



Intervention Module to Train Speech and Language Skills for Children from Birth to Six Years

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Abstract

The present study aimed at developing an intervention module to train speech and language skills in children between birth to six years. The intervention module comprised of a checklist to assess speech and language skills and activities to enhance the same. The checklist was prepared and finalized by establishing various measures of validity and reliability. This was then administered to 365 typically developing children in the age group of birth to six years for standardizing the same. This checklist was also administered on children with hearing impairment and intellectual deficit. Activities were prepared for each item in the checklist. Following the baseline assessment, specific items and activities were provided to the parents/caregivers to train at home with specific instructions on regular and systematic documentation of responses. They were followed up periodically. The post training scores were compared with the pre training scores which revealed statistically significant improvement in the scores in both the groups of children. It can be concluded from the study that the checklist was useful in identifying the baseline levels and the activities in the module were effective in training the children with hearing impairment and intellectual deficit. Future investigations can include the validation of the module on children with other communication disorders.

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Background

The social transactions of human beings can be analyzed in three major dimensions - communication, speech and language which are inseparably interrelated. These social transactions define the existence and support the survival of human beings. Communication which is vital for both biological and social existence involves exchange of information between two or more individuals. It occurs in an array of natural circumstances either verbally through speech or nonverbally through gestures, body movements, writing, sign language and thus encompasses both speech and language. Human communication takes place through language by providing meaningful arrangements of words in a socially shared code or conventional system that represents ideas through the use of arbitrary symbols and rules that govern combination of these symbols. In human beings, the primary means of communication is through speech. It is a verbal mode of communication, which involves the precise coordination of neuromuscular movements in order to produce sounds and linguistic units. Thus,

speech and language form important components of communication (De Houwer, 1999).

Human beings have the most elaborate, sophisticated, versatile and creative means of communication. The ability to communicate verbally through the use of speech and language is a unique gift to human beings. The human nervous system is specially equipped to handle sequentially complex aspects of language. Not only the nervous system but the listening apparatus (external ear and hearing system) and vocal structures of respiration like larynx, nasal and oral system, the phonatory, articulatory equipment etc., are all 'designed' to facilitate speech and language processing. Child's expression through speech serves as one of the important avenues for language testing. The development of speech and language in particular is a dynamic constructive process (Thelen, 2005).

As soon as the child is born, s/he announces his/her presence in the world through a cry (birth cry) which forms the first signs of communication. This sets the platform for further speech and language development. As the infant gains greater

control over the respiratory and vocal mechanisms, speech and language starts developing and this process continues from birth through several years of life. This development is a slow and gradual process. Somewhere around age one the child actually begins to utter single words with meaning. Around the age of two, the child will begin putting two words together to make sentences like 'doggie run'. The child's vocabulary also increases simultaneously. As the child grows, the child may produce longer and complex sentences, uses questions, narrates stories, sings rhymes etc. By the time the child enters preschool, vast majority of the rules and sounds of the language are acquired. After this it is just a matter of combining different sentence types in new ways and adding new words to the vocabulary (Peechi, 1994). All children go through the same stages of language development although each child develops at his/her own pace. The 'environment' plays an important role in learning to speak. Children learn to speak only when they hear people talk to them in many different circumstances (De Houwer, 1999).

The acquisition, development and maintenance of speech and language in human beings are dependent on adequate functioning and appropriate integration of distinct neural networks. Majority of the children develop speech and language without any effort. But, for some individual children, this skill breaks down or is arrested/hindered because of several factors such as brain damage caused during prenatal, natal (birth) or postnatal period leading to conditions such as intellectual deficit, cerebral palsy, dysphasia/aphasia in childhood, hearing impairment, cleft palate, autism spectrum disorders etc. These conditions could result in a communication disorder which is an impairment affecting one's understanding and speaking abilities. These conditions may range in severity from mild to profound and may be developmental (present since birth) or acquired (develop later in life). Such conditions could be evidenced by a few speech and language characteristics/manifestations such as lack of onset of speech or delay in the onset of speech and language, limited language development, incorrect/inappropriate speech characteristics including voice, articulation and prosodic abnormalities, lack of spontaneous and responsive speech seen as an inability or failure to respond to communication by others etc.

Two common conditions which lead to speech and language problems are hearing impairment and intellectual deficit. They are disabilities which impose a host of related problems such as delayed development of cognitive and perceptual skills, which may result in slow learning and difficulty progressing in school. Hearing impairment is a broad term used to describe the complete or partial loss of the ability to hear in one or both ears. Intellectual

disability is a developmental disorder characterized by significantly below-average intelligence (an intelligence quotient [IQ] below 70) and an inability to function in and adapt to daily life without assistance. They exhibit deficits in adaptive behaviors such as inadequate functioning, economic activity, communication, number and use of time, social activity etc. The level of these impairments can be mild, moderate, severe or profound.

Children with hearing impairment cannot hear language and speech sounds and hence they cannot learn and imitate them. The impact of hearing impairment on a child's speech, language, education and social integration depends on the level and type of hearing impairment, and the age of onset, especially if it begins before the age when speech normally develops. The consequences of hearing impairment can be viewed as primary and secondary effects. Primary effect of hearing impairment is on language development. The primary loss of hearing affects the acquisition, maintenance and generalization of language concepts (Svirsky, Robbins, Kirk, Pisoni, & Miyamoto, 2000; Norbury, Bishop, & Briscoe, 2001; Hansson, Sahlen, & Maki-Torkko, 2007). Because of improper and inadequate auditory inputs, the children with hearing impairment face speech problems. The secondary effect is on social and emotional adjustment. Their inability to develop adequate skills in both receptive and expressive language make communication with others difficult thus creating psychological and social isolation from the peer group.

Children with intellectual disability often experience delayed development of speech, language and many other skills, which may result in slow learning and difficulty progressing in school (Coggins, Carpenter & Owings, 1983; Beeghly, Weiss-Perry, & Cicchetti, 1990; Ferrier, Bashir, Meryash, Johnston, & Wolff, 1991; Abbeduto & Rosenberg, 1993). The problems seen in these children depend on the degree of severity. Apart from speech and language problems, they may have poor sensory motor skills, poor gross and fine motor skills and poor self help skills. They exhibit a variety of behavior problems such as hyperactivity, poor attention span and concentration. They have poor cognitive deficits too in terms of poor reasoning abilities, poor perceptual skills, poor sorting, matching and association, sequential and logical thinking and memory abilities. Most of these children have good socialization abilities and they use gestures and have the intent to communicate. Their speech and language skills can be either delayed or deviant. The most common language problems seen are limited vocabulary, usage of simple and short sentences, grammatical errors and or mistakes, lack of generalization of verbal output etc. The most common speech problems seen are inconsistent articulatory errors, omission of sounds in the final position etc.

It is therefore imperative that the speech and language difficulties in these children be identified as early as possible so that they could receive the necessary supporting intervention at the earliest which would in turn help them function at par with their typically developing peers. To facilitate identification, a thorough assessment is essential which is generally carried out through formal or informal methods. Assessment of speech and language skills in very young children is usually based upon both checklists and rating scales given to parents/caregivers and play-based assessment. This could be due to the fact that there is considerable variability in the rates at which children develop language skills. Moreover, the dividing line between typical and delayed language is not always clear. Myers (1988) also stated that checklists are as good as developmental milestones. At the early childhood and school-age level, assessment is through a combination of formal and standardized tests, informal checklists/rating scales, and observations. Both the receptive and expressive abilities in terms of semantics, syntax, and pragmatics are assessed, in addition to articulation and other speech related skills. In general the assessment of children with different communication disorders is a difficult and time-consuming process. When these children have additional disabilities of severe nature, the problem of assessment is further compounded. For these 'difficult to test' population, assessment through checklists is preferred.

Following assessment, these children have to undergo intensive training for the development of speech and language skills. It is also a well known fact that a systematic training program with focus on several skills for children with communication disorders, instituted at an early age, facilitates their overall development and inclusion in the society. Such a training program for preschoolers was initiated at the All India Institute of speech and hearing with a well planned curriculum. As a part of the well planned curriculum incorporating different domains such as sensory, self-help, motor, social-emotional, play, academic, and cognitive that was prepared, there was a need felt to incorporate the speech and language skills too so as to facilitate all round development in these children. Thus, it was planned to develop an intervention module comprising of an assessment checklist and activities to train speech and language skills. The development of the curriculum was taken up as a five year project and this paper is an extract from the larger project.

There are a few checklists which are currently being used to assess language skills in different setups in the Indian context. For children upto 3 years of age, the assessment is usually carried out by using checklists such as The Receptive Expressive Emergent Language Scale (REELS; Bzoch &

League, 1971) and Three Dimensional Language Acquisition Test (3DLAT; Harlekar, 1986). These are language independent and quick to administer. The latter has been developed in the Indian context and thus gives more reliable data when administered on Indian children. However, for children with language age greater than three years, these cannot be used. For the older children (between 4-7 years), language tests such as Language Test in Kannada, Tamil, Malayalam, etc. (Karanth, 1995; Sudha, 1993; Rukmini, 1994) have been developed. However these tests are language dependent, performance based and time consuming. Moreover, for children with severe cognitive motor deficits, the utility of these are restricted. Language skill assessment checklist has also been developed as a part of Communication DEALL Developmental checklists for children in the age range of 0-6 years. (Karanth, 2008). Another recent checklist was developed by Navitha and Shyamala (2009) titled 'comprehensive language assessment tool' which assesses language skills in the age group of 3-6 years. Both these are standardized checklists developed in the Indian context, and are language independent and based on parent interviews. Most of these tests assess language skill for a restricted age range and tools for the entire age group of 0-6 years are scarce.

Further most of these language tools developed, focus on the assessment of semantic and syntactic skills. These checklists have limited scope for the assessment of pragmatic skills. Pragmatics is also an important component of language skill and without pragmatics, language learnt cannot be used appropriately for social interaction.

It is a known fact that children with language impairments also have speech difficulties. However this aspect is not tested formally and is generally documented informally especially in case of children with cognitive-motor difficulties. All the tools that have been developed focus only on language skill and do not address both these skills simultaneously. To get a clearer picture of both speech and language aspects, it is ideal to develop checklists which have both speech and language components ingrained into it. Hence, a need was felt to develop a checklist for age group ranging from birth to 6 years covering all the components of language, which is language independent, quick (less time consuming), comprehensive and which focused on the assessment of speech skills in addition to language skills.

Moreover most of these checklists/tools were developed two decades ago. The results of an exploratory study on articulation showed that children were acquiring proficiency in articulatory skills at an earlier age than would be expected from previously established norms (Arlt & Goodban, 1976). These results indicate a need for new data consistent with the performance of children seen at the

present time.

A few intervention modules and activity manuals to facilitate language and other skills have been developed in the Indian context such as Preschool curriculum for young hearing impaired children (Rathna, Ghate, More, & Roy, 1991), Communication DEALL intervention manual (Karanth, 2008) to name a few. However there are limited modules that focus on both speech as well as language skills. Keeping these aspects view, the present study was planned.

Aim of the study

The main aim of the study was to develop an intervention module to train speech-language skills for children between birth to 6 years and to standardize the same. The specific objectives were: (1) To prepare a checklist to assess the speech-language skills (2) To assess the reliability of the checklist (3) To develop an intervention module for speech and language skills (4) To assess the clinical validity of the intervention module by administering it on children with hearing impairment and intellectual deficit.

Method

The study was undertaken in the following four phases:

Phase I: Construction of the Checklist to Assess Speech and Language Skills

As a part of construction, the following research steps were undertaken:

Step 1: Development of the Checklist to Assess Speech and Language Skills: A preliminary version of the checklist was developed that would serve as an indicator of a given child's speech and language abilities at a given period in time. The checklist construction began with the formation of a comprehensive item pool by referring to the existing criterion referenced checklists and assessment tools related to the development of children between birth to 6 years of age such as REELS, 3D-LAT, KLT etc and other internet resources. An extensive review of literature on developmental speech and language milestones in early childhood was then carried out by the investigators. Items under comprehension and expression domains were collated. A few items focusing on the assessment of articulation skills were also included under the expression domain. Since articulation problems are most commonly associated with developmental language disorders, the aspects pertaining to articulation has been included. Items assessing the pragmatic component of language were also included. It was also ensured that each of the items was in

observable and measurable terms for ease of understanding and interpretation. A comprehensive list of 175 items was initially selected and compiled for the assessment of speech and language abilities.

During the initial formation of the item pool, care was taken to see that the test items were placed in a hierarchical order of increasing difficulty according to the chronological ages of the children. The easiest and lower chronologically-aged test items were placed at the beginning of the checklist, and the more difficult and higher-aged items were placed towards the end of the checklist. The checklist was divided into eighteen different levels ranging from 0-6 years. The levels from 0-3 years were in three months interval and the levels from 3-6 years ranged over a six interval. The number of items under comprehension and expression were equalized. The number of items under each level ranged from 2-11.

A rating scale to assess the speech and language skills objectively was also prepared to rate the responses obtained from the parents/caregivers in order to obtain an objective score. Each statement was accompanied with response choice of 0-Not applicable/absent, 0.5-totally dependent/physical/verbal prompt, and 1-consistent and independent.

Step 2: Content Validity Check: The content validity of the checklist was assessed by obtaining the feedback from two experienced speech-language pathologists. They were asked to judge the appropriateness of the items included, the rating scale used and to comment on the adequacy of the phrasing of the sentences and their understandability. The feedback was collected using a 3 point rating scale ranging from the 'contents are not very valid' (score 0) to all the 'contents are valid' (score 2). Thirty items were rated with a score of '0' and ten items obtained a score of '1' which indicated 'not very valid' or 'somewhat valid'. The remaining 135 items were scored as '2' which indicated high content validity and these items were retained in the checklist. Based on their input, the list of items were reviewed and edited and the following changes were incorporated:

1. Deletions: Test items which were redundant in eliciting the same behavior, age-inappropriate and culturally unsuitable were deleted from the item pool. Thus, a total of 40 items were deleted reducing the number of items to 135.
2. Inclusions: Seven test items were added. These included items that focussed on articulation and pragmatic skill. The items included were E15, E24, E27, E37, E51, E62,

and E63.

3. Terminology: Technical and ambiguous words were substituted with non technical and simple words.
4. User manual: A user manual consisting of the method to elicit the information from the parents/caregivers and the materials required was included.

Thus, the content validity of the items were established in this manner. The total number of items after content validity was 142. Further, it was ensured that the items included in the checklists were both exhaustive and mutually exclusive. A score sheet was also developed to document the response of each child.

Step 3: Pilot Study: A pilot study was carried out so that the examiner could familiarize herself with the administration procedure and in order to foresee and prevent glitches in administration of the checklists if any. The initial pilot study was carried out on a selected sample of 12 typically developing children in different age groups between 0-6 years. The responses obtained were documented in the score sheet. This resulted in a few more modifications of the checklist. Around 2 items which were repetitive were deleted. Further, after the pilot study, it was also found that there was a need for including examples under a few items in the checklist for better understanding of the items by the parents/caregivers.

Step 4: Finalization of the Checklist: The final version of the checklist was prepared after the content validation and the pilot study. The final form of the tool had a total of 140 items with 70 items each to assess comprehension and expression. The final version of the checklist has been provided in the Appendix. The maximum score that can be obtained by a six year old child on any given item is one and on all the items is 70 for comprehension and 70 for expression. This number was maintained to facilitate ease of computation and analysis of data.

Phase II: Standardization of the Checklist

The final version of the checklist was administered to the parents/caregivers of 365 typically developing children in the age range of 0-6 years. The details of the participants and procedure have been provided below.

Participants: 185 typically developing children in the age group of 0-3 years and 180 typically developing children in the age group of 3-6 years

from different play homes, primary health centers, and pediatric clinics in Mysuru were randomly considered for standardizing the checklist. The children in the 0-3 year age group were selected in 3 month interval and the children in the 3-6 years age group were selected in 6 month interval. This was done because during the first three years, there is major development seen in speech and language skills since it is considered to be a very sensitive period owing to the central nervous system maturation.

The sample included 182 males and 183 females as shown in the Table 1. All the participants were exposed to Kannada and had Kannada as their mother tongue. Those children with no history of language, hearing, neurological, developmental, academic, intellectual, emotional and orofacial abnormalities were included in the study. This was ensured using the 'WHO Ten-question disability screening checklist' (Singhi, Kumar, Malhi, & Kumar, 2007). They were informally screened for voice, articulation, fluency and language problems. Informal oral mechanism examination and hearing screening was carried out to rule out any abnormality. Ethical procedures were used to select the participants. The parents/caregivers were explained the purpose and the procedures of the study and an informed written consent was obtained. The parent's education, socio economic status and other variables were controlled. All the participants were matched on the socioeconomic status using NIMH-SES scale developed by Venkatesan (2009). The scale has sections on occupation and education of the parents, annual family income, property, and per capita income to assess the socioeconomic status of the participants.

Procedure: The items listed were administered individually on all the typically developing children who participated in the study. The testing was carried out in a relatively noise free environment with minimum distractions. A rapport was established with the parent/caregiver. The purpose of the administration was explained. The demographic data was obtained initially. The below mentioned guidelines were followed during the administration of the checklist.

1. Each item was read carefully and the child was evaluated on that item. It was assessed whether the child could perform the item or not upon clear instructions being given under the stipulated conditions therein.
2. The examiner proceeded with the premise that the child can perform the said item (and not vice versa) before establishing the correct degree/level of the performance.
3. The responses were obtained by interviewing the parents/caregivers or on direct observation of the behavior whenever necessary. The

Table 1: Age and gender distribution of the typically developing children

Age group in months	No. of participants		Total
	Male	Female	
0-3	5	5	10
4-6	11	7	18
7-9	6	9	15
10-12	8	9	17
13-15	8	9	17
16-18	10	10	20
19-21	9	10	19
22-24	5	5	10
25-27	9	4	13
28-30	6	14	20
31-33	8	8	16
34-36	7	3	10
37-42	15	15	30
43-48	15	15	30
49-54	15	15	30
55-60	15	15	30
61-66	15	15	30
67-72	15	15	30
Total	182	183	365

direct observation was given more weightage rather than the parental interviews /reports about the child's performance. In cases where it was difficult to observe the child's response, information was obtained from them by providing a lot of examples related to real life situation.

4. The test administration started at a lower-age level and then proceeded to higher-age levels.

The child was given periods of rest in between sessions. The rating scale developed as a part of the checklist was used to rate the speech and language skills and the responses were scored and entered in the score sheet. The time taken to administer the tool was approximately one hour. Positive reinforcements like verbal and social reinforcements were provided to maintain the interest and motivation of the child throughout the test administration.

Data analysis: The scores of 365 typically developing children were categorized based on the age interval considered. In each age interval the total number of participants who scored "one" for a particular item was counted. The traditional criteria of 50 percent of children passing any given test item to determine its developmental age allocation along the age scale was maintained (Venkatesan, 2002a, 2002b) in development and standardization of the checklist. The lowest age group in which more than 50% of the children scored "one" for an item was noted and that particular item was retained in that age group. The same procedure was followed to standardize all the items. This was done to determine the developmental hierarchy of test items in order to arrange them in sequence of complexity.

Phase III: Assessment of Reliability

Three types of reliability checks were undertaken for the checklist.

- a. **Inter-rater reliability:** This was carried out by administering the checklist on a sub-sample of 20 typically developing Kannada speaking children in the age group of 0-3 years and another 20 typically developing Kannada speaking children in the age group of 3-6 years and subjecting them to repeat testing by two independent raters. One rater was a special educator and the other rater was a speech-language pathologist, both of whom had three years of experience in their respective fields. They were given training on administration and scoring of these checklists. These scores were compared to check for the inter-rater agreement.
- b. **Correlation between items:** The correlation between items in this checklist was estimated using the Spearman's rank correlation coefficient. This describes how much each item is correlated with the other items in the checklist.
- c. **Test-retest reliability:** The items in the checklist were re-administered on a randomly selected sub-sample of 20 typically developing Kannada speaking children from each age group (0-3 and 3-6 years) after a period of 15 days from the date of initial administration. The obtained data was compared with the initial data on the same participants.

Phase IV: Development of an Intervention Module and its Validation on Clinical Population

To carry out the validation, activities to enhance the development of the items present in the checklists were prepared. A sample of 42 participants with communication disorders [33 with hearing impairment (HI) and 9 with intellectual deficit (ID)] in the age group of 0-3 years and 43 participants with communication disorders [34 with hearing impairment (HI) and 9 with intellectual deficit (ID)] in the age group of 3-6 years were included. Their baseline was assessed following which the activities from the prepared module were given for home training. This was a field study employing a time series research design. The steps carried out as a part of the validation were as follows:

Step 1: Development of an Intervention Module and an Activity Kit: An intervention module was developed incorporating the items in the checklist and activities to facilitate the items in greater detail along with adequate pictures and illustrations. This was prepared by referring to existing curriculum such as Preschool curriculum for young hearing impaired children (Rathna, Ghate, More, & Roy, 1991), Communication DEALL Developmental checklists and intervention manual (Karanth, 2008), books by Swaminathan and Daniel (2004) and various other internet sources. This was checked for the content validity by two experienced speech-language pathologists for the relevancy and practicality of the activities. Their feedback was obtained and necessary modifications were incorporated. Simultaneously an activity kit was also developed which contained the materials necessary for training the different items on the checklist. A sample set of activities listed in the intervention module has been provided in the appendix II.

Step 2: Formulation of Baseline/Progress Chart: A progress chart incorporating all the items was prepared to assess the baseline and to monitor the rate of progress of the participants selected objectively as well as descriptively during the sensitivity assessment at periodic intervals.

Step 3: Selection of Participants: Forty two participants in the age group of 0-3 years and forty three participants in the age group of 3-6 years with HI and ID were considered for the study. These children were selected from those attending the preschool program and the Department of Clinical Services at All India Institute of Speech & Hearing, Mysore. Their parent’s education, socio economic status and other variables were controlled. All the participants were exposed to Kannada and had Kannada as their mother tongue. The details

of the participants have been depicted in the Table 2.

The children with HI had bilateral sensorineural loss and the children with ID had moderate and severe degree of retardation. They were diagnosed by an experienced team of professionals including an Audiologist, Speech-language pathologist and Clinical psychologist. Those children with HI who had associated problems such as neurological, intellectual or emotional and orofacial abnormalities etc. and those children with intellectual deficit with associated problems such as hearing/visual impairment, neurological and orofacial abnormalities were excluded from the study. All the children were from among those who had enrolled into an intervention program at the Department of clinical services. Some of the children with HI were attending speech and language therapy and listening training, each ranging for duration of 2-3 hours per week. Some of them were attending the preschool training program for a duration of 20 hours per week which included speech, language and listening therapy. Ethical procedures were used to select the participants. The parents/caregivers were explained the purpose and the procedures of the study and an informed written consent was obtained. There were 2 children with moderately severe, 59 with severe and 6 with profound hearing impairment in the HI group. Amongst the children in the ID group, there were 11 with moderate and 7 with severe intellectual deficit. All the children with HI wore bilateral behind the ear type of hearing aids for an average duration of 3 months to 4 years.

Step 4: Preparation of Demographic Data Sheet: A data sheet was prepared to elicit the demographic information of the children and their parents/caregivers.

Step 5: Baseline Assessment: The final checklist was then administered on the participants with HI and ID. The responses were rated as per the scoring pattern mentioned under standardization procedure and recorded on the baseline/progress sheet. When the participants failed on five consecutive items, the administration was terminated and this was considered as the baseline of the participant. The baseline score of the participant was converted into percentage which was called as “baseline percentage”.

$$\text{Baseline\%} = \frac{\text{Total number of items the participant passed}}{\text{Total number of items from the first item to the item in the age group corresponding to the chronological age of the participant}} \times 100$$

If the baseline percentage was below 50% then the score was considered as below average; if the baseline percentage was between 50-75% then the score was considered to be in average level and scores above 75% were considered to be

Table 2: Details of participants who were a part of the sensitivity assessment

Age group in months	Children with HI		Children with ID	
	Male	Female	Male	Female
0-3	-	-	-	-
4-6	-	-	-	-
7-9	-	-	-	1
10-12	1	-	-	-
13-15	-	2	-	-
16-18	2	3	-	1
19-21	3	1	-	-
22-24	-	1	-	-
23-27	4	2	1	-
28-30	2	3	-	1
31-33	2	2	2	-
34-36	1	4	1	2
37-42	-	1	-	1
43-48	3	-	3	-
49-54	5	6	1	-
55-60	6	7	-	-
61-66	4	2	-	-
67-72	-	-	4	-
Total	33	34	12	6
Grand total		67		18

above average level. Activities for training were given to the participants who had below average and average scores for a duration of three months.

Step 6: Training Program: Those items on which the participants obtained a score of 0 or 0.5 on the baseline assessment were given for training to each participant. The parents/caregivers were given a remediation program with a selected list of three items each under both comprehension and expression. Only six items in total were provided because they were recommended for a follow up once in two weeks. Guidelines and activities were given to them from the intervention module to maintain uniformity in the activities and techniques used for training across all the participants. The parents/caregivers were trained in carrying out the activities mentioned in the intervention module. Basic speech and language stimulation techniques such as modeling and imitation were taught to the parents/caregivers. Supporting verbal and written guidelines were provided to them on the following: 1) Items/objectives to train the subject and activities, 2) Methods/techniques to be followed while training, 3) Reinforcement strategies to be used, 4) Simple record keeping procedures to track progress and 5) Specific toys and teaching aids to be used.

Periodic counseling to maintain motivation in carrying out the activities on a regular basis was carried out for the parents/caregivers involved in the training program. They were given follow up dates on a regular basis at the rate of at least one follow up in two weeks ranging for a period of three months to discuss issues regarding the activities carried out, the day to day progress, queries, if any etc. The progress and the achievements made was recorded during every follow up along with the information on items not achieved or those that were inconsistently achieved (ongoing) for further training. Only when the participant achieved the specified number of item/objectives given in the first set (four out of six items), the second set of training objectives which included another six items was given for training. The final assessment was carried out at the end of the intervening training period of three months to assess the overall progress made.

The checklist was re-administered at the end of three months to assess the improvement in the child. The pre and post-training scores obtained for each disability and age group were averaged. These were converted into percentage

score using the formula mentioned above which was further subjected to statistical analysis using SPSS (version 10). Descriptive statistics to obtain mean and standard deviation was carried out. Wilcoxon Signed Ranks Test, a non-parametric test to examine whether there was a significant difference between the pre and post training mean scores was also carried out.

Results

A checklist to assess speech and language skills comprising of 70 items each under comprehension and expression domains was prepared for children in the age range of 0-6 years. The final list of 140 items was finalized from a pool of 175 items following the content validation and pilot study and was divided into XVIII levels. This was done using the procedure for standardization as mentioned in the method. The statistical measures adopted for establishing instrument goodness in this study were reliability and sensitivity checks for the checklist. The inter-rater reliability was high between the two raters i.e., Cronbach's alpha value was 0.88 for the 0-3 age group and 0.95 for the 3-6 age group. With regard to correlation between items, the Spearman correlation obtained was 0.30 for the 0-3 year age group and p was 0.03 and for the 3-6 year age group, the Spearman correlation obtained was 0.46 and p was 0.02. Generally $p < 0.05$ indicates a significant correlation between the items. These findings indicate high correlation and confirm the homogeneity of the test item pool and the hierarchy of the developmental age allocations made for items included in the checklist. The results of test retest reliability indicated that the average between the initial and the second administration was highly correlated. The Cronbach's alpha value for all the items on this checklist within the same sample was found to be 0.90 ($p < 0.05$) for the 0-3 age group and 0.83 ($p < 0.05$) for the 3-6 age group.

Based on the items in the checklist, an intervention module was prepared incorporating activities to facilitate each item. This intervention module was then administered on the participants with hearing impairment and intellectual disability and the results with regard to the sensitivity assessment has been presented under the different heads below:

I. Participants with hearing impairment: The speech

Table 3: Pre and post-training mean percentages and Standard Deviation (SD) in children with hearing impairment in the 0-3 year age group (N indicates the number of children)

Age group in months	N	Mean & SD	Comprehension		Expression	
			Pre-training %	Post- training %	Pre-training %	Post- training %
10-12	1	-	31.82	50.00	18.18	36.36
13-15	2	Mean	9.45	18.59	8.93	24.58
		SD	3.27	11.14	12.63	5.65
16-18	5	Mean	16.47	28.24	18.82	25.29
		SD	24.48	23.95	17.35	17.84
19-21	4	Mean	16.48	24.43	20.45	28.41
		SD	8.58	11.19	8.70	10.08
22-24	1	-	53.70	64.81	66.67	77.78
25-27	6	Mean	38.71	45.83	30.38	37.08
		SD	20.59	22.43	21.13	21.18
28-30	5	Mean	45.95	52.72	40.55	48.99
		SD	24.98	28.05	18.63	19.53
31-33	3	Mean	23.41	28.97	31.55	37.50
		SD	14.69	15.07	22.60	21.77
34-36	5	Mean	38.88	46.22	30.44	40.22
		SD	13.40	12.44	10.23	12.33
Total	32	Mean	30.61	38.98	28.55	37.03
		SD	21.02	21.53	18.56	18.65

Table 4: Pre and post-training mean percentages and Standard Deviation (SD) in children with hearing impairment in the 3-6 year age group (N indicates the number of children)

Age group in years	N	Mean & SD	Comprehension		Expression	
			Pre-training %	Post- training %	Pre-training %	Post- training %
3.1-3.6	1	-	24.14	34.48	27.58	34.48
3.7-4.0	3	Mean	45.9	51.72	25.2	31.03
		SD	7.17	9.12	17.00	18.24
4.1-4.6	11	Mean	41.37	50.15	63.9	71.17
		SD	17.3	16.12	17.36	0.00
4.7-5.0	13	Mean	41.37	49.33	29.17	35.80
		SD	21.7	20.7	17.47	14.53
5.1-5.6	6	Mean	24.4	42.52	27.0	35.05
		SD	9.25	7.76	5.93	7.98
Total	34	Mean	40.06	48.17	28.39	34.37
		SD	17.23	16.22	13.50	13.31

and language checklist consisted of items under comprehension and expression. The checklist was administered on 33 participants with HI in the 0-3 year age group and 34 participants in the 3-6 year age group to check the baseline as a part of the sensitivity assessment of the module. Among the participants in the 0-3 year age group, 24 participants had below average (<50%) speech-language scores, 8 participants had average scores (50-75%) and one child had above average scores in comprehension. Accordingly items from 'comprehension' and 'expression' from the checklist based on their baseline along with the activities from the module were selected and given to the parents/caregivers of 32 participants for training.

Post-training scores were obtained by re-administering the checklist. Table 3 shows the mean and standard devi-

ation for the comprehension and expression subskill for the participants in the 0-3 year age group. In the first age group depicted in the tables 3 & 4, only one child participated and the mean and standard deviation could not be calculated. The results revealed that the post-training mean percentage score was greater than the pre-training mean in all the age groups for both comprehension and expression. The pre-training mean percentage score of the group for comprehension was 30.61 which increased to 38.98 after training for 3 months. The pre-training mean percentage score of the group for expression was 28.55 which increased to 37.03. Wilcoxon Signed Ranks Test revealed that the difference between pre-training and post-training mean percentage score for comprehension ($Z= 4.94, p<0.05$) and expression ($Z= 5.01, p<0.05$) was significant.

Similarly among participants in the 3-6 age group, 25 of them had below average (<50%) scores in comprehension and 9 had average scores (50-75%). 32 participants had below average (<50%) expression scores and 2 participants had average scores (50-75%). Hence items for comprehension and expression along with the activities were given to the parents/caregivers of 34 participants.

The post-training scores were obtained by re-administering the checklist. Table 4 depicts the mean and the standard deviation with respect to the comprehension and expression sub skills respectively. The results revealed that the post-training mean percentage score was greater than the pre-training mean percentage score for all the age groups. The pre-training mean percentage score of the group for comprehension was 40.06 which increased to 48.17 and the pre-training mean percentage score for expression which was 28.39 improved to 38.37. The mean values were subjected to Wilcoxon Signed Ranks Test which revealed that the difference between pre-training and post-training mean percentage scores for comprehension ($Z= 5.20$, $p<0.00$) and expression ($Z=5.08$, $p<0.00$) were significant.

II. Participants with intellectual deficit: The checklist was administered on 9 participants with ID to assess the baseline as a part of the sensitivity assessment of the module. Among them all the 9 participants had below average comprehension and expression scores. For a few age groups, since the number of participants was only one, the mean and standard deviation could not be calculated (tables 5 & 6). Therefore, items and corresponding activities were given to the parents/caregivers of all the participants. Post-training scores were obtained by re-administering the checklist. Table 5 depicts the mean and standard deviation with respect to the comprehension and expression. On comparison of the data, the results revealed that the post-training mean percentage score of comprehension and expression of these participants were greater than the pre-training percentage score. The mean percentage score of the group for comprehension was 12.78 (pre-training) which increased to 22.16

(post-training). The mean percentage score of the group for expression was 24.71 (pre-training) which increased to 30.99 (post-training). Wilcoxon Signed Ranks Test revealed that the difference between pre-training and post-training mean were significant for both comprehension ($Z=2.37$, $p<0.005$) and expression ($Z= 2.67$, $p<0.005$).

In a similar manner, in the 3-6 years age group, the checklist was administered on 9 participants with ID to assess the baseline. Among them all 9 participants had below average scores in comprehension and expression. Therefore items and activities were given to the parents/caregivers of all the participants. Post-training scores were obtained by re-administering the checklist. Table 6 depicts the mean and the standard deviation. A comparison of the data revealed that there was an increase in the post-training percentage score of comprehension and expression of these participants when compared to the pre-training scores. The mean percentage score of the group for comprehension was 37.54 (pre-training) which increased to 43.67 (post-training). The mean percentage score of the group for expression was 24.52 (pre-training) which increased to 30.65 (post-training).

Wilcoxon Signed Ranks Test revealed that the difference between pre-training and post-training mean were significant for both comprehension and expression sub skills ($Z=2.72$, $p<0.005$, $Z= 2.70$, $p<0.005$).

A comparison of these scores in both the age groups revealed that the children with HI made greater gains during the three month training period in both comprehension and expression skills. There is almost an eight point jump from pre to post in the group with HI, while there is only a six point jump in children with ID. The younger age group of children with ID however demonstrated greater gains than the younger HI group.

III. Comparison between children with HI and ID: The pre and post training mean percentage scores for the HI and ID groups for both comprehension and expression have been depicted in table 7.

Table 5: Pre and post-training mean percentages and Standard Deviation (SD) in children with intellectual deficit (N indicates the number of children)

Age group in years	N	Mean & SD	Comprehension		Expression	
			Pre-training %	Post- training %	Pre-training %	Post- training %
3.1-3.6	1	-	48.27	58.62	44.82	55.17
3.7-4.0	3	Mean	24.13	31.03	11.49	17.24
		SD	26.03	22.61	7.96	5.97
4.1-4.6	1	-	24.13	27.58	20.68	24.13
5.7-6.0	4	Mean	48.27	53.44	30.17	36.20
		SD	15.67	17.46	18.32	20.78
Total	9	Mean	37.54	43.67	24.52	30.65
		SD	20.57	20.25	16.57	18.28

Table 6: Pre and post training mean percentage scores for the HI and ID groups for both comprehension and expression

Age group	Mean Scores	Children with HI		Children with ID	
		Comprehension	Expression	Comprehension	Expression
0-3 years	Pre training mean percentage	30.61	28.55	12.78	24.71
	Post training mean percentage	38.98	37.03	22.16	30.99
3-6 years	Pre training mean percentage	40.06	28.39	37.54	24.52
	Post training mean percentage	48.17	38.37	43.63	30.65

Table 7: Pre and post-training mean percentages and Standard Deviation (SD) in children with intellectual deficit (N indicates the number of children)

Age group in months	N	Mean & SD	Comprehension		Expression	
			Pre-training %	Post- training %	Pre-training %	Post- training %
7-9	1	-	0.00	25.00	0.00	20.00
16-18	1	-	11.36	25.00	31.81	45.45
25-27	1	-	6.25	9.37	31.25	34.37
28-30	1	-	5.26	13.15	15.78	19.73
31-33	2	Mean	24.40	35.71	28.57	44.04
		SD	0.84	6.73	0.72	5.71
34-36	3	Mean	14.4	18.51	21.85	24.44
		SD	4.84	4.62	4.20	3.84
Total	9	Mean	12.78	22.16	24.71	30.99
		SD	8.59	9.72	6.42	10.61

Discussion

The speech-language skill plays an important role in the communication with other fellow human beings. It helps the individual to function socially and enhances the development in other domains such as cognition, socio-emotional, reading and writing. The intervention module which comprised of an assessment checklist and activities for speech and language skill developed as a part of this study incorporates items and activities at different levels such as phonology, semantics, morphology, syntax and pragmatics and also includes items to assess and facilitate articulation skills. It incorporates these items in a hierarchical manner in the order of development in the typically developing children. The cronbach’s alpha values obtained were also high indicating a good reliability.

In children with hearing impairment as a result of auditory deprivation, the development of speech and language skill is affected. The children may exhibit problems in the acquisition of phonology, semantics, morphology, syntax and pragmatics. Hence it is important to identify the speech and language problems in them and initiate training in these skills at the earliest.

All the children with hearing impairment selected in this study were initially assessed for their current functioning level (baseline) using the assessment checklist. The results revealed that all children had deficits in the comprehension and expression skills in addition to articulation problems except one child in the 0-3 age group who only had a delay in expressive skills and had age appropriate comprehension abilities. This could be consequent to the early intervention that had been initiated for him by his parents. The parents/caregivers of the remaining children were provided with suitable activities from the intervention module according to their baseline levels for a duration of three months to improve comprehension and expression. All the children with hearing impairment selected for training in this skill showed significant improvements in comprehension and expression which indicated that they responded positively to the activities mentioned in the intervention module. This indicated a good clinical validity for the tool developed. The parents/caregivers reported that their children showed greater involvement while carrying out the activities and learnt the concepts at a faster rate. They also stated that the day to day recording of the responses of their children helped them track their progress and work systematically with them. The parents/caregivers also were very cooperative in learning the activities and systematic in executing the activities recommended as a part of the module.

In general, it was observed that some of the children were quick in learning the items and covered more number of them during the training period, while some others were a little slow. On an average the children who were fast learners, were able to learn and complete as many as 10 items in three months time, while the others completed upto 6 items. This could be due to the individual differences in the children, differences with respect to the other domains, abilities of the parents/caregivers in understanding and executing the activities on their children, differences in the severity of the hearing impairment and working status of the hearing aid (two children were without amplification for a duration of two weeks during the intervention program since their hearing aids were under repair).

All the children with intellectual deficit selected in this study had difficulties with speech and language skills. They did not have age adequate speech and language abilities which were reflected by the poor scores obtained on the checklist. The parents/caregivers were provided with suitable activities for their children according to their baseline levels for a duration of three months to improve comprehension and expression. All the children selected for training in this skill showed significant improvements in comprehension and expression which indicated that they responded positively to the activities mentioned in the intervention module. These parents/caregivers were also cooperative in learning the activities and systematic in executing the activities recommended as a part of the module.

When the pre and post training percentage scores of children with HI and ID were compared, it was seen that the children with HI made greater gains during the three month training period in both comprehension and expression skills. There was almost an eight point jump from pre to post in the group with HI, while there was only a six point jump in children with ID. This indicated that both the groups showed progress, however the children with ID were slower than the children with hearing impairment in learning the items. The younger age group of children with ID however demonstrated greater gains than the younger HI group. This could be attributed to the severity of ID of the children and the early intervention initiated in the age group. Amongst the nine children in the younger age group, 7 of them had moderate degree of intellectual deficit, while only 2 had a severe level of deficit and 5 children had already undertaken the intervention program for a duration of 6 months.

It was also observed that within both groups there were children who were fast learners and others who were slow. The fast learners completed upto 7 items in three months time, while the others completed around 4 items on an average. This could be due to the individual differences in

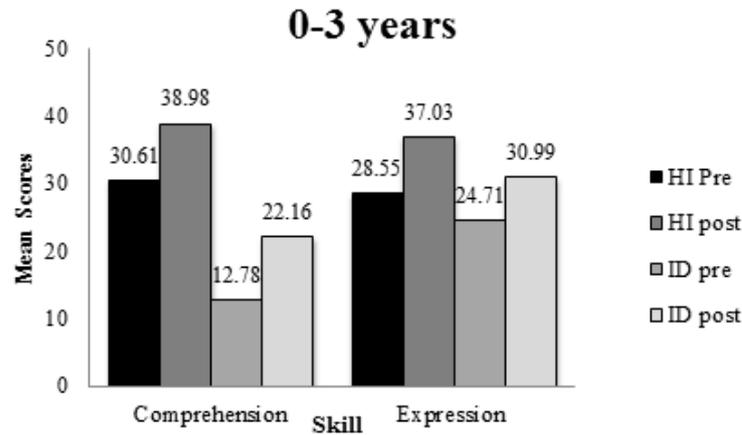


Figure 1: Pre and post training mean percentages of 0-3 year old participants of the HI and ID group in comprehension and expression skill.

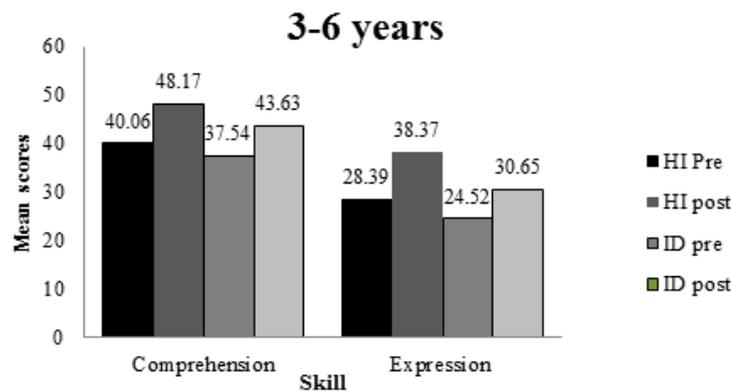


Figure 2: Pre and post training mean percentages of 3-6 year old participants of the HI and ID group in comprehension and expression skill.

the children, differences with respect to the other domains, abilities of the parents/caregivers in understanding and executing the activities on their children and differences in the severity of the impairment.

Conclusion

The children with communication problems face great difficulty in acquiring speech and language and other related skills without extra support from both parents/caregivers as well as professionals. In order to develop their potential, these children with special needs require support services beyond those that are considered sufficient for the development of their same age peers. They benefit maximally if the problem is identified early and rehabilitation is instituted right from preschool age. In an attempt to achieve this in a systematic manner, it was planned to develop an intervention module to train speech and language skills with an assessment checklist and culturally appropriate activities. The checklist was prepared and finalized by establishing various measures of validity and reliability. This was then administered to 365 typically developing children in the age group of 0 years to 6 years for standardizing the checklist. This checklist was also administered on children with hearing impairment and intellectual deficit. An intervention module was prepared with activities for each item in the checklist. Following the baseline assessment and based on the responses of the participants to the items on the checklist, specific items and activities were provided to the parents/caregivers

as home training program with specific instructions on regular and systematic documentation of responses. They were followed up periodically. The post training scores were compared with the pretraining scores which revealed statistically significant improvement in the scores in both the groups of children.

In sum, it can be concluded that the checklist that assesses the development of speech and language skills in preschool children was useful in identifying the baseline levels and the activities in the intervention module for speech and language skills were effective in training the children with hearing impairment and intellectual deficit, since there was a significant improvement in their speech and language level. Thus it is a valid and reliable tool in identifying and training the speech language deficits in children with hearing impairment and intellectual deficit. The checklist also provides an easy and accurate measurement of the progress in children over a period of time; more specifically helps in easy comparison of pre and post therapy results. The intervention module also enables easy selection of goals and facilitates planning of a treatment program by parents and professionals as it provides user friendly and simple activities which will bring about a positive change in the child. However, the results should be generalized with caution, since there are a few limitations of the study. One of the limitations of the study is that a control group was not considered for the sensitivity assessment. The investigators of the present study do realize that the sample size, especially in the group of children with intellectual deficit, is small and that the children are not distributed equally in the different

age groups considered. This could be one of the reasons for the high standard deviation seen in some age groups. Moreover, there are several extraneous variables that could have influenced the results of the study such as the effect of development, other treatments taken by the children parallelly, hours of treatment per week etc. This is only a preliminary attempt to assess the sensitivity of this module. Future investigations can use a more concrete group study design and take these variables into consideration. Further work can also include the validation of the module on children with other communication disorders and undertake the translation of the intervention module in different Indian languages so that it can be accessed and used all over the country by different sections of people.

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APPENDIX I

ASSESSMENT CHECKLIST FOR SPEECH-LANGUAGE SKILL

Instructions: Rate speech and language skills of the child for each of the items based on the scoring pattern given.

Scoring: 0-Not applicable/absent; 0.5-Totally dependent/physical/verbal prompt, 1-Consistent and independent

Level & age group in years	Item Code	Item (Comprehension)	Item Code	Item (Expression)
I 0-0.3	C-1	Regards speakers' face and shows interest in the process of talking	E-1	Cries to indicate discomfort/pain/hunger
	C-2	Looks about in search of the speaker	E-2	Vocalizes and uses some intonation patterns
II 0.4-0.6	C-3	Stops crying when someone talks to him/her	E-3	Plays by making sounds and noises (cooing)
	C-4	Regularly localizes source of voice with accuracy	E-4	Vocalizes in response to others' speech
III 0.7-0.9	C-5	Frequently appears to listen to whole conversations between others	E-5	Utters series of syllables (babbling) and longer vocalizations with varied intonation patterns
	C-6	Responds to pitch and loudness changes in voice of others (distinguishes emotions)	E-6	Mimics the sounds and syllables used by others (repetitive & variegated babbling)
	C-7	Responds to name call	E-7	Often uses jargon (short sentence like utterances of four or more syllables without true words)
IV 1.0-1.0	C-8	Recognizes family members (parents)	E-8	Mimes/vocalizes when an action is named, e.g. how does a car go?
	C-9	Gives or points to objects when named	E-9	Utters at least a word meaningfully, generally 'amma' to indicate mother
	C-10	Understands denial (responds to the word 'no')	E-10	Says 'finished' to signify completion of action
V 1.1-1.3	C-11	Points to body parts when named	E-11	Asks for objects by saying give or naming the object
	C-12	Comprehends many words (nouns such as common objects, animals, and vehicles)	E-12	Imitates sounds of animals or vehicles, e.g., 'bow bow - dog', 'meow - cat', 'drrrrr - car' etc.
	C-13	Comprehends simple instructions, e.g., "Bring the plate", "Point to your eyes" etc.	E-13	Begins naming objects, animals etc. using some true words along with gestures
VI 1.4-1.6	C-14	Comprehends simple 'what' and 'whose' questions, e.g., "What is this?", "Whose shirt is this?" etc.	E-14	Begins repeating words overheard in conversation, has an expressive vocabulary of 20-30 words
	C-15	Comprehends simple, 'who' and 'where' questions, e.g., "Who is this?", "Where is the ball?" etc.	E-15	Utters sounds like /m/, /w/, /b/, /p/, /t/, and /d/ consistently; speech is 25% intelligible
	C-16	Carries out two consecutive directions with any object, e.g., "Take the ball and roll it" etc.	E-16	Begins to use 1-2 word utterances and requests for actions, e.g., 'Papa come', 'Mama give' etc.

VII 1.7-1.9	C-17	Selects an item from a group of five or more varied items	E-17	Rejects and protests, if not satisfied with others' decision or opinion, ('don't want', 'no')
	C-18	Understands around fifty words (other nouns such as fruits, household materials, birds, food items etc.)	E-18	Uses question markers (what & where) and thereby requests for information
	C-19	Points to action verbs in pictures, e.g., eating, running etc.	E-19	Uses possessives, e.g., daddy's, mummy's etc.
	C-20	Remembers and associates new words by categories, e.g., cake-food, lion-animal, etc.	E-20	Greet others by saying 'hello' or 'hi' on request
VIII 1.10-2.0	C-21	Detects simple rhymes (responds by action, if a familiar rhyme is heard)	E-21	Says his/her name
	C-22	Comprehends pronouns (I, mine, you, this, that)	E-22	Has expressive vocabulary of minimum 30-50 words
	C-23	Comprehends questions concerning habitual behavior of named agents, e.g., "What does mummy cook?" etc.	E-23	Imitates/verbalizes 2 or 3 word sentences, e.g., "Mama give bikki" etc.
	C-24	Comprehends complex verbal sentences, e.g., "When we get to the stores, I'll buy you an ice cream" etc.	E-24	Utters more sounds like /n/, /h/, /k/, /g/; speech is 25-50% intelligible
IX 2.1-2.3	C-25	Understands more number of words (nouns such as clothes, vegetables, flowers, stationary items etc.)	E-25	Asks for help with some personal needs such as washing hands, going to toilet etc.
	C-26	Recognizes other pronouns (he, she, him, her and they)	E-26	Uses pronouns and possessives (I, my, you, me, mine, this, that)
	C-27	Recognizes possessives (his, her, and your)	E-27	Initiates topic for conversation and takes one or two turns with a topic
	C-28	Understands size differences, e.g., big vs. small	E-28	Uses past, present and future tense appropriately to describe events
X 2.4-2.6	C-29	Understands the meaning of kinship terms such as 'grandma', 'uncle', 'aunty' etc.	E-29	Uses negatives (not, won't and can't), e.g., "The ball is not there", "I won't do", "I can't do" etc.
	C-30	Identifies objects by use, e.g., "What do you cut with?" etc.	E-30	Modifies speech in relation to social situations, e.g., talking to dolls, young children etc.
	C-31	Comprehends prepositions, e.g., in, on, out, under, in front and behind	E-31	Produces a yes-no question by adding a rising intonation to the end of a sentence, e.g., "You took ball?" etc.
	C-32	Recognizes common adjectives and adverbs, e.g., fat, thin, short, tall, dry, wet, slow, fast, etc.	E-32	Uses some verbs, prepositions, adjectives and adverbs
	C-33	Comprehends 'how' questions, e.g., "How is the chocolate?" etc.	E-33	Uses pronouns and possessives (he, she, him, his, her, they, we and your)
XI 2.7-2.9	C-34	Comprehends 'why' questions, e.g., "Why are you crying?" etc.	E-34	Uses correct gender forms and kinship terms such as 'grandma', 'uncle', 'aunty' etc.
	C-35	Comprehends descriptive statements about objects	E-35	Expresses in 3-4 word sentences and maintains topic beyond several turns during conversation
	C-36	Comprehends 'how many' questions, e.g., "How many flowers are there?" etc.	E-36	Asks simple 'why' questions using verbs, e.g., "Why are you crying?" etc.
	C-37	Comprehends sequentially related events and situations	E-37	Utters sounds such as /t/, /d/, /f/, /s/, /j/, /l/, /ng/; speech is 60-75% intelligible

XII 2.10-3.0	C-38	Comprehends two step verbal commands e.g., “Switch on the light and close the door” etc.	E-38	Have the ability to comment on own utterances and those of others (disagreeing, correcting, arguing etc.)
	C-39	Comprehends questions related to imaginary situations, e.g., “What will you do if it rains when we go out?” etc.	E-39	Uses complex sentence construction incorporating if-then, e.g., “If you pick up these toys on the floor, then you will get a reward” etc.
	C-40	Comprehends descriptive statements about individuals	E-40	Uses conjunctions ‘and’, e.g., “Papa and I went to the hospital” etc.
XIII 3.0-3.6	C-41	Shows gradual increase in the number of words understood in all categories including nouns, verbs, adjectives and adverbs	E-41	Shows gradual increase in the number of words expressed in all categories including nouns, verbs, adjectives and adverbs
	C-42	Comprehends pronouns such as them, us etc. e.g., Ravi played with <u>them</u> , Who is sitting with <u>us</u> ?	E-42	Sings or recites nursery rhymes along with the corresponding actions/movements, e.g., twinkle, twinkle-----
	C-43	Comprehends possessives such as its, our(s), their(s) e.g., This is <u>our</u> umbrella, It is <u>their</u> puppy etc.	E-43	Attempts to tell stories (recalls or sequences 3 or 4 events of a familiar story)
	C-44	Comprehends quantitative adjectives such as few/some, something, many/much, another, little/no, all, how far, any, enough/ sufficient, e.g., I want <u>another</u> balloon, I want <u>some</u> water, He has <u>enough</u> rice, <u>How far</u> is your house from the school? etc.	E-44	Describes objects, events (e.g., visit to the zoo, park etc.), 2-3 related actions (e.g., painting a picture, carrying out a household work etc.) in 4- word sentences
	C-45	Comprehends syntagmatic relations, e.g., fish-swims; bird – flies; night-moon; day-sun, elephant- big , mouse- small etc.	E-45	Uses present and past forms of the modal verbs such as can/could, will/would, may/might, must, etc., e.g., I <u>can</u> dance, I <u>will</u> eat chocolate, It <u>may</u> rain today?, You <u>must</u> go etc.
	C-46	Comprehends more prepositions such as ‘to the side of / next to / beside’, ahead of, ‘between’, around, across etc., e.g., Her house is <u>next to</u> my house, She is sitting <u>between</u> the two tables etc.	E-46	Uses he-remote/proximate or she-remote / proximate, e.g., this boy or that boy and also uses other pronouns and possessives such as them, us, its, our(s), their(s), your(s) e.g., Take <u>us</u> to the pond, He is taking <u>them</u> in his car, <u>It is their</u> car, Those books are <u>ours</u> , <u>Your</u> dress is pretty etc.
	C-47	Comprehends conjunctions such as but, or, because, when, so in most contexts, e.g., Show me the pen, <u>but</u> not the pencil, Show me the pen <u>or</u> pencil, The boy fell down <u>because</u> the cow hit him, <u>When</u> it rains she uses the umbrella, The boy hit her <u>so</u> she is crying etc.	E-47	Uses question markers such as how much/many, which and questions with a tag, e.g., How many flowers are there?, Which is big?, He is cute, isn’t he?, Is this yours?
	C-48	Understands and detects semantic anomaly, e.g., Fire is cold, Sun is seen in the night, Sugar is salty in taste etc.	E-48	Uses polite/indirect language form of requests, e.g., please, or thank others, “Would you please give me the book?” etc.
	C-49	Comprehends three and four step commands, e.g., come here, take this book, give it to your sister; go to the kitchen, fill a glass of water, switch off the light and bring it to me etc.	E-49	Uses repair strategies such as self correction, rephrasing, etc. e.g., While narrating an event, if the child makes mistake, s/he say ‘no’ and then corrects himself /herself, rephrases if the listener fails to understand

<p>XIII 3.0-3.6</p>	C-50	Comprehends case markers (prepositional phrases) containing with, to, at, from, for, over, through, of, like, etc. e.g., The dog is <u>with</u> her, I am going <u>to</u> the park, He is standing <u>at</u> the gate, He jumped <u>from</u> the wall, I am going <u>for</u> a walk, I jumped <u>over</u> the wall, He pushed the stick <u>through</u> the table, The chair is made <u>of</u> wood, The flower is <u>like</u> the sun, etc.	E-50	Uses conjunctions in sentences such as but, or & because and case markers containing with, to, at, from, next to, for, over, through, of, like etc. in sentences. e.g., I went home <u>because</u> I was not well, He likes chocolates <u>but</u> not ice cream, You can go to play <u>or</u> read, The dog is <u>with</u> her, I am going <u>to</u> the park, He is standing <u>at</u> the gate, He jumped <u>from</u> the wall, his house is <u>next to</u> the school, I am going <u>for</u> a walk, I jumped <u>over</u> the wall, He pushed the stick <u>through</u> the table, The chair is made <u>of</u> wood, The flower is <u>like</u> the sun, etc.
	C-51	Comprehends questions related to daily routine activities, e.g., What did you do in the morning? etc.	E-51	Utters sounds such as /n/, /l/, /v/, /tS/, /dz/, /s/, /j/, and blends such as nt, nt, nd, nk, e.g., <u>kannu</u> (kannada), Kalla (Kannada), <u>van</u> , <u>chair</u> , judge, <u>ship</u> , <u>shale</u> , etc.
<p>XIV 3.7-4.0</p>	C-52	Comprehends singular/plural contrasts for nouns, e.g., Give me <u>a pencil</u> , give me <u>pencils</u> etc.	E-52	Speaks in sentences of five or more words. e.g., My school is near his house, I went to the market with my mother etc.
	C-53	Comprehends demonstrative nouns such as these, those, e.g., <u>These</u> are pencils, <u>Those</u> are pencils etc.	E-53	Uses plural forms in sentences, e.g., The girl <u>is</u> playing, The girls <u>are</u> playing etc.
	C-54	Understands PNG (person, number and gender) markers, e.g., The cat <u>is</u> /cats are sleeping, He <u>is</u> / they are sleeping, Mother <u>is</u> sleeping, This <u>is</u> my glass, These <u>are</u> my glasses etc.	E-54	Expresses different subordinating conjunctions such as when, then, while & so, e.g., It was raining, <u>so</u> we did not go out, We take medicine <u>when</u> we get fever”, He dropped him and <u>then</u> went home etc.
	C-55	Understands causatives, e.g., The girl <u>is made to</u> brush her teeth. , The baby <u>was made to</u> drink milk etc	E-55	Uses causatives, e.g., The girl is made to brush her teeth, The child is made to take bath, the child is made to take bath, he is made to eat his food etc.
	C-56	Understands and identifies primary and secondary colors	E-56	Utters sounds /z/, /r/ and few blends such as bl, kr, dr, pr, ks, br, sk, tr, rtS etc.E.g., zip, river, blade, cry, dress, press, kicks, break, school, tree, church etc.
	C-57	Identifies basic shapes such as square, circle and triangle	E-57	Names all colors and shapes (circle- round; square-box) etc
<p>XV 4.1-4.6</p>	C-58	Understands reflexive pronouns such as myself, themselves, yourself, himself, herself, itself, e.g., he brushed his teeth <u>himself</u> , She took bath <u>herself</u> .	E-58	Describes short stories in simple and compound sentences
	C-59	Understands quotatives, e.g., <u>he said</u> “She took her home”, <u>mother said</u> “take the pencil” etc.	E-59	Expresses demonstrative nouns such as these and those e.g., <u>These</u> are my books; <u>Those</u> are my brother’s books etc.
	C-60	Knows common antonyms (opposites), e.g., big x small, hard x soft, heavy x light etc.	E-60	Uses PNG (person, number and gender) markers, e.g., The cat <u>is</u> /cats are sleeping, He <u>is</u> / they are sleeping, mother <u>is</u> sleeping , This <u>is</u> my glass, these <u>are</u> my glasses etc.

XV 4.1-4.6	C-61	Understands conditional clauses (if, unless), e.g., <u>If</u> there is picture of fan in this page, clap your hands, <u>Unless</u> I call your name you should not touch the picture	E-61	Speaks of imaginary conditions such as such as “I hope, I feel.....”e.g., I hope it rains, I feel that she will come to play with me, etc.
	C-62	Comprehends long stories when told or read and retells it and can answer content related questions based on the story	E-62	Asks for clarification/asks for explanation, repetition etc. E.g., In a conversation with the mother or when a specific request is made if the child doesn’t understand, s/he ask for repetition or explanation.
	C-63	Processes longer and more complex language structures, e.g., “Can you find something that lives in a tree, has feathers and a yellow crest” etc.	E-63	Adds new information such as elaborating in a conversation with 2-3 people, (e.g. If the mother gives a brief account of an event to another known person, which is also familiar to the child, s/he try to add new information or elaborate, which the mother has not provided)
XVI 4.7-5.0	C-64	Understands synonyms (meanings), e.g., shut–close, sad-grief etc.	E-64	Expresses antonyms (opposites), e.g., cry x laugh; half x full, brother is a boy, sister is a -----, etc. and synonyms, (words which are similar in meaning), e.g., shut–close, sad-grief etc.
	C-65	Understands small paragraphs	E-65	Expresses reflexive pronouns such as myself, themselves, yourself, himself, herself, itself, e.g., He is taking the basket <u>himself</u> , The machine started <u>itself</u> etc.
XVII 5.1-5.6	C-66	Understands jokes	E-66	Expresses conditional clauses such as if, unless, e.g., He can’t get in to the train <u>unless</u> it stops, <u>If</u> the train moves, the goat will die etc.
	C-67	Understands spatial and temporal concepts, e.g., before/after, whole/half etc., e.g., She had <u>half</u> an apple, The rabbit went <u>before</u> the tortoise etc.	E-67	Speaks in sentences/clauses of 8 or more words in length using since, in order that, as soon as, until, even though, although, before, after etc. e.g., Come and see me <u>as soon as</u> the work is finished, Don’t come <u>until</u> you finish eating, the baby ate the cookie <u>before</u> I could put it on the table, let’s go to the store <u>after</u> we eat etc.
	C-68	Understands passive sentences, e.g., The rat was killed by the cat etc.	E-68	Utters a few blends such as ks.a, skr, st, str, s, t etc. Speech is 100% intelligible.
XVIII 5.7-6.0	C-69	Understands the concepts of left and right	E-69	Uses quotatives, e.g., He said “she took her home”, He asked “will you go in an auto or a bus”, Mother is asking “You seem to have fever”, “Will you take the medicine? etc.
	C-70	Understands time concepts such as today/ tomorrow/yesterday, for a long time, for years, a whole week, in the meantime, sooner-later, two things at once etc.), e.g., What is the day tomorrow? Yesterday did you go to school? etc.	E-70	Expresses hints that do not mention the intention in the request, e.g., those smell good” etc.

Note: C- Comprehension, E- Expression

APPENDIX II

ACTIVITIES TO ENHANCE SPEECH & LANGUAGE DOMAIN

Level I: 0-3 Months

Comprehension**Item code:-** C-1**Objective:-** To develop the ability to regard speakers face and show interest in the process of talking**Materials required:-** Colorful objects /toys, clean white sock, permanent felt-tip markers.**Activities:-**

1. Place the child in a comfortable position. Be seated in the line of vision of the child. Talk to the child in a pleasant voice, in different tones, whisper or sing songs of different rhythm/speed. Look at the child as you perform these activities.
2. Hold a colorful object/toy near the child to get his attention. Once he looks at it, hold it near your face as you speak to the child. Pleasant sounding noise makers also can be used to draw attention to your face. Hold them near your face and talk to the child. Once the child is looking at you, gradually take away the toy while you continue to talk with the child.
3. Buy a pair of white socks, large enough to fit over your hands. Use permanent felt-tip markers to draw eyes, eyebrows, noses, and ears on the socks' toes. Outline the heels to create mouths and draw red tongues inside the folds. Place the child in your lap or on a mattress. Slip one puppet onto your hand and entertain the child with songs, rhymes, or simple conversation. Slip the second puppet onto your other hand for two-handed fun.

Expression**Item code:-** E-1**Objective:-** To develop the ability to indicate discomfort/pain/hunger**Materials required:-** None.**Activities:-**

1. Use natural situations to make the child indicate his needs. During mealtimes, when the child is hungry, do not initiate to feed the child. Wait to see if the child cries for food. If he does cry, attend to the child and talk to the child. Say "Good, you did cry to show your hunger; you can also tell that you are hungry". If the child does not indicate, even after you wait after the meal time, then go the child and ask "Are you not hungry, do you want to eat something?" as you point to his stomach. Show his favourite foods as you talk to him.
2. In a similar manner, carry out the same, when the child is wet or uncomfortable. Rather than checking your child to see if he is wet, let your child initiate the communication. As soon as your baby cries, attend to him and talk to the child saying "Are you wet?, shall I change your nappy?". When the child responds, acknowledge him by praising him.
3. Talk and play with the child for some time. Then switch off the light for some duration in the night or darken the room during the day and stop talking to the child. Wait for the child to cry and then switch on the light. Appreciate the child's vocalization attempts by encouraging him.