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ADAPTATION OF LITTLEARS AUDITORY QUESTIONNAIRE IN TAMIL

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Abstract:
Objectives: To adapt the LittlEARS Questionnaire in Tamil language and evaluate it in Tamil speaking cochlear implant children. **Methods:** LEAQ was translated to the Tamil language by a back-translation method following the guidelines of the World Health Organisation. The translated version was later administered to 100 randomly selected parents of cochlear implantees, scoring was done out of 35 for each child. Statistical analysis was done using SPSS software version 20.0 were descriptive statistics were carried out extracting the mean, standard deviation and range. **Results:** The results got did not significantly deviate from the normative, thus being able to quantify hierarchical auditory development skills and performance of children. **Conclusion:** LEAQ is a good subjective tool that can measure the outcome of cochlear implant/hearing aids, it must be translated and validated based on cultural and linguistic background.

Keywords: auditory questionnaire, hearing impaired, LEAQ, EARS, cochlear implant, outcomes

1. Introduction

Hearing or auditory perception is the ability to sense or perceive sound. The auditory mechanism has a crucial association with analysis and interaction of the auditory world

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which are vital for communication and listening. Alterations in this mechanism will upshot the hearing loss. Individuals with hearing loss have lack of auditory feedback which in turn impairs the individual's oral communication development in reception as well as in the expression, mainly in aspects related to speech and voice [1]. Hearing aids and cochlear Implants aids in the loss of hearing sensitivity, hearing aids amplify the sound and cochlear Implant directly stimulates the cochlea.

The cochlear implant is a neuroprosthetic device that directly stimulates the auditory nerve fibres, it converts incoming acoustic energy directly into electrical current [2], [3]. Osberger in 2002 [4] alleged that the cochlear implant significantly improves the acquisition and utilization of spoken language and has affirmative social and mental impacts as well.

It is essential to measure the outcomes of hearing aid or cochlear implant in hearing-impaired individuals for a progress check and gives the clinician the feedback about the usage. There have been objective tools used to measure the outcomes and some of them include electrically evoked Compound Action Potential (eCAP), Cortical Auditory Evoked Potential (CAEP), Electrically Evoked Stapedial Reflex Threshold (eSRT) etc.

As children are implanted at a very young age after the new-born hearing screening, it is essential to also use subjective tools in identifying their progress. Subjective measures provide the clinician with the opportunity to estimate the realistic status of the child when compared to objective tools. These tools evaluate the auditory ability of the child; they are directed at parents or caregivers and cover the necessary domains for auditory behaviour at natural contexts [5]. However, still, there is a lack of these test materials validated in different languages. Some of the subjective tools include

Categories of Auditory Perception Scale (CAP) [6] and Speech Intelligibility Rating (SIR) [7] scales are the most commonly used rating scales among all others rating scales and with questionnaires meaningful auditory integration scale (MAIS) [8], and Infant toddler Meaningful auditory integration scale (IT- MAIS) is used.

Among all "EARS (Evaluation of Auditory Response to Speech) family" has got crucial importance as it provides information related to normal auditory development and also it has modified questionnaires across ages. It includes LittlEARS Diary and LittlEARS Auditory Questionnaire (LEAQ), Evaluation of auditory response to speech (EARS) and Teen EARS are the few parental questionnaires which we assess auditory perception outcomes in all the children's of all ages.

The present study focusses on translating and adapting the LittlEARS questionnaire in Tamil context. Main aspect for focus in translation and adaptation was to potentially avoid reliability problems aroused by form fillers (parents or caregivers). Reading and answering process requires substantial understanding of questions and individual aspects (cognition, language and extra-linguistic factors) in relevant to the context. As a result, this study provides a normative for the Tamil version in accordance with the auditory development scores for Tamil speaking children.

2. Literature Review

LittlEARS is a questionnaire which accounts for the development and betterment of auditory behaviour in paediatric cochlear implantees over time as that of typical auditory development [9]. This tool not only assesses the auditory behaviour of children who receives a hearing before 24 months but also assesses the auditory preverbal skills less than 2 years of age. On considering the cross-cultural changes and linguistic variations, LittlEARS has been translated and validated in 15 various languages mainly because of its uniqueness in measuring young children's auditory behaviour as time follows.

Some of the studies like Validation of the Mandarin version of the LittlEARS auditory questionnaire where they successfully validated the tool in Mandarin language and are using it in their clinical population [10].

The tool was also validated in the Polish version, where they had concluded that the psychometric analyses support the use of Polish version in Polish Polish-speaking children [11].

The tool validated in Spanish reveals that the Spanish version is a culturally appropriate tool to assess the development of auditory behaviour in Spanish children who are 24 months younger [12].

The translated versions must have the same variable measures of the original version [13]. The translation involves 4 steps and the first step is where the original version is translated to the target language, second step is where the translated version is back-translated into the original version, the second version of this is created in similar steps, third step is where both the versions are translated back to the original version, final step is where the content validation must be done.

There is a lack of a subjective tool to assess the auditory behaviour in Tamil speaking population, with reference to previous authors who have translated and validated LEAQ in their respective languages, there is a need to have a validated Tamil test material that can assess auditory behaviours in Tamil speaking children below the age of 2 years. LEAQ is found to be the best material to have domains that can assess auditory behaviours.

3. Materials and Methods

A cross-sectional descriptive study was designed to evaluate the parental experiences and Pre-verbal auditory development of paediatric cochlear implantee that represent the Indian community.

Hundred random samples of parents of prelingual paediatric cochlear implantees who were implanted in the same centre participated in the study. Participants were unilateral cochlear implant (CI) user with a chronological age of one to ten years (mean age of 4.18 years) and implant age of six months to twenty-four months (mean age of 12.5 months) with a minimum of one Auditory Habilitation

Programme. All participants had aided responses within the speech spectrum and also they were individuals of regular cochlear implant usage.

The questionnaire was administered to the 100 parents who were native Tamil speakers and who were able to read Tamil were selected for the study. The overall design of the study was approved by the ethical committee of Madras ENT Research Foundation and MERF Institute of Speech and Hearing.

3.1 Procedure

3.1.1 Translation and adaptation process

The translation of this questionnaire was done on the basis of guidelines given by the World Health Organization (a process of translation and adaptation of instruments, 2008). This study included four phases:

1) Selection of questionnaire;
2) The forward and backward translation;
3) Content validation;
4) Pilot study.

Phase 1 - The selection of the questionnaire: extensive literature review was done to select an appropriate questionnaire to assess the parental perspectives and views of the child's auditory development. Among all LittlEARS Auditory Questionnaire (LEAQ) was selected as it has an association with early auditory skill and real-life auditory performance monitoring.

Phase 2 - Forward and backward translation: the questionnaire was subjected to translate into the Tamil language as most of the parents were Tamil speakers. Forward translation (English and Tamil) was done by a translator with good Tamil and English proficiency and back translation (Tamil and English) by linguist and professionals in speech and hearing

Phase 3 - Content validation: translated (Tamil) questionnaire was validated for resemblance with the original version and appropriateness with culture by 3 professional native Tamil speakers. Questions with 90% appropriateness and content relevance were finalised.

Phase 4 - A pilot study: a pilot study was done for the parents who were randomly selected to check the appropriateness and structure of the questions and statement for self-administering. After the pilot study final version of the questionnaire was selected for self-administering.

3.2 Administration

The developed questionnaire was provided to the parents/caregivers of children with Cochlear Implant. The questionnaire consisted of 35 sequential age-related questions that should be given "Yes" or "No" by the parents. The questions hierarchy is in the order of simple to complex levels.

In prior to administration parents were instructed properly to reduce the response bias and answer each question based on his/her own experiences with their child. Out of 100 participants, 81 parents were interviewed face to face and four of them

were interviewed via e-mail and 15 of the parents were interviewed through phone call since parent could not access the centre.

Scoring of the LEAQ consists of "one" point for each yes answers and "zero" for no answers. Interpretations of the LEAQ is higher the "yes'' scores better the auditory development. The data for each group were tabulated and statistical analysis was carried out using statistical package for the social sciences (SPSS) software version 20.0. to profile the performance of the implanted children. Descriptive statistics and inferential statistics were done.

4. Results and Discussion

Results from the pilot study reveal the questionnaire to be comprehendible and structurally appropriate for administration. The obtained LittlEARS scores and chronological age can be matched with the child's age-appropriate auditory behaviour development. Therefore the tabulated data were analysed using the descriptive statistics such as mean, standard deviation and range. All the participants included in the study were taken as a cluster of sample and their descriptive results were extracted, in which out of hundred participants fifty-one were females and forty-nine were males with their mean age of four years as the chronological age and 12 months as the implant age.

The overall LEAQ data showed 29.25 a better mean score for the considered implant age which signifies the implanted children had performed better in auditory developmental skills and pre-verbal skills within two years of implant age; hence the LEAQ questionnaire could quantify the hierarchical auditory developmental skills and performance of the children.

With better scores in Cochlear Implanted children, the present findings are in consensus with the earlier studies on LEAQ by Geal-Dor et al in 2011 [14], which highlights that implanted children with two years of hearing age have good score in LittlEARS questionnaire and also there is evidence which shows an increasing rate of development compare to normal hearing age children with LEAQ score. The better score for total participants indicates that they have age-appropriate cognitive abilities as well as better performance in auditory and preverbal skills which is attributed to the intensive auditory habilitation given after implantation.

The similar findings have been reported by Mederake et al in 2010 [15], the samples taken were within the two years of chronological age, hence their performances were found to be faster and near-normal auditory skills development. However, the findings can be partially supported, as the chronological age was not the considerable factor, as this present study inclusively focussed on the implant age rather than the chronological age, still the overall sample performance was found to be near normal development which is also supported by Coninx et al in 2009 [16].

Table 1: Mean, standard deviation and range taken for the total number of samples of cochlear implant children

N(Total samples)	Range	Mean	Standard deviation
100	18	29.25	4.15

5. Recommendations

Though a cross sectional study was carried out in this paper, a longitudinal study would yield better results. The Tamil translated version of LEAQ done must be administered in a normal hearing Tamil speaking population to check the percentage of specificity. This tool can also be administered across different hearing devices (hearing aids to implants). A comparison between normal cochlear anatomy vs anomalous cochlea can be carried out to check the performance. This tool can be correlated with various objective tests to check the subjective vs objective correlation.

6. Conclusion

The general conclusion of study demonstrates that the LittlEARS Auditory Questionnaire is a promising tool to be used in clinical settings for very young children with hearing loss who received cochlear implants and implant age of two years and below. It is also a well-structured screening tool that can be used longitudinally, for children who underwent cochlear implant within two years of implant age. It also helps to collect information for follow-up testing and also for early intervention programmes or for screening children with normal hearing.

Hence the tool can be feasible to use at all populations if validated in accordance with the population's cultural and linguistic background.

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