sounds are followed by a vocabulary checklist of 399 words (Part B) arranged in 19 semantic categories (Fig. 1). The checklist is followed by five questions (Part C) to evaluate the frequency of the child's reference to the past, future and absent objects and events. These advances have often been noted to occur late in the single-word period of language development and are viewed by many investigators as another important index of the child's emerging capacity to represent the world [14]. The subsequent sections (D–F) in the questionnaire are designed to assess the morphological and syntactic development of the child. Part E in the questionnaire has a one open-ended feature in which the parents are asked to write down the three longest sentences the child has said recently to evaluate the child's performance using parental opinion in a real life situation. It is a complimentary assessment and not included in the scoring. Subtest 3 assesses the child's global speech production

Table 2
Describing Subtest 2—language skills.

Part	Evaluates	Number of questions/items
A	Vocabulary	11 listen to learning sounds and 399 words distributed in 19 semantic categories
B	Frequency of the child's reference to past, future and absent objects and events	5 questions
C	Ability to combine words	1 question
D	Ability to use plurals, possessive nouns, present continuous tense, past tense morphemes	4 questions
E	Ability to make sentencesParents are asked to write three longest sentences their child has said recently	1 question
F	Ability to narrate a story	1 question