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Research Article

Adaptation and Validation of Parents Evaluation of Aural/Oral Performance in Children (Peach) Questionnaire in Odia Language

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Abstract

PEACH (The Parents' Evaluation of Aural/oral performance of Children) is a questionnaire which provides important information for determining the effectiveness of provided amplification as well for determining the effectiveness of different frequency responses. When the English version of PEACH is administered to other regional languages, the intended meaning of the question may change. Hence it was important to have the standardized version of the test in regional language (Odia). This study was carried out in two phases. In first phase adaptation of all items of questionnaire into Odia was done. The adapted version was checked for content validity and appropriateness. Translation was done with the help of a linguist and two audiologists with the knowledge of syntax of Odia. In second phase, the questionnaire was administered to 30 parents of child with hearing impairment and 30 normal hearing child's parents. The scores were also compared between the groups for estimate of appropriateness. All the hearing-impaired subjects had moderately severe to profound sensorineural hearing loss bilaterally. Both descriptive and inferential was carried out with the consultation of statistician. The paired t test was carried out to compare scores of quiet condition and noise conditions. The result suggests that the scores obtained for quiet and Noise condition were significantly different for all age group. The result of ANOVA shows that age groups did not differ on scores obtained. Regression statistics was applied to know whether the duration of aural rehabilitation had any effect on the scores. And the results suggested that the effect of duration of Aural rehabilitation on obtained scores on PEACH was statistically significant for all the three scores. PEACH helps to systematically gather hearing aid fitting details which provide information about the quality of the hearing aid fitting in order to support the interpretation of the functional outcomes measured with the subjective questionnaires.

Keywords: Hearing Impairment; Evaluation; Normal Hearing; Hearing Loss; Questionnaire; Noise

Abbreviations

PEACH: Parents' Evaluation of Aural/Oral Performance of Children

Introduction

Questionnaires serve as effective tools for monitoring the progress of rehabilitation programs. Standardized and well-designed tools are essential for audiologists and other professionals who track a child's developmental progress. These tools offer valuable insights into the nature and degree of progress, enabling professionals to make informed decisions about potential adjustments to amplification or the types of devices used. Diagnosing hearing loss in children can be challenging because subjective tests are difficult to administer reliably. The accuracy of these tests depends on various factors related to the child's condition, including their state of alertness and physical health. Hence collecting information from parents/caregivers is the effective method to evaluate hearing in children. Planning an intervention program for hearing impaired children in India has its unique challenges. As highlighted by effective intervention would require periodic evaluation of outcome measures [1]. Such efforts help audiologists to take account of programming of hearing aids and help them to decide when a device needs to be changed at when alternative modes have to be decided upon. Now this means availability of such standard outcome measures in many Indian languages. PEACH is one such most commonly agreed upon tool internationally. Implementing this tool for Indian languages could greatly enhance our clinical practices.

PEACH (The Parents' Evaluation of Aural/oral performance of Children) is a questionnaire which provides important information for determining the effectiveness of provided amplification as well for determining the effectiveness of different frequency responses [2]. The PEACH also provides information about the real-life functional performance of the participants in the home environment [3]. This is an interview-administered parent questionnaire for assessing children's functional performance in different situations in everyday life, based on parents' observations. The test evaluates the effectiveness of amplification for infants and children with hearing impairment by a systematic use of parents' observations. These questionnaires are designed to record observations of children's functional performance with their current hearing instruments [4]. PEACH is available in English as well as in few other foreign languages. For any child who uses any regional language, administration of PEACH is difficult. When the clinician himself/herself translates the questions from the standardized English version of PEACH to other regional languages, the intended meaning of the question may change. Hence it is important to have the standardized version of the test [5].

Method

This study was carried out in two phases. In first phase adaptation of all items of questionnaire into Odia was done. The adapted version was checked for content validity and appropriateness. 5 independent judges, all audiologist and speech pathologists were given the questionnaire to compare and comment. Effort was taken into making the translation of questions, appropriate in content and not just literal translation. Translation was done with the help of a linguist and two audiologists with the knowledge of syntax of Odia. In second phase, the questionnaire was administered to 30 parents of child with hearing impairment and 30 normal hearing child's parents. Group 1 (G1: 30 Normal hearing Child Mean = 64.27, Std Deviation = 26.12), Group 2(G2: 30 Hearing Impaired Children Mean = 64.27, Std Deviation = 26.12). Further the subjects were (children) grouped into 3 (1-3 yrs, 3-5 yrs, 5 yrs and above) subgroups within each group i.e., G1 & G2 to know the developmental trends in PEACH scores. The scores were also compared between the groups for estimate of appropriateness. All the hearing-impaired subjects had moderately severe sensorineural hearing loss to profound hearing loss bilaterally. The hearing loss was identified within 2 years of age and appropriate hearing aid was fitted bilaterally after identification with further intervention program. All the children have been receiving follow up audiology care including measurement of adequacy of hearing aid fitting once in every 3-4 months. This includes ear examination, ruling out of otitis media, aided audiogram and speech adequacy index measured using the current program of hearing aid. No co-morbid conditions existed for all selected children. All children had received initial assessment in a reputed institute of audiology and speech pathology and had evaluations related to all developmental aspects. Parents belonged to middle socio-economic group and had received education equal to or higher than 10^{th} std. The PEACH includes 13 questionnaires that assess, (a) Use of amplification and loudness discomfort, (b) Listening and communicating in quiet and noise, (c) Use of telephone, (d) Responses to environmental sounds. The Odia PEACH was provided to the parents/primary caregivers. Each question was explained by the authors. A session for interviews was scheduled to address any questions or recommendations. Subsequently, they were requested

to monitor their children's auditory and verbal behavior concerning each question over a two-week duration. They were directed to record numerous examples of answers for each question and to video-record the scenario if feasible. Once the test items were completed, a follow-up interview session was scheduled with parents/caregivers to clarify the recorded ambiguous response examples. The explanation will enhance the precision of reply actions.

Scoring

Each response to a question was scored on a five-point rating scale ranging from 0 to 4. The descriptive criterion for rating was as follows.

- (0)- Child did not demonstrate any auditory response.
- (1)- Auditory response occurred 25% of the time.
- (2)- Auditory response occurred 50% of the time.
- (3)- Auditory response occurred 75% of the time.
- (4)- Auditory response occurred more than75% of the time.

Statistical analysis

Statistical analysis was carried out using SPSS software package version 2.0, both descriptive and inferential was carried out with the consultation of statistician.

Result

The internal consistency of the PEACH Rating Scale was evaluated using statistical procedure, Cronback's alpha to ensure that the items measure the same construct (i.e., functional auditory behaviors). Cronback's alpha equaled 0.94 which exceeds the 0.70 acceptable criteria for internal consistency. This is a measure of reliability indicating that questionnaire items measure the same overall construct (i.e., functional auditory behaviors). The original English version had obtained a score of 0.88., [3] on the same statistical measure. And the PEACH, Kannada version had a Cronback alpha value of 0.74 [6].

Normal hearing children

The PEACH Rating Scale is comprised of 13 items designed to assess the child's auditory performance in both quiet and noisy listening situations. Each item is rated on a five-point rating scale which has a value from zero to four assigned to it. Rating categories include both a word and a numeric value ranging from Never (0%) to Always (75-100%). The first two questions relate to the frequency of hearing aid use and whether the child displays discomfort to loud sounds while wearing his/her hearing aids. The children in Group I of this study were children with normal hearing (Control group) and did not use hearing aids. Therefore, the first two items were not completed by the parent involved in this study. only items 3 through 13 were completed by the parent who rated the frequency with which they observed their child's behavior in a particular scenario over the past week. The subjects were grouped into 3 sub-groups (1-3 yrs, 3-5 yrs and 5 yrs and above) based on age of the child to know normative trends. An independent samples t-test was conducted to evaluate scores between three groups of children: 3yrs and below (n = 05), 3-5 yrs (n = 10) and those 5 yrs and older (n = 15). Between groups, the Levene's test of equality of variance was violated ($F = 80.014$, $df = 27$, $p < 0.001$). With equal variances not assumed, overall, PEACH scores between age groups were significantly different ($t = -6.528$, $p < 0.001$). Children in the younger group, 1-3yrs age group (n = 05) had obtained significantly lower scores (mean = 27.5, SD = 2.34) than children in the other two groups, (3-5yrs = 40.29, 5yrs and above = 44).

Age Group	1-3 years	3-5 years	5 years and above
No of Children	05	10	15

Table 1: Shows the distribution of age of the children involved in this study (Normal).

Age Group	1-3 years	3-5 years	5 years and above
Quiet	14.5	20	20
Noise	13	20	20
Total Score	27.5	40	40

Table 2: Shows the mean for total, quiet sub-score, noise sub-score for different age groups (normal).

Results for PEACH score for 3 age groups in Hearing impaired

Descriptive statistics were applied, and following results were obtained. The Mean age was 64.27 months. They were classified into three age groups, for analysis of age effects. Average for age group 1-3 yrs is 24 months, 3-5 yrs is 43.44 months and for 5yrs and above was 83.64 months. One way ANOVA test was conducted to evaluate scores between three groups of children: 3yrs and below (n = 02), 3-5 yrs (n = 13) and those 5 yrs and older (n = 15). With equal variances not assumed, overall, PEACH scores between age groups were significantly different (p > 0.001).

Age Group	1-3 years	3-5 years	5 years and above
No of Children	2	13	15

Table 3: Shows the distribution of no of children across age groups (Hearing Impaired).

Age Group	1-3 years	3-5 years	5 years and above
Quiet	3	10.77	12.75
Noise	02	07.23	08.69
Total Score	05	18.00	20

Table 4: Shows the mean for total, quiet sub-score, noise sub-score for different age groups (Hearing Impaired).

ANOVA					
Sum of Squares	df	Mean Square	F	Sig.	
TOTAL_ SCORE Between Groups	299.263	2	149.631	1.518	0.237
SCORE_ QUIET Between Groups	104.059	2	52.029	1.674	0.206
SCORE_ NOISE Between Groups	50.421	2	25.211	1.234	0.307

Table 5: Results of ANOVA showing F and Significance value for hearing impaired group.

Scores for quiet condition and noise condition for hearing impaired group

The paired t test was carried out to compare scores for quiet condition and noise condition. The result suggests that the scores obtained for quiet condition and Noise condition were significantly different for all age group. The Scores for Noise were poorer in all age groups. The scores for quiet condition were better for all three groups, than the scores for noise sub scores. It shows even with amplification children with hearing impaired were not showing adequate improvement in auditory behavior in social surroundings. In environment their auditory only in quiet environment like home, behavior is like children with normal hearing.

Paired Sample Test				
Pair wise comparison		t	df	Sig. (2-tailed)
Pair 1	TOTAL_SCORE- SCORE_QUIET	9.416	29	0
Pair 2	TOTAL_SCORE- SCORE_NOISE	11.108	29	0
Pair 3	SCORE_QUIET- SCORE_NOISE	9.663	29	0

Table 6: Paired comparison (t and Significance value) for sub score of PEACH. (Total Score = Overall, Score _Quiet = Quiet, Score Noise = Noise).

Effect of age

The result of ANOVA shows that age groups did not differ on scores obtained. The differences in scores were not statistically significant. Though an increase in trend was seen for individual scores for all three, overall score, scores for Quiet and Scores for noise, across the age groups studied, the age of the child (with hearing impairment) was not the only contributing factor to the obtained score on PEACH, in the present study.

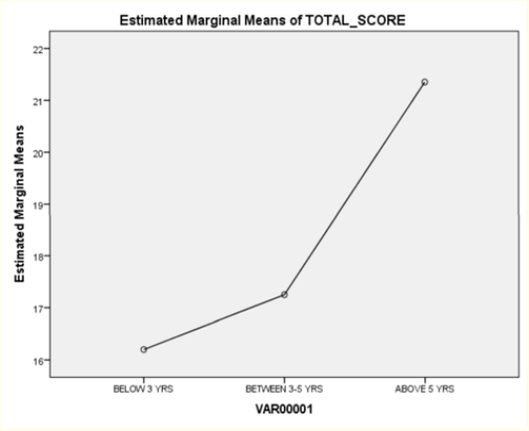

Figure 1: Graph showing Mean score for overall (PEACH) across age groups (Hearing Impaired).

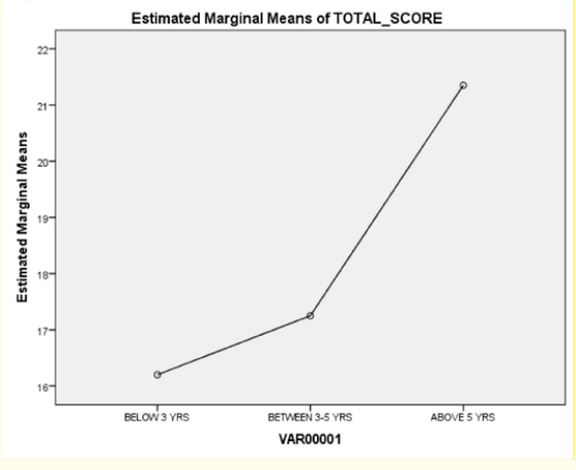

Figure 2: Graph showing Mean score for Quiet (PEACH) across age groups (Hearing Impaired).

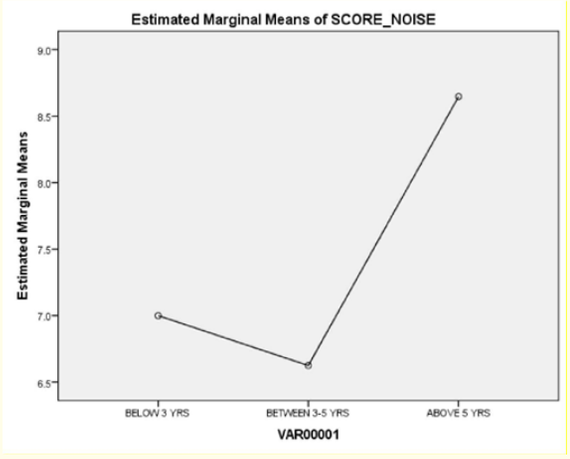

Figure 3: Graph showing Mean score for Noise (PEACH) across age groups (Hearing Impaired).

Effect of duration of aural rehabilitation

Regression statistics was applied to know whether the duration of aural rehabilitation had any effect on the scores. And the results suggested that this effect of duration of Aural rehabilitation on obtained scores on PEACH was statistically significant for all the three scores.

The results agree with common observation that rehabilitation is a strong factor for better scores on PEACH and therefore the scale can be useful in monitoring the progress of the child through the therapy. Majority of children of the study were receiving therapy for lesser than (24 months) and their overall scores on PEACH was lower than expected for their age group, as discussed in previous section. Though they started therapy, as duration of rehabilitation improved the PEACH which reflects change in their auditory behavior with amplification. Only consistent factor is that auditory behavior in situations of noise was still lower than expected.

Discussion

The internal consistency of the PEACH Rating Scale was evaluated and the value of Cronback's alpha equaled 0.94 which exceeds the 0.70 acceptable criteria for internal consistency. Like the original English version that had obtained a score of 0.88., on the same

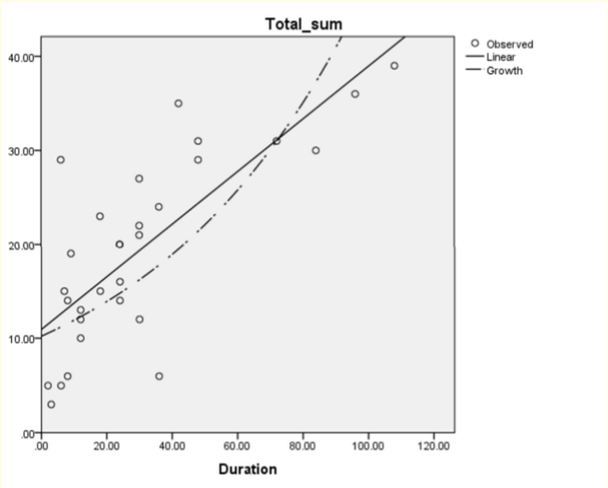

Figure 4: Showing scattered plot of Overall Score vs Duration of Rehabilitation (Hearing Impaired Group).

statistical measure [3]. And the PEACH, Kannada version had a Cronback alpha value of 0.74 [6].

The children in Group I of Age group 3yrs and below obtained lowest score and ceiling values were seen by 5 yr age group. The norms of original PEACH diary show a similar finding, where the logistic function reached asymptotic scores by 40 months of age [3]. As duration of rehabilitation improved the PEACH which reflects change in their auditory behavior with amplification [7]. Only consistent factor is that auditory behavior in situations of noise was still lower than expected. Similar findings were seen in the study by Jithu [6].

Conclusion

The development of PEACH in Odia language is to be used in pediatric population to evaluate functional measure of hearing aid benefit in Odia. This scale will help to evaluate the effectiveness of amplification for infants and children with hearing impairment by a systematic use of parent's observations. PEACH helps to systematically gather hearing aid fitting details which provide information about the quality of the hearing aid fitting in order to support the interpretation of the functional outcomes measured with the subjective questionnaires. Similar attempt has been made for Tamil language, which is now being used in cochlear implant programs and center in Tamil Nadu while carrying out early intervention program for hearing impaired children.

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Conflicts of Interest

There is no conflict of interest between the authors.

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