

Auditory verbal training for children with severe to profound hearing loss

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ABSTRACT

Mudasir Jan, student of the Master in [Clinical Audiology and Hearing Therapy](#), analyzes in his thesis the effectiveness of auditory-verbal therapy in the development of language in children with severe to profound hearing loss.

For that purpose, five cases have been selected from the patient database of Perfect Hearing Solutions, a hearing and speech centre located in the state of Jammu and Kashmir in India. The selection has been made strictly on the basis of cases of severe to profound hearing loss without any other neurological or physical deficits.

Auditory training methods and case evaluation scores before and after auditory-verbal therapy were then compared using CEFL-4. The outcome of this study indicates that, auditory verbal therapy brings positive improvement in the language development of hearing-impaired child, particularly in receptive language.

1. METHODOLOGY

A sample of five cases with severe to profound hearing loss was chosen from the case register of Perfect hearing solutions, Srinagar, Jammu and Kashmir India. All the cases are native of Kashmir province. Hearing loss ranges from bilateral severe to profound SNHL in all the cases. All the cases wore bilateral hearing aids. Age of the cases ranges from five to 14 years. No other disability was observed.

Cases	Hearing aid/C.I	Gender	Current age	Age of diagnosis
Case 1	Bilateral hearing aids	Male	14:1	3:6
Case 2	Bilateral hearing aids	Male	8:9	1:6
Case 3	Bilateral hearing aids	Male	5:10	2:6
Case 4	Bilateral hearing aids	Female	7:9	3:9
Case 5	Bilateral hearing aids	Female	12:3	2:1

Each case receives auditory verbal therapy at Perfect hearing solutions Srinagar, Kashmir once in a week for one hour. Assessment of language before therapy and after therapy was done on all the cases using a CEFL- 4 (clinical evaluation of language fundamentals, 4th edition) kit.

1.1. Background of cases profiles:

Case one: Is a male child, aged fourteen years and one month at the time of pre-therapy assessment, born through caesarean section at govt. hospital. Case 1 had delayed birth cry at the time of delivery as is evident from his medical history. All the developmental milestones have been perfectly timed except hearing and language milestones. Parents took lot of time to get

their baby diagnosed because of unavailability of audiological facilities in their village hospital, and because of their poor financial status. The age at which case one was diagnosed was 3 years and 6 months. After diagnosis, the kid was fitted with bilateral hearing aids and has been advised for intensive auditory verbal therapy. The consent form from his parents was signed before including this case in the sample for master's thesis.

Case 2: Is a male child, aged eight years nine months at time of pre- therapy assessment, born through normal delivery at govt. hospital. Case 2 was born to parents whose marriage is consanguineous. Because of consanguineous marriage, the doctors put the baby in high-risk register and advised parents for periodic evaluation of their baby. At the age of 1year and six months, case 2 was diagnosed with bilateral profound SNHL hearing loss. Bilateral hearing aids have been fitted and the doctors advised the intensive auditory verbal training. Case 2 was chosen after proper and documented consent from the parents.

Case 3: Is a female child, aged five years and 10 months at the time of pre- therapy assessment, native of Kashmir province, born through normal delivery in govt. hospital. Medical history of this case reveals that at the age of three months case 3 has Cytomegalovirus infection. Due to this infection, hearing loss occur in case 3, although hearing loss remain unnoticed till case 3 attained age of two years and a half. Case 3 was diagnosed with bilateral severe SNHL and was fitted with bilateral hearing aids with the advice to go for auditory verbal therapy. During the assessment, no other disability has been noticed apart from hearing loss. Case 3 has been included in the

sample study after proper and documented consent form from the parents.

Case 4: Is a female child, aged seven years nine month at the time of pre- therapy assessment, case 4 is native of Kashmir province. Medical history reveals that case 4 was a preterm birth (7 months) delivered at private hospital. Case 4 received phototherapy and blood transfusion in a child care hospital as a part of treatment protocol. Due to the delay in speech and language in case 4 doctors advised for audiological evaluation. Results of the audiological test confirm bilateral severe to profound SNHL. Audiologist fitted bilateral hearing aids to case 4 and started auditory verbal therapy soon after. Other than hearing loss, no other disability had been present in case 4. After proper and documented consent from parents, case four was included in the present study.

Case 5: Is a female child, aged twelve years and three months at the time of pre- therapy assessment. Case 5 is native of Kashmir province, born by caesarean section at private hospital. Medical history of case 5 reveals nothing relevant during her birth or after birth of case 5. Parents notice delay in speech and language in their child. Case 5 was diagnosed with bilateral severe SNHL, bilateral hearing aids were fitted to case 5 and auditory verbal therapy was suggested. No other neurological deficit had been observed during pre- therapy assessment of case 5. After proper and documented consent from parents, case 5 was included in the study.

All the above five cases were assigned to the author and auditory verbal training was given weekly for one hour duration each session. Training continues for 7 weeks. Before the start of the first session, a pre-

therapy assessment test was done on each case to know the present state of development in language by using CEFL-4 (clinical evaluation of language fundamentals, 4th edition). As this paper focuses only on language development, so CEFL -4 was used before the therapy starts and after when therapy ends to compare the results.

1.2 CEFL-4 (Clinical Evaluation of Language Fundamentals, 4th edition)

CEFL-4 is a language assessment kit developed by Eleanor, Elisabeth, Wayne, & Secord in 2003. CEFL-4 was standardized on kids with hearing loss for the assessment of language. CEFL-4 consists of 19 subtests and 2 test forms, one is for age group of 5-8 and another test form is for age group 9-21.

1.3. Therapy approach

Each case along with their caregiver came to Perfect hearing solution, Srinagar, Kashmir, India on same stipulated time every week. The therapy session lasts for one and a half hour in company of parents or caregivers. Before starting the therapy session, it was necessary to see whether hearing aids are functioning properly or not. So therefore, Ling's six sound tests (Ling, 1976) been conducted every time the case came for auditory verbal therapy. Ling's six sound tests cover low as well as high frequencies. Following are the six sounds:

“mm”

“oo”

“ah”

“ee”

“sh”

“s”

Ling’s sound test needs quite environment. Speaker should be at distance of 50cm to 1 meter from the microphone of the hearing aid of a child. Speaker presents the sound not too loud and not too long at conversational volume. If a child is fitted with bilateral hearing aids then independent test, is been performed for each hearing aid.

After successful Ling test, the therapist sat close and on the same side of the case in order to make the speech clearer and avoid lip reading by the case. The therapist and caregiver took turn to give therapy to the case. This active participation in therapy session by the parents, allows them to practice the strategies and technique in achieving the targets. Parents have a set of home activities, which they incorporate in their sessions at home during the week. Parents and therapist involves in healthy discussion during the therapy session. For example, the therapist introduces new word “ball”. Then he/she explains why the word “ball” was incorporated it might be for the production sound /b/ in the initial of word; practice verb- noun phrases (e.g. “let’s play with the ball”, “kick the ball”); adverbs (“we have a small ball”).

Every therapy session has a peculiar pattern. This pattern of teaching has been further divided in targets for expressive language and receptive language (targets were chosen according to age and present developmental state in language of the cases). New strategies are incorporated each week in order to teach different variety of nouns, verbs, adjectives, prepositions to the individual case. Find below an example of such scenario:

Scenario: Concept about term “Year”.

Nouns: Day, night, morning, evening, noon, afternoon, week, months etc.

Adjectives: Long day, short day, long night, short night, rainy day, hot day, cold day..

Prepositions: On, at, by, in, after.

Verbs: Blowing, snowing, raining etc.

Different materials have been used like pictures, toys, animation, pamphlets, brochures, photos etc. for younger cases to impart strategies focused on the desired goal. For older, cases therapy was imparted through writing and reading method only. All the instructions were given to the parents regarding home activities, and include in a case’s workbook dairy to avoid any confusion at home.

2. RESULTS

The result of proposed therapy was assessed by using CEFL-4 and was compared with the scores taken before the start of the therapy for the each case. Language was assessed in two forms one is receptive language and the other is expressive language. Receptive language subtests include concepts and following directions, understanding spoken paragraphs and word classes receptive. Expressive language subtests include word classes- expressive, formulated sentences and recalling sentences. Find below the results of before and after therapy scores for each individual case.

Table 1.

Case 1.

Sessions	Recalling sentences	Formulated sentences	Word classes receptive	Word classes expressive	Concepts & follow directions	Understanding spoken paragraphs	Core score
Before therapy	10	9	8	8	10	5	107
After therapy	11	9	10	9	15	8	112

Table 2.

Case 2.

Sessions	Recalling sentences	Formulated sentences	Word classes receptive	Word classes expressive	Concepts & follow directions	Understanding spoken paragraphs	Core score
Before therapy	7	9	10	9	6	9	82
After therapy	8	7	11	11	9	11	85

Table 3.

Case 3.

Sessions	Recalling sentences	Formulated sentences	Word classes receptive	Word classes expressive	Concepts & follow directions	Understanding spoken paragraphs	Core score
Before therapy	8	9	10	9	13	8	80
After therapy	9	11	9	8	11	12	95

Table 4.

Case 4.

Sessions	Recalling sentences	Formulated sentences	Word classes receptive	Word classes expressive	Concepts & follow directions	Understanding spoken paragraphs	Core score
Before therapy	12	14	14	15	18	11	130
After therapy	13	16	14	16	16	18	132

Table 5.

Case 5.

Sessions	Recalling sentences	Formulated sentences	Word classes receptive	Word classes expressive	Concepts & follow directions	Understanding spoken paragraphs	Core score
Before therapy	6	9	12	9	10	12	93
After therapy	8	11	9	9	13	13	99

Pre and post therapy scores reveal variation across all the cases and in all the subtests. It is important to mention that core score (indicating overall language skills) has shown improvement in all the cases. “Formulating sentences” showed decline in score after therapy in case 2. “Word classes receptive and expressive” were difficult for case 3. “Concepts and following directions were confusing for case 3 and case 4. There is substantial increase in the score line of understanding spoken paragraphs in all the cases.

Table 6.

CEFL-4 subtests scores of 5 (N=5) cases with mean and standard deviation (in parentheses). CEFL-4 standard scores have a mean of 10 and standard deviation of 3.

Type of Measure	Subtests	N	Before Therapy	After Therapy
Receptive language	Concepts & follow directions	5	11.4(3.98)	12.8(2.56)
	Understanding spoken paragraphs	5	9(2.44)	12.4(3.26)
	Word classes receptive	5	10.8(2.03)	10.6(1.85)
Expressive language	Word classes expressive	5	10(2.5)	10.6(2.86)
	Formulating sentences	5	10(2)	10.8(2.99)
	Recalling sentences	5	8.6(2.13)	9.8(1.93)

3. DISCUSSION

The outcome of this study indicates that, auditory verbal therapy brings positive improvement in the language development of hearing-impaired child, particularly in receptive language. Regarding the evaluation of scores obtained before and after therapy, it is evident that substantial improvement after therapy did not occur for the children with young age and thus seems that the age of the children does not have any connection regarding intervention for this study with this undersized sample.

Studies regarding children with hearing loss indicate that there is a language developmental gap between normal hearing children and children with hearing loss and this gap becomes wider in children with profound hearing loss (Yoshinaga-Itano, 2006). It is suggested that time-to-time assessment must be done in order to ascertain whether hearing loss kids have been in parallel pace with normal hearing kids in language and speech development. A longitudinal study conducted by Kiese-Himmel (2008), indicate that children with profound hearing loss lag behind in language development as compared to the children with normal hearing. Newborn screening and early rehabilitation has become a norm in every developed country. So, we hope with the further development in technology associated with auditory verbal therapy will yield greater good.

Results of this study depict good improvement in receptive language mainly because the focus of therapy was on development of meaningful vocabulary (nouns, verbs, prepositions). Therapy sessions were designed in such a way that a child must have improved genuine language,

meaning of synonyms like “day-night” “long-short” “hot-cold” and concepts about prepositions like “after”, “by”, “between”.

The results of expressive language were not impressive after the completions of therapy. Reasons behind this could be many. One reasons perhaps the small sample size chosen and the big standard deviation. Other reason maybe the fewer therapy sessions provided to the cases and our expectation in yielding good results maybe high. We understand from the study that if we want to yield good scores in expressive language there has to be a change in the strategies and techniques and a modification in the therapy approach. It was found that the children, who have delayed speech and language issues regardless of hearing loss scores, are better in expressive language than receptive language after auditory verbal training.

4. CONCLUSION

It is evident that auditory verbal approach has shown promising results in developing speech and language in the children with hearing loss. Hearing-impaired children may take time to pace up with the typical hearing kids in language development. The results we got in this exploratory study suggest that rehabilitation process should continue for the longer period possible not only just for the initial critical years. Language is a continuous ongoing process so auditory verbal therapy must also continue, to ensure literacy skill acquirement must not lag behind in hearing-impaired kids. Auditory verbal therapy is a time consuming process, and we need to ensure that financial and psychological support must be provided to the families having hearing-impaired children.

To find out the answers of the questions that arise about the variability in the expansion of language among hearing-impaired children, a longitudinal study design is suggested. It would be beneficial to study other aspects of language apart from receptive and expressive language but problem arise CEFL-4 assessment tool that does not recognise other aspect of language. A broad range with more efficient assessment tool kit maybe required. Therefore, further studies should be conducted to include more assessment tools to keep other aspects of language in play apart from CELF-4.

It is suggested that children using auditory verbal therapy for language acquisition must be compared with children using other modalities of language development, to find out the effectiveness of auditory verbal approach. More research needs to be conducted, to find out an easy and more accurate measurable approach that will allow hearing-impaired kids to explore more feature of language acquisition apart from auditory verbal approach.

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