Egyptian Journal of Ear, Nose, Throat and Allied Sciences (2014) **15**, 29–35

Egyptian Society of Ear, Nose, Throat and Allied Sciences

Egyptian Journal of Ear, Nose, Throat and Allied Sciences

www.ejentas.com

ORIGINAL ARTICLE

Psycholinguistic abilities in cochlear implant and hearing impaired children

Hatem Ezzeldin Hassan [a,b,*], **Sally Taher Kheir Eldin** [c], **Rasha Mohamed Al Kasaby** [d,e]

[a] *Otorhinolaryngology Department, Sohag University, Egypt*
[b] *King Fahd Hospital, Jeddah, Saudi Arabia*
[c] *Otorhinolaryngology Department, Ain Shams University, Egypt*
[d] *Otorhinolaryngology Department, Mansoura University, Egypt*
[e] *Military Hospital, Riyadh, Saudi Arabia*

Received 20 September 2013; accepted 14 December 2013
Available online 17 January 2014

KEYWORDS

Psycholinguistic;
Cochlear implant;
Language disorders;
Hearing

Abstract *Background:* Many congenitally sensorineural hearing loss (SNHL) children and cochlear implant (CI) recipients develop near-normal language skills. However, there is a wide variation in individual outcomes following cochlear implantation, or using hearing aids. Some CI recipients or Hearing aids users never develop useable speech and oral language skills. The causes of this enormous variation in outcomes are only partly understood at the present time. So, the aim of this study was to assess the psycholinguistic skills in Arabic speaking children with either SNHL or CI in comparison to normal controls in order to estimate the nature and extent of any specific deficit in these children that could explain the different prognostic results of language intervention.

Subjects and methods: Three groups were selected, according to Language test, Pure tone audiometry (PTA) & Auditory brain stem response (ABR). Group I included fourteen children with severe and/or severe to profound SNHL aided with proper hearing aids. Group II consisted of fourteen children with CI (MED-EL and Nucleus) and group III included fourteen children with normal hearing. Receptive, Expressive and total language quotients were calculated using the Arabic Language test. Assessment of psycholinguistic abilities was done using the Arabic version of the Illinois Test of Psycholinguistic abilities.

* Corresponding author at: King Fahd Hospital, Jeddah, Saudi Arabia. Mobile: +966 594183458.
E-mail address: hezzm268@yahoo.com (Hatem Ezzeldin Hassan).

Peer review under responsibility of Egyptian Society of Ear, Nose, Throat and Allied Sciences.

ELSEVIER Production and hosting by Elsevier

http://dx.doi.org/10.1016/j.ejenta.2013.12.006

Conclusion: HI individuals have poor auditory short-term memory (A-STM) in comparison to normal hearing individuals. Also, HI individuals have visual short-term memory (V-STM) better than normal hearing individuals. So, multisensory training is needed both in therapy sessions and classrooms with more focus on visual stimuli.

1. Introduction

Many congenitally sensorineural hearing loss (SNHL) children and cochlear implant (CI) recipients develop near-normal language skills. However, there is wide variation in individual outcomes following cochlear implantation, or using hearing aids.[1] Some CI recipients or Hearing aids users never develop useable speech and oral language skills. The causes of this enormous variation in outcomes are only partly understood at the present time.[2] Unfortunately, deaf students often have been found to have lower vocabulary skills than hearing age-matched peers. The size of their vocabulary tends to be smaller, the rate in which they acquire new vocabulary is slower, and they less easily develop new word meaning acquisition processes (Pisoni et al., 2000).

Several researchers have pointed out that early identification of hearing loss (HL) has a positive effect on vocabulary development. The result of early intervention services provides support for both language and cognitive development. Aside from studies of early vocabulary development as part of language acquisition, studies of vocabulary in deaf learners have focused on the relation between vocabulary and reading.[3]

Psycholinguistic abilities, both auditory short-term memories (Auditory sequential memory, Sound blending, Auditory closure, Auditory association and Verbal expression) and Visual short term memories (Visual sequential memory, Visual reception, Visual closure and Manual expression) are important predictors for language development in normal children and children with disabilities.

Surowieck et al.[4] claimed that many children using cochlear implants are able to hear fine differences between speech sounds but are not progressing as wel1 as expected in receptive language ability. There is strong evidence from teachers that some children using cochlear implants have poor short-term auditory memory ability, which may be impeding their language development. Temporal ordering and short-term memory storage capacity involve higher order processing. Severe auditory deprivation prior to implantation may have caused auditory processing deficits at a cortical level.

When cochlear implant implantation will be carried out especially at the very critical period of language development (before age of four), this will help the child, in his/her future life, not only with his/her hearing skills and communication but for his/her attention skills and behavior.[5] The causes of these apparent differences in the success of treatment among HI & CI children are poorly understood. Therefore, early identification, understanding the nature of the disorders and proper intervention is warranted. However, to our knowledge, there have been no studies done to assess short term memory of Arabic speaking children with HI and CI. In this study we tried to have answers for the former questions, why there is a wide variation in outcomes of rehabilitation of HI & CI regarding A-STM & V-STM.

1.1. Aim of the work

The aim of this study was to assess the Psycholinguistic skills in Arabic speaking children with either SNHL or CI in comparison to controls in order to estimate the nature and extent of any specific deficit in these children that could explain the different prognostic results of language intervention.

1.2. Subjects and methods

This study was conducted on children presented with delayed language development to Phoniatrics clinic, King Fahd Hospital Jeddah, during the period from October 2011 to July 2012.

Three groups were selected, according to Language test, Pure tone audiometry (PTA) & Auditory brain stem response (ABR). Group I included fourteen children with severe and/or severe to profound SNHL aided with proper hearing aids. Group II consisted of fourteen children with CI (MED-EL & Nuleus) and group III included fourteen children with normal hearing.

All children included in this study were subjected to a comprehensive language assessment protocol.[6]

- Patient's interview.
- Audiological evaluation including Auditory Brain Stem Response (ABR), Otoacoustic Emissions (OAEs) and Cochlear Microphonic (CM).
- Psychometric evaluation by using Wechsler intelligence scale.[8]
- Objective language assessment was done using Standard Arabic language test to calculate Receptive, Expressive and total language quotients.[6]
- Assessment of psycholinguistic abilities was done using the Arabic version of the Illinois Test of Psycholinguistic Abilities.[7]
- *Inclusion criteria:* Individuals with severe and/or severe to profound SNHL, aided with proper hearing aids more than 5 years. Individuals using CI more than 5 years duration.
- *Exclusion criteria:* Subjects with mental retardation (MR), below average mentality or any subject with behavioral problems, pervasive developmental disorders or with auditory neuropathy were excluded from the study.

Children with Hearing Impairment (HI) were 8 boys and 6 girls. Their mean age was 8.3 ± 1.3 and age ranged from 6 to 12 years. The mean duration of H.As fitting was 5 ± 2 years.

Children with Cochlear Implant (CI) were 7 boys and 7 girls. The mean age was 7.9 ± 0.9 years and age ranged from 6 to 12.6 years. The mean duration of CI was 5 ± 1 year. Both