

Development of Questionnaire for Evaluating Hearing Aid Benefit in Children

Nayana S.¹ & Devi N.²

Abstract

The study aimed to develop a questionnaire for evaluating hearing aid benefit in children and also to evaluate its usefulness as a measure of hearing aid benefit. The study was carried out in two phases; Phase I, involved the development and standardization of the questionnaire and in phase II, the developed questionnaire was administered on mothers of 50 children (4-5 yrs) with hearing impairment using binaural digital BTE hearing aids. Questionnaire was explained to mothers and asked to observe the response of their child for one week. The mother's then rated their child based on the behavioral response. Results showed significant difference in mean percentage scores between unaided and aided condition, indicating observable hearing aid benefit. Thus the study showed that the hearing aid benefit questionnaire is an efficient tool in quantifying hearing aid benefit in children. There was higher mean percentage scores in the favorable condition compared to unfavorable condition, which indicated less perceived hearing aid benefit in more difficult listening situations compared to the favorable listening situation. The developed questionnaire obtained a reliability value of > 75% for all the sub skills which indicated high test retest reliability of the questionnaire. Thus it can be concluded that the hearing aid benefit questionnaire is a reliable and valid measure of assessing hearing aid benefit in real life situations.

Key words: Questionnaire, hearing loss, hearing aid.

Auditory habilitation refers to remedial efforts for children having hearing loss at birth (Schow & Nerbonne, 1989). The most important tool to help the hearing impaired person surmount the hearing handicap is a hearing aid or educational amplification unit. No system of amplification can restore hearing, but it can make useful residual hearing which could not otherwise be reached. When fitted appropriately, hearing aids/FM technology will in most instances enable the child to use residual hearing so that speech and language can develop on or near an age-appropriate pace with appropriate intervention for aural rehabilitation, (Cunningham, 2008).

According to Cunningham (2008), the four-step protocol for identifying hearing loss and fitting hearing aids on infants and young children are as follows (1) assessment, (2) selection, (3) verification, and (4) validation.

Validation of aided auditory function is a demonstration of the benefits and limitations of aided hearing abilities. It should begin immediately after the fitting and verification of amplification (Pediatric working group, 1996). Validation is an ongoing process designed to ensure that the child is receiving optimal speech input from others and that his or her own speech is adequately perceived. According to Cunningham (2009) Validation Measurement Options includes, objective outcome measures and subjective outcome measures.

The subjective outcome measures that are part of the hearing aid validation process include questionnaires that specifically assess hearing aid benefit. These hearing aid benefit outcomes are designed to directly assess treatment efficacy, or the subjective benefits perceived by the listener. According to Cox (2003), there are at least three reasons to use self-report measures of benefit and satisfaction.

The major indices of quality of services are provided by self-report outcome and satisfaction. Consumer-driven health care places an added emphasis on the patient's point of view. Therefore, it is critical to measure the real-world benefit and satisfaction of hearing aid use.

The real-world experiences cannot be measured effectively in laboratory conditions. The traditional hearing aid outcome measures do not capture the true experiences of hearing aid use in everyday listening situations. In order to quantify the true impact hearing loss and its associated treatment have on activity limitations, lifestyles, etc., self-report measures of outcome should be used.

Even when laboratory conditions are used to simulate real-world listening situations they do not always resemble the patient's impression of the actual real-life situation. The self-report outcome measures are increasing in use, because they give us a scientifically defensible way to validly measure the real-life success of the hearing aid fitting.

Self reporting questionnaires plays a very major role in assessing the child's progress in several ways;

¹ e-mail: nayanaa123@gmail.com, ² Lecturer in Audiology, AIISH; email: deviaish@gmail.com

the questionnaire gives us an overview on the different factors that has to be considered in the process of rehabilitation. These measures also help us to promote better understanding of child's further requirement for the development of various skills like speech and language development, listening and social and emotional aspects. In Indian scenario, the subjective evaluation of hearing aid benefit for children in terms of various developmental processes is highly limited. Hence a standardized questionnaire for Indian population with respect to various communication skills is required to provide better understanding about children's needs.

According to Bentler & Kramer (2000) there are few existing questionnaires to quantify hearing aid benefit. Different questionnaires have been developed for children and adult as their listening situation and listening needs are different. Questionnaires which have been developed for children includes, the meaningful auditory integration scale (MAIS) and Meaningful Use of Speech Scale (MUSS) by Robbins, Renshaw and Berry (1991), Infant-Toddler Meaningful Auditory Integration Scale (IT-MAIS) by Zimmerman, Osberger and Robbins (1998), The listening inventory for education (LIFE) developed by Anderson and smaldino (1997), Children's Home Inventory for Listening Difficulties (CHILD) developed by Anderson and Smaldino (2000), Functional Auditory Performance Indicators (FAPI), Brown & Johnson (2001), Hearing aid outcome measures in children: developed by Ching and Hill (2001), Early Listening Function (ELF) evaluation developed by Anderson (2002) and Parent evaluation of aural/oral performance of children (PEACH) developed by Teresa Ching & Mandy Hill (2005).

Present study was aimed to develop a questionnaire for evaluating hearing aid benefit in children and also to evaluate the usefulness of questionnaire as a measure of hearing aid benefit in children using hearing aid.

Method

Present study was conducted to develop a questionnaire for evaluating hearing aid benefit in children and also to evaluate the usefulness of questionnaire as a measure of hearing aid benefit in children using hearing aid. A total of 50 children (4-5 yrs) with hearing impairment using hearing aid and their mothers participated in the study. Across children, sensorineural hearing loss varied between moderately severe to profound degree. All of them were using binaural digital BTE hearing aids for more than six months and their aided thresholds within the speech spectrum. They did not have any relevant middle ear abnormality and neurological problem.

Procedure

The study was carried out in two phases.

Phase I - Development of the questionnaire:

Questions were chosen from existing questionnaires like meaningful auditory integration scale (Robbins, 1991), Children's Home Inventory for Listening Difficulties, (Anderson & Smaldino, 2000), The Children's Outcome Worksheets, (Williams, 2005), Functional Auditory Performance Indicators (FAPI- Brown & Johnson, 2001), Parent evaluation of aural/oral performance of children (PEACH- by Ching & Hill, 2005).

Based on normative of language development in children and appropriate suggestions from the experienced professionals.

Questions chosen were further divided to assess performance of a particular child in three different conditions such as favorable condition, unfavorable condition and environmental condition. Under each condition questions were divided into different subscale listening skills, communication skill, social and emotional skill in both favourable and unfavorable conditions. Questionnaire also includes questions in the areas of language skills, academic skills, and use of device, discomfort or aversiveness. Items under each skill were assessed both without hearing aid and with hearing aid conditions.

The selected questions were evaluated by 10 audiologists and 10 laymen for validating the questionnaire. Based on their suggestions appropriate modification were made in the questionnaire. The developed questionnaire was also translated into two different languages, Kannada and Malayalam. For standardization of the translated questionnaire it was given to 30 native speakers of Kannada and Malayalam and the suggestions were incorporated.

Prior to the administration of the questionnaire pure tone audiometry and Speech audiometry was done. Functional gain measurement was also done to evaluate the hearing aid performance. Based on the results of above mentioned tests, suitable subjects who fulfilled our subject selection criteria were taken for the study.

Phase II- Administration of Questionnaire:

Hearing aid benefit questionnaire was administered on mothers of children who are using the hearing aid. Questionnaire was explained to mothers and asked to observe the response of child for one week. The mothers then rated their child on each skill based on the behavioral response.

Scoring of response based on behavioral response:

Behavioral response of the child was rated on a 5 point rating scale A, B, C, D, and E. where A-

always, B-occasional, C-half of the time, D-rarely, E-never. The questionnaire instructions stated that an alphabet between A and E should be circled to indicate which rating best described the child's behavior during the past week. Scoring for each point will be 100% for response 'A', 75% for 'B', 50% for 'C', 25% for 'D' and 0% for 'E'. From each child, total score as well as the separate subscale scores were obtained. Comparison of scores with and without hearing aid condition was made for each skill by taking the difference of subscale mean score and also total score. An additional repeat assessment on 10 mothers after 2 weeks was conducted to evaluate the reliability of previous rating.

Results and Discussion

The data obtained after administration of hearing aid benefit questionnaire developed in phase I was subjected to statistical analysis, to check if the developed questionnaire is psychometrically robust, demonstrating adequate reliability and validity. Using Statistical package for social sciences (version 17), the results are discussed under the following groups: (1) to compare the mean scores between unaided and aided condition across different skills, (2) to evaluate the test-retest reliability of the developed questionnaire, (3) to compare the percentage scores for subjects across different questions under each skill.

To compare the mean scores between unaided and aided condition across different skills: In order to compare the mean score between unaided and aided condition across different skills non-parametric test was carried out and the values are tabulated in Table 1.

From Table 1, it can be seen that mean scores of the aided condition are significantly higher than the unaided condition scores. It means that, with hearing aid, scores are better for all skills compared to the scores without aid. The mean scores in both in both favorable and unfavorable condition have got almost equal mean percentage scores. Unfavorable social and environmental skill also got almost same mean percentage scores. There is a gradual improvement in score from the environmental condition to the academic skill.

From the Table 1, it revealed that the mean percentage scores for aided condition are almost equal for the sub skills under the favorable and unfavorable conditions. Environmental condition has got higher scores than the favorable and unfavorable conditions. Language sub skill has got the highest mean percentage score and unfavorable communication skill has got the lowest score. From the Table 1 we can see that a greatest improvement

from unaided condition to aided condition was in the favorable listening skill. Listening skill in favorable condition is getting the highest benefit while using the hearing aid. Least benefit is obtained with the social skill in favorable condition.

Table 1. Mean and standard deviation for unaided and aided scores across different conditions and skills

Conditions	Skills	Unaided		Aided	
		Mean (%)	SD	Mean (%)	SD
Favorable	Listening	13.91	10.27	69.19	10.9
	Communication	28.90	12.78	64.30	12.8
	Social	38.60	17.08	65.30	14.2
Unfavorable	Listening	10.69	9.68	62.30	12.7
	Communication	26.30	16.56	61.20	15.6
	Social	18.25	13.77	63.38	7.9
Environmental	-	17.75	15.12	70.88	17.7
-	Language	27.46	15.55	75.07	14.5
-	Academic	32.90	16.69	67.90	13.8

Wilcoxon's Signed Rank test was done to check for the significance of mean differences between unaided condition and aided conditions. Test result showed that there is significant difference between aided and unaided condition for all the skills under favorable condition, unfavorable condition, environmental condition, and also with language and academic skills which is shown in Table 2.

Results showed that, all the skills in favorable condition has got a $p < .000$ value. From both Tables (1 & 2) we can conclude that there is significant difference in scores between aided and unaided condition for all the sub skills, indicating improvement in performance with the hearing aid.

Table 2. Results of Wilcoxon's signed rank test

Condition	Skill	Unaided vs. aided	
		Z values	p
Favorable	Listening	-6.156	$P < .000$
	Communication	-6.146	$P < .000$
	Social	-5.839	$P < .000$
Unfavorable	Listening	-6.160	$P < .000$
	Communication	-6.042	$P < .000$
	Social	-6.168	$P < .000$
Environmental	-	-6.168	$P < .000$
Other	Language	-6.157	$P < .000$
	Academic	-6.163	$P < .000$

To evaluate the test-retest reliability of the developed questionnaire: Test retest reliability

of questionnaire was assessed by calculating the correlating scores obtained from a group of 10 parnts on two activities with a gap of two weeks. Test retest reliability for hearing aid benefit questionnaire was assessed by finding reliability coefficient 'α' for each sub skill in favorable, unfavorable and environmental condition and also for language skill and academic skill. Reliability coefficient 'α' was ≥ 0.80 for all the skills. It means there is good test retest reliability for the hearing aid benefit questionnaire for all the sub skills for both aided and unaided condition and also for the knowledge of device of hearing aid and discomfort sub sessions.

To compare the percentage scores for subjects across different questions under each skill:

This analysis was done descriptively by calculating the percentage of subjects rated from 0 to 4 on a 5-point rating scale for each questions. Percentage of subject data is calculated for each question for both aided and unaided conditions. In a total of 50 subjects percentage of subjects who rated 4, 3, 2, 1, 0 for each question are calculated. In the aided condition for all the subskills under favorable, unfavorable and environmental condition more percentage of subjects gave response of 100% or 75% compared to 0% or 25 % response in unaided condition. It shows children are getting hearing aid benefit for language skill and academic skill in aided condition.

In Knowledge of device sub session, ranging from a high percentage of subjects gave response 100% to 50%. It indicates that most of the children and parents had good knowledge about the device and care of the device. In discomfort or aversivness sub session a score of 100 % in each question indicates that child is facing problem or discomfort while wearing hearing aid. The degree of discomfort increases for scores from 0% to 100%. A response score of 0 % to 50 % is an indicator of good performance with hearing aid. For all the questions in the sub session, response score ranging from 0% to 100%. It indicates that even though the aided mean percentage scores are significantly higher than unaided scores, all children were facing the challenge of discomfort while wearing hearing aid.

Result showed that there is significant difference in mean percentage scores between unaided and aided condition, indicating observable hearing aid benefit. Thus hearing aid benefit questionnaire is an efficient tool in quantifying hearing aid benefit in children. There was higher mean percentage scores in the favorable condition compared to unfavorable condition, which indicates less perceived hearing

aid benefit in the more difficult listening situation compared to the favorable listening situation. The highest mean percentage score in aided condition is obtained in language sub skill, the possible reason for this result is that children selected in the study are undergoing training/therapy for listening, speech and language developments. Also mothers of these children are more aware of performance in areas of language and listening. There is a trend of decreasing the response score in each sub skill from the first question towards the last question. This could be due to the increasing difficulty of questions as it goes on. This pattern of response can be avoided by randomizing the questions. The developed questionnaire has got a reliability value $> 75\%$ for all the sub skills which indicates the high test retest reliability of the questionnaire as a clinical tool.

Conclusions

Parents constitute a major source of information on the consequences of rehabilitation in hearing impaired children.

The result of the study indicates that hearing aid benefit questionnaire for hearing impaired children is a reliable and valid measure of assessing hearing aid benefit in real life situations. However, the questionnaire is still lengthy, which may limit its use clinically. A simple, easy questionnaire is highly desirable for busy parents to be able to rate the child's hearing aid benefit. But reducing the items in questionnaire will further miss out valuable information in different listening conditions. Further research can be conducted by administering the hearing aid benefit questionnaire and one of the objective hearing aid benefit measures on the same age group of subjects. There is a need to develop hearing aid benefit questionnaire. In other age group children considering the speech and language development of that group.

References

- Anderson, K., & Smaldino, J. (1997). Listening inventory for education an efficacy tool. Retrieved March 2, 2010, from <http://home.earthlink.net>
- Anderson, K., & Smaldino, J. (2000) June 1. Children's Home Inventory for Listening Difficulties. Retrieved February 23, 2010, from <http://www.oticonusa.com>
- Anderson, K. (2002). Listening Inventories for Education (LIFE). Retrieved March 20, 2010, from <http://www.kandersonaudconsulting.com>.
- Bentler, R.A., & Kramer, S. E. (2000). Guidelines for choosing a self report outcome measure. *Ear and Hearing*, 21(4), 37-49.

- Brown, A., & Johnson, C.D. (2001). Functional auditory performance indicators: An integrated approach to auditory skill development. Retrieved February 16, 2010 from <http://www.cde.state.co.us/cdesped/sd-eaaring.htm>.
- Ching, C. Y., & Hill, M. (2005). The Parents Evaluation of Aural/Oral Performance of Children (PEACH) scale. Retrieved May 2 from www.psych-sci.manchester.ac.uk/mchas/eval/quest/peach.doc.
- Ching, C. Y., & Hill, M. (2001). Hearing aid outcome measures in children: how effective is amplification in real life. Retrieved May 10, 2010, from www.nal.gov.au
- Cox, R. (2003). Assessment of subjective outcome of hearing aid fitting: getting the client's point of view. *International Journal of Audiology*, 42, S90-S96.
- Cunningham, R. F. (2008). A review of amplification protocols for hearing-impaired infants and children. *The hearing journal*, 61(11), 48-52.
- Robbins, A. M., Renshaw, J.J., & Berry, S.W. (1991): Evaluating meaningful auditory integration in profoundly hearing impaired children. *American journal of otology*, 12, 144-150.
- Schow, L. R., & Nerbonne, A. M. (1989). *Introduction to Aural Rehabilitation* (2nd ed.). United States of America: Allyn & Bacon.
- Zimmerman, S., Osberger, M.J., & Robbins, A.M. (1998). Infant-Toddler: Meaningful Auditory Integration Scale (IT-MAIS). In: W. Estabrooks (ed). *Cochlear Implants for Kids*. Washington: AG Bell Association for the Deaf.
- Williams, C. (2005). The Children's Outcome Worksheet (COW) - an outcome measure focusing on children's needs (Ages 4-12). Retrieved March 6, 2010, from <http://www.oticonusa.com>.

Appendix Questionnaire

I) Favourable condition

A. Listening skills -without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child show awareness for sounds by turning towards source, smiling					
2	Awareness response seen only for loud environmental sounds					
3	Does the child show awareness to conversational speech and soft sound					
4	Does the child associate sounds with the object /animal producing the sound (Eg:while hearing bow, bow child looks at dog)					
5	Does the child spontaneously respond to his/her name in quiet at 8 feet distance					
6	Does the child respond differently to different sounds (crying response to angry sound and smiling response to pleasant sound)					
7	Does the child respond to a door bell or a knock in a quiet condition at 8 feet distance					
8	Does the child listens to the T.V /radio at normal volume levels at 8 feet distance					
9	Does the child more aware of mothers voice					
10	Does the child identify the difference in pattern in a set of 3 different pattern of sounds(e.g. loud-soft-loud and soft-loud-soft, loud-loud-soft)					
11	Does the child identify difference in sound in a set of two vowel sounds (e.g. a and u)					
12	Does the child understand a one to one conversation in a quiet place					
13	Is the child able to spontaneously discriminate between a male speaker and a female speaker					
14	Is the child able to spontaneously discriminate between two male speakers and two female speakers					
15	Does the child enjoy listening to music					
16	Does the child identify songs through listening and dances appropriately					

A=always, B=generally, C=half of time, D=occasionally, E=never

Favourable condition

A. Listening skills with hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child show awareness for sounds by turning towards source, smiling					
2	awareness response seen only for loud environmental sounds					
3	Does the child show awareness response to conversational speech and soft sounds					
4	Does the child associates sounds with the object /animal producing sound (Eg:while hearing bow, bow child looks at dog)					
5	Does the child spontaneously respond to his/her name in quiet at 8 feet distance					
6	Does the child respond differently for different sounds (crying response to angry sound and smiling response to pleasant sound)					
7	Does the child respond to a door bell or a knock in a quiet condition at 8 feet distance					
8	Does the child listens to the T.V /radio at normal volume levels at 8 feet					

	distance					
9	Does the child more aware of mothers voice					
10	Does the child identify the difference in pattern in a set of 3 different pattern of sounds(e.g. loud-soft-loud and soft-loud-soft, loud-loud-soft)					
11	Does the child identify difference in sound in a set of two vowel sounds (e.g. a and u)					
12	Does the child understand a one to one conversation in a quiet place					
13	Is the child able to spontaneously discriminate between a male speaker and a female speaker					
14	Is the child able to spontaneously discriminate between two male speakers and two female speakers					
15	Does the child enjoys listening to music					
16	Does the child identify songs through listening and dance appropriately					

A=always, B=generally, c=half of time, D=occasionally, E=never

B. Communication skills without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child use sign language/gestures to communicate effectively with peers and family members in a quiet condition					
2	Does the child use spoken language to communicate effectively with peers and family members in a quiet condition					
3	Does the child initiates spoken conversation with familiar people in quiet					
4	Does the child wait for whole message before responding in quiet condition					
5	Does the child spontaneously respond to speech with its meaning based on hearing alone					

B. Communication skills with hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child use sign language/gestures to communicate effectively with peers and family members in a quiet condition					
2	Does the child use spoken language to communicate effectively with peers and family members in a quiet condition					
3	Does the child initiates spoken conversation with familiar people in quiet					
4	Does the child wait for whole message before responding in quiet condition					
5	Does the child spontaneously responds to speech with its meaning based on hearing alone					

A=always, B=generally, c=half of time, D=occasionally, E=never

C. Social and emotional skills without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Is the child able to do turn taking through listening in a quiet condition[first mother's turn to put ball and next turn for child)					
2	Is the child able to do play with peers through listening in a quiet condition					
3	Is the child able to listen to greetings and respond to that in quiet condition					
4	whether your child is being uncomfortable without hearing aid					
5	How often does the child become upset without hearing aid					

D. Social and emotional skills with hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Is the child able to do turn taking through listening in a quiet condition[first mother's turn to put ball and next turn for child)					
2	Is the child able to do parallel play through listening in a quiet condition					
3	Is the child able to listen to greetings and respond to that in quiet condition					
4	whether your child is being uncomfortable by hearing aid					
5	how often does the child become upset					

A=always, B=generally, c=half of time, D=occasionally, E=never

II) Unfavourable condition**A. Listening skills- without hearing aid**

SL. NO	QUESTIONS	A	B	C	D	E
1	Does the child spontaneously respond to name in the presence of background noise					
2	Does the child respond to own name spoken from another room					
3	Does the child associate sounds with animal/object producing sound in the presence of noise					
4	Does the child enjoy listening to music in the presence of background noise					
5	Does the child spontaneously discriminate between the two speakers using audition alone in the presence of TV noise					
6	Does the child respond to a door bell or a knock in the presence of noise					
7	Does the child more aware of mothers voice in the presence of noise					
8	Does the child understand the room to room conversation in the presence of noise					

B. Communication skills-without hearing aid

SL. NO.	QUESTIONS	A	B	C	D	E
1	Does the child use sign language/gestures to communicate effectively with peers and family members in the presence of background noise					
2	Does the child use spoken language to communicate effectively with peers and family members in the presence of background noise					
3	Does the child wait for whole message before responding in noisy condition					
4	Does the child initiate spoken conversation with familiar people in noisy condition					
5	Does the child spontaneously responds to speech meaningfully based on hearing alone in the presence of noise					

A=always, B=generally, c=half of time, D=occasionally, E=never

A. Listening skills- with hearing aid

SL. NO.	QUESTIONS	A	B	C	D	E
1	Does the child spontaneously respond to name in the presence of background noise					
2	Does the child respond to own name spoken from another room					
3	Does the child associate sounds with animal/object producing sound in the presence of noise					
4	Does the child enjoy listening to music in the presence of background noise					
5	Does the child spontaneously discriminate between the two speakers using audition alone in the presence of TV noise					
6	Does the child respond to a door bell or a knock in the presence of noise					
7	Does the child more aware of mothers voice in the presence of noise					
8	Does the child understand the room to room conversation in the presence of noise					

B. Communication skills with hearing aid

SL. NO	QUESTIONS	A	B	C	D	E
1	Does the child use sign language/gestures to communicate effectively with peers and family members in the presence of background noise					
2	Does the child use spoken language to communicate effectively with peers and family members in the presence of background noise					
3	Does the child wait for whole message before responding in noisy condition					
4	Does the child initiate spoken conversation with familiar people in noisy condition					
5	Does the child spontaneously respond to speech meaningfully based on hearing alone in the presence of noise					

A=always, B=generally, c=half of time, D=occasionally, E=never

C. Social and emotional skills without hearing aid

SL. NO	QUESTIONS	A	B	C	D	E
1	Is the child able to do turn taking through listening in noisy condition (first mother's turn to put ball and next turn for child)					
2	Does the child is able to play with peers through listening in noisy condition					
3	Does the child is able to listen to greetings and respond to that in noisy condition(whether child listen to hello and says hello in a party or in a gathering)					
4	How often does the child become upset in noisy condition(Eg:crying,showing temper tantrums)					

A=always, B=generally, c=half of time, D=occasionally, E=never

III) Environmental condition without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child spontaneously respond to environmental sounds (doorbell, telephone, and water running) with hearing alone?					
2	Does the child spontaneously respond to auditory signals in a new environment(someone else home or restaurant)					
3	Does the child spontaneously respond to speech signals that child hears in his/her school or home routine?					
4	Is the child able to hear what others are talking while playing					

III) Environmental condition with hearing aid

SL. NO	QUESTIONS	A	B	C	D	E
1	Does the child spontaneously respond to environmental sounds (doorbell, telephone, and water running) with hearing alone?					
2	Does the child spontaneously respond to sound signals in a new environment(someone else home or restaurant)					
3	Does the child spontaneously respond to speech signals that child hears in his/her school or home routine?					
4	Is the child able to hear what others are talking while playing					

A=always, B=generally, c=half of time, D=occasionally, E=never

C. Language skills without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child respond to simple commands(giving toy on request)					
2	Does the child know his/her name					
3	Does your child understands 'wh' questions(what is your name?, where is your house ? etc)					
4	Does the child responds to yes/no question (is it a bus?)					
5	Does the child identifies body parts (point body parts on request)					
6	Does the child understands prepositions (keep ball on table)					
7	Does the child identifies objects by function (seeing through eyes, hearing through ears)					
8	Does the child recalls three numbers, letters or words (mother says no's 22,33 ,44 and ask child to remember and tell, same for words and letters)					
9	Does the child follow directions(open the door ,bring the box)					
10	Is the child able to understand long sentence with 5-6 words					
11	Is the child able to identify the colors(show red, show green)					
12	does the child know the concept of same and difference					
13	Is the child able to follow 3 step instructions					
14	Does the child use the correct grammatical form in spontaneous production					

D. Academic skills without hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child shows interest in learning new things through listening					
2	Are u satisfied with the child's performance at school					
3	Is the child willing to take turns while learning					
4	Does the child gets involved/participated in group discussions in class					
5	Does the child hesitate or become confused when teacher says in the class?					

A=always, B=generally, c=half of time, D=occasionally, E=never

D. Language skills with hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child respond to simple commands(giving toy on request)					
2	Does the child know his/her name					
3	Does your child understands 'wh' questions (what is your name? where is your house?)					
4	Does the child responds to yes/no question (is it a bus?)					
5	Does the child identifies body parts(point body parts on request, show eye)					
6	Does the child understands prepositions (keep ball on table)					
7	Does the child identifies objects by function(seeing through eyes, hearing through ears)					
8	Does the child recalls three numbers, letters or words (mother says no:s 22,33 ,44 and ask child to remember and tell, same for words and letters)					
9	Does the child follow directions(open the door, close the box)					
10	Is the child able to construct long sentence with 5-6 words and produce it					
11	Is the child able to identify the colors(show red, show green)					
12	does the child know the concept of same and difference					
13	Is the child able to follow 3 step instructions					
14	Does the child use the correct grammatical form in spontaneous production					

E. Academic skills with hearing aid

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child shows interest in learning new things through listening					
2	Are u satisfied with the child's performance at school					
3	Is the child willing to take turns while learning					
4	Does the child gets involved/participated in group discussions in class					
5	Does the child hesitate or become confused when teacher says in the class?					

A=always, B=generally, c=half of time, D=occasionally, E=never

F. Knowledge of device

by parents

SL. NO	QUESTIONS	A	B	C	D	E
1	Do you understand battery change criteria (eg. when to change battery?)					
2	Do you check regularly if your child's hearing aid is working properly					
3	Do you encourage the child to wear hearing aid					
4	Have you accepted your child wearing a hearing aid (eg:acceptance while attending marriage function or gathering)					

E. Knowledge of device

By child

SL NO	QUESTIONS	A	B	C	D	E
1	Does the child tells if hearing aid is not working					
2	Does the child wear the hearing device all the working hours without hesitation (when he/she is awake)					
3	Does the child ask to have his/her device put on					
4	Does the child put on/off his hearing device without being told					
5	Does the child appear upset if his/her device is nonfunctioning					
6	Does the child remove battery from hearing aid with ease					
7	Does the child accept wearing a hearing aid					

F. Discomfort or aversiveness

SL. NO	QUESTIONS	A	B	C	D	E
1	Does your child complain about or been upset by any loud sounds					
2	Sounds of running water such as toilet or shower uncomfortably loud					
3	Everyday sounds that do not bother others are too loud for the child					
4	Unexpected sounds like alarm bell uncomfortably loud					
5	When the telephone rings the sound startles the child					
6	Traffic noise too loud					
5	Is the ear moulds comfortable for the child					

A=always, B=generally, c=half of time,
D=occasionally, E=never