

**FIELD TESTING OF THE QUESTIONNAIRE ON ASSESSMENT OF CHILDREN'S
SPEECH BY PARAENTS.**

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MAY 1991

DEDICATED TO
MY
GRAND PARENTS

CERTIFICATE

This is to certify that the Independent Project entitled “Field Testing of the Questionnaire on Assessment of Children’s Speech by Parents” is the bonafied work on part fulfillment for the Degree of Master of Science (Speech and Hearing) of the student with Register No. M 9011.

Mysore
1992

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CERTIFICATE

This is to certify that the Independent Project entitled “Field Testing of the Questionnaire on Assessment of Children’s Speech by Parents” has been prepared under my supervision and guidance.

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GUIDE.

DECLARATION

I hereby declare that this Independent Project entitled “Field Testing of the Questionnaire on Assessment of Children’s Speech by Parents” is the result of my own study under the guidance of Dr. S. Nikam, Professor and Head of the Department of Audiology, All India Institute of Speech and Hearing, Mysore has not submitted earlier to any university for any other Diploma or Degree.

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INTRODUCTION

Speech is unique to man. Its presence has made all the difference between man and the lower beings. Poor speech development may not only hamper effective communication but also the overall development of the individual. Among the many variables affecting speech development, hearing level is perhaps the most important (Ling, 1976).

In the past two to three decade several different assessment procedures in the area of communication problems for children have been developed and standardized. Though standardized test could ensure objectivity, reliability and validity it had some serious limitations too.

The clinical practice revealed that clinicians did not get the complete clinical picture of the child for monitoring development from administration of tests, parental interviews and observations. Hence, the need arose to include programmes. This has been found to yield valid and reliable information about a child's communication status.

NEED FOR THE STUDY:

Clinicians who lead hearing impaired children through the rehabilitation programme have to carry out a very comprehensive and descriptive assessment procedure. This enables them to plan and administer an individually based therapy programme.

During the assessment procedure some of the factors may prevent the clinician from acquiring data for monitoring development. Firstly, the reluctance of the children to exhibit their typical communication behaviour in the presence of strangers. Secondly the fact those in some programmes clinicians are able to observe the children only during infrequent and short intervals. To avoid such problems parental reporting has been included in the rehabilitation programme.

In working with parents it has become apparent that some are able to accurately describe their children's speech and language skills, while others are less able to do so. Yet it is necessary to rely heavily on the parents to obtain information about the child's communication status (Roman, 1980).

Parental reports have been found to be beneficial in the following instances:

- 1) When information could not be obtained by testing the child in one sitting due to physical, emotional or intellectual disabilities.
- 2) In case of children residing in places where speech and hearing centres are not available.
- 3) Parental reports can be used as a basis for monitoring the child's progress and to know the effectiveness of remedial programmes instituted.
- 4) Parents themselves can benefit from such reports as the documentation may be reinforcing to them.

- 5) When clinics are over crowded and handicapped by lack of personnel, parental reports can be an effective way of screening large number of children and identifying those who are in need of through professional evaluation.

In western countries several studies have been conducted involving parental reporting techniques (Elliot and Ambruster, 1967; Ashed et at, 1970; Roman, 1980; Gleason and Blood, 1982; Kessler, 1983). But in India, very few studies have been reported when parents of the hearing impaired have participated in the assessment programmes. Hence, the study was undertaken.

The study was designed to find out whether the parents of normal and hard of hearing children are able to assess their childrens speech using the questionnaire.

REVIEW OF LITERATURE

Speech communication one of the most complex functions acquired by man, involves certain information which is transmitted between two or more individuals. It is within this matrix of communication that the essence of human behavior is embedded.

It is well known that hearing plays a crucial role in the acquisition of speech and language. We learn to talk and later to control our speech mainly by an auto-corrective cyclical process using the auditory feedback.

The ability to hear is, therefore, essential for the development of normal speech. One of the most devastating effects of congenial hearing impairment is that normal development of speech is disrupted (Osherger and McGarr, 1982).

The appraisal and diagnosis of speech and language disorders is primarily a descriptive task. An adequate description should define the speech and language skills observed, judge the communication ability, determine the relevant variables in the speakers and make obvious a plan of action for remediation if the pattern presented warrants it. Consequently, before discussing the specifics of speech and language description it is appropriate to focus on the normal aspects of speech and language.

Children's language development is characterized by the modification of early non-language vocalizations, eventually becoming the sound of language. There appear to be roughly five stages in the development of speech production prior to the emergence of the first words, at about twelve to thirteen months. Oller (1980) divides the first six months into three sequential stages, which he terms the phonation stage, the cooing stage, and the expansion stage. The last two stages of prelinguistic vocalization which occur in the second half of the first year, are canonical and variegated babbling.

Birth cry is the first milestone in the child's acquisition of phonology. In this stage the vocalizations are reflexive in nature, primarily related to the infant's various experiences of comfort and discomfort. Parental reports suggest that crying during the later part of the first month can be differentiated in response to various stimuli (Eg. hunger, illness, discomfort). These reflexive sounds sound like the high front vowels within the oral cavity, such as 'eeh'. These cries vary in length pitch and volume (Bryen, 1982).

The characteristics of these cries of the hearing impaired children do not differ from those of normal children. Lenneberg (1965) who made recordings of spontaneous vocalizations of deaf babies from the first, found that the voice of the deaf babies were similar to those of hearing children and that the cooing sounds, laughter and sounds of discomfort were not different from those of normal subjects.

The period between one month and three months is called cooing. Cooing is essentially vowel like in form. Back consonant like sounds such as /k/, /g/ and specific fricative sounds are produced during this early period, although vowels exceed consonants (Irwin, 1948, 1951).

In the **expansion stage** (4-6 months) the child appears to gain increasing controls of both laryngeal and oral articulatory mechanisms. He or she explores the vocal mechanism through the playful use of squealing, growling, yelling and raspberry vocalization (bilabial trills). “Fully resonant nuclei” (adult like vowels) being to be produced in this period, as does “marginal babbling” in which consonant like and vowel like features occur. There is further development of imitation characterized by the child’s own imitation. This period of self-imitation is viewed as a preparatory period for imitating unfamiliar sounds produced by others (Syren, 1982).

Mavilya (1968) studied three congenitally hearing-impaired infants (12 + 6 weeks old at the start of the study) over a period of three months. She reported that the hearing impaired infants stopped babbling and there was a significant difference between the characteristics of vocalization patterns after this stage.

During the period of 6-8 months, the first probable evidence of adult language influence on production is seen. This stage is called canonical babbling or reduplicated babbling. Genuine syllabic productions involving a true consonant and a fully

resonant nucleus or vowel, often chained in repeated sequences as (ba ba ba), (da da da) or (ma ma ma).

Winitz and Irwin (1985) reported that labials and post-dentals constitute 80% of the consonants and approximately 95% of the words were composed of both vowels and consonants. The onset of this stage is easily recognized by parents who reported the child to be babbling or even talking although no consistent sound meaning relation are likely to be observed.

Oller et al (1986) reported that deaf children do not produce canonical babbling within the first year (Oller, Eilers Bull and Carnesy, 1985; cf also Stoel Gammer, 1982) whereas such babbling predictably occurs in normal babies by 10 months at the latest end is an extremely reliable developmental milestone. These recent findings suggest that canonical babbling depends on auditory exposure.

The last babbling stage is that of variegated babbling in which continued use of adult like syllable is supplemented by the use of increasingly varied consonants and vowels within a single vocalization. Elbers (1982) has closely traced the development from reduplicated to variegated babbling in the speech of one child, between 6 and 12 months of age. Elbers (1982) views this period as a “systematic, continuous and largely self-directed process of exploration”, in which the child constructs a “phonetic spring board” to speech. There is the appearance of first words in his speech during the end of this period which take on the practical functions of attracting adult attention (Berry, 1969).

Stark (1982) observed in a group of hearing-impaired infants 15-24 months old, an overall increase in rate of vocal output with

age. Mean number of vocalizations were also observed to increase as progressively higher levels of vocal output were attained by the infants. In general, the stages of vocalization behavior of the 15 to 24 month old hearing impaired infants were similar to these of a group of normal hearing infants 9 – 48 weeks of age.

PHONOLOGICAL DEVELOPMENT:

According to Menyuk (1971), the following consonants are mastered by age four; /b/, /m/, /n/, /f/, /w/, /h/, /p/, /g/, /k/, /j/, and /l/. Although, their mastery is not evidenced in all word positions, their intelligibility is at a fairly high level. In addition to these individual speech sounds, the following initial consonant clusters are reported by Temp lin (1957); /sm-/, /sn-/, /st-/, /tw/, /bk/, /kw/, /pi-/, /pr-/, /tr-/, /dr-/, /kl-/ and /kr-/. The following consonants and to the child's inventory /t/, /v/, /s/, /z/, /s/, /s/ /z/, /ts/, /r/, /dz/, /o/, and /J/ and complete the phonological mastery by 7 years of age.

Thirumalai (1972) studied the acquisition of Tamil phonology of a four year plus child. The results analyzed showed that among the consonants, the subject had acquired all the stop consonants /k/, /c/, /h/ and /p/ found in the adult Tamil Speech. The subject had acquired all the six nasal sounds in adult tamil speech. But the retroflex and alveolar nasals in the inter vocal position were interchanged.

Sreedevi (1976) studied the acquisition of aspects of Kannada language in 2+ year old children. The results analyzed revealed that, at the commencement of the recording, all the 4 subjects had acquired most of the vowels in kannada language. The stop consonants

had been uniformly acquired, but in 2 children of the older age group, the voiceless and voiced velar stops were only at the phonetic level. Aspirated counterparts were not acquired during the course of the study. The laterals, sibilants and trills were not fully established till the stage of the completion of the study. The distinction between the nasals was not fully made during the course of the study.

Tasneem Banu (1977) studied the articulatory acquisition in children between 3 – 6.6 years. She found a definite pattern in the articulation acquisition. There was gradual but definite change from one age to another. The children were found to acquire most of the sounds earlier than the English speaking children.

PRELINGUISTIC OF LINGUISTIC SPEECH:

During the period from 12-24 months speech sounds, which were previously unattached to meaning become phonemic with the onset of the first words. There is some similarity in the form of speech sounds produced during the pre-linguistic period and these used during this period. The phonological structure of the first words is comprised of either Cv and cvc combinations of most monosyllabic words and of the CVC and CV CVC combinations of bisyllabic words. The occurrence of consonants become more frequent than that of vowels (Bryen, 1982). Schewartz et al (1980) describe the reduplication of syllables in children's early words. Schwartz (1980) and Smith (1973) hypothesize that the role of syllable reduplication may be a transitional one, facilitating the phonological acquisition of multi-syllabic words.

The single word utterances used are tied to “here and now” objects, actions and relations helps rather than being capable of displacement in time and space (Byren, 1982). Over generalization of one word for any member of a given category and extreme restriction of the meaning of a word, i.e., using a label of only one instance of a category is quite common during this period (Bowerman, 1976). Nelson (1973) reported that the names of salient objects and events constituted the major portion of child’s vocabulary during this period.

The first language expression or the single-word stage seems to be the time when the child’s cognitive understanding are being tied to his linguistic system not only in terms of naming of specific words, but also in terms of general semantic categories of agent action (Streng, Kretschmer, Kretschmer, 1978).

Semantic categories that form the basis for the single word stage is placed into two categories by Bloom (1973). The first category is labelled functional words, i.e., words which represent non-existence, recurrence and existence. Eg. no, more, that, this etc. This category is the most stable in the child’s lexicon. The second semantic category basis for the single word utterance is labelled the referential category. Referential words encode the ideas of actor, action, patient, location or instrument. Unlike functional words, referential words tend to be unstable.

As child begins to merge information on semantic categories with some notions of word order, two word combination emerge. Normals do not adhere to the rigid word order but seem to move towards syntax during this period (Bloom, 1973).

The order of acquisition of prepositions reported by Johnston Slobin (1979) were 'in', 'on', 'under', 'beside', 'back', 'front', 'between', whereas the locative prepositions reported by Dromi (1979) were 'in', 'to', 'on', 'from', 'beside', 'behind' and 'under'. Basavaraj (1981) observed the acquisition of 'below', 'inside', 'on top', 'outside', 'in front of' at 4 – 4 ½ years of age.

Sreedevi (1976) reported the acquisition of transitive and intransitive verbs to be earlier than reflexive and causative ones. Prema (1979) studied children between 5 and 6 years and found that the causative verbal sentences were not used properly. Basavaraj (1981) observed the use of simple transitive and intransitive verbal sentences in children of 2-2 ½ years of age and causative verbal sentences at 4 ½ - 5 years of age.

Bloom (1970) reported about the acquisition of the following person markers – 'me' and 'my' at 21 to 22 months, 'I', 'It' at 24 months. Mexley (1970) reports acquisition of 'he' 'she', 'they' at 3 ½ years and we at 8 years. Basavaraj (1981) reported the occurrences of 'I' 'you' at 2 ½ - 3 years, 'he' at (remote and proximate) 4 – 4 ½ years and 'she' (remote and proximate) at 4- 4 ½ years and 'she' (remote and proximate) at 4- 4 ½ years.

The acquisition of adjective 'more' at 3 to 3 ½ years, 'little' 'straight' at 4 to 4 ½ years was reported by Basavaraj (1981).

Bloom (1970) reported acquisition of the determiners – 'this', 'that', 'a', 'the', 'these' and 'more' at 2 years. Devillers and Devillers (1973) reported the consistent use of 'a' and 'the' at 4 ½ years to 5 years of age, and 'here', 'there', 'this' and

'that' at 3 years of age. Webb and Abrahamson (1976) observed that the children had difficulty with 'this' and 'that' at 7 years of age also. The mastery of 'here' and 'there' was not observed at 4 years by Clark and Sengul (1978). Basavaraj (1981) reported the acquisition of 'this' 'that' at 4 ½ years.

Sreedevi (1976) studied the children in the age group of 2 years to 2 years 8 months and found that children used 'where', 'why' and 'who'. Roopa (1980) reported acquisition of 'what', 'where', 'who', 'who', 'how', and 'where', in 4 year old children. Prema (1979) found all types of Why – questions in 5 -6 years children. Basavaraj (1981) reported the occurrence of 'why', 'who' at 2 ½ - 3 years and 'what', 'how much' at 3 ½ - 4 years of age.

The acquisition of 'yes-no' type of question has been reported around 2 years of age (Smith, 1933; Menyuts, 1964; Limber, 1973; Sreedevi, 1976; Tyack and Ingram, 1977). Prema (1979) did not observe the tag questions in 5-6 years children which is in contrast to Roopa's (1980) study who reported the use of tag questions in 4 – 5 years aged children.

The negation 'no' for all types of negation at 22 months, 'not' at 24 months, 'cannot' and 'don't' at 26 months and 'couldn't' at 28 months was reported by Bloom (1970). Prema (1979) in 5-6 years aged children found acquisitions of 'no' and 'not' negative suffixes with modal auxiliaries and other main verbs were not acquired by these children.

With the appearance of 2 word combinations in the child's expressive repertoire, he next works on 3 word combinations and the establishment of the finer details of language usage, while developing modulations children tend to focus first on these modulations that

convey useful semantic informations to the sentence. In addition, children tend to focus on those modulations that are grammatically the most consistent in their application in sentences. (Strong, Kretschmer and Kretschmer, 1978).

After the child is well into possibly producing modulations and modalities, he begins to turn his attention to the development of complex sentences resulting from the conjoining of sentences to one another and embedding of one sentence into another. One complex operation of interest in conjoining involve in joining of two or more sentences with a conjunction. Prema (1979) reported the use of 'before', 'after' and 'therefore' at 5-6 years of age. Ingram (1975) found that co-ordinating conjunction are acquired before subordinate conjunctions.

SPEECH PRODUCTION OF THE HEARING IMPAIRED

A. Vocalization Patterns:

For many years it was believed that the vocalization development of hearing and hearing impaired infants was the same, atleast through the babbling stage. After this period, hearing impaired infants were reported to stop babbling (Mavilya, 1968). However, the results of Stark's (1982) research do not support the belief that hearing impaired infants simply stop vocalizing upon completin the babbling stage. Difference between the vocalization of normal hearing and hearing impaired infant do emerge at an early age, but the difference are seen in the phonemic production rather than rate of vocal output.

B. Speech sound Inventories:

Phonetic inventories have been obtained from the spontaneous samples of hearing impaired children ranging from 11 months to 7 years of age (Carr, 1953; Sykes, 1940; Stark, 1982). Although these studies report differences in the frequency of specific vowel sounds in the samples of hearing impaired vowel production is similar. The vowels most commonly used by young hearing impaired children include the central vowels [ʔ |, |ð| and the low front vowels [æ], [e]. The extreme high vowels /i/, /u/ occurred infrequently in the children's sample. Carr (1953) compared the relative frequency of each vowel type in the speech of hearing impaired children to that of hearing impaired children used vowels in a manner and degree similar to hearing infants children used vowel sound more often than consonant sounds. Sykes (1940) found that 4 to 7 year old hearing impaired children produced almost half of their vowel sounds in isolation and not in combination with a consonant.

Analyses of consonant production have shown that young hearing impaired children produce front consonants /p, b, m, w/ more often than they produce back consonants (Carr, 1953, Sykes, 1940).

C. Phonemic and phonological skills:

The cross-sectional data obtained by Stoel – Gammon (1982) on phonological acquisition by hearing children 1.5 to 3.10 years of age and hearing impaired children. 2.4 to 7.3 years of age

showed that the patterns of development were similar for the two groups of children, although the rate of development was considerably slower for the hearing impaired children than for hearing children. The set of substitution patterns consonants to both groups included voicing of initial stops, devoicing of final stops, fricatives and affricates and substitutions of homorogonic stops for fricatives. When errors were common to both groups, they were more frequent in the speech of the hearing impaired than in the speech of the normal hearing children.

Some differences in the pattern of development between the normal hearing and hearing impaired children were also observed in the above study. Errors found to be present only in the hearing impaired childrens speech were; substitution of glottal stops for the target phoneme, substitution of back consonants /h, k, g/ for non-labial consonants and substitution of the palatal fricative for the affricates /t and dz/. The data also showed that the substitutions of the hearing impaired children deviated further from the target phoneme with respect to manner and place of production than did the substation of the normal children.

The longitudinal data observed and obtained by Stoel Gammon (1982) revealed that the hearing impaired children passed through three development al stages. In the first stage, the child produced a wide variety of substitution for the target phoneme. In the second stage, there was a narrowing of the range of substitutions followed by substitutions with a single sound. In the third stage, the phoneme was produced correctly.

Although, the data suggest that hearing impaired children are simply delayed in phonemic acquisition, we know there are differences in the phonology used by hearing children and hearing impaired. Additional research is needed in order to delineate the stages of speech acquisition in hearing impaired children.

RESPIRATION:

Studies on the respiratory pattern of profoundly hearing impaired speakers have shown that;

- (i) they initiate phonation at too low a level of vital capacity and produce a reduced number of syllable per breath and
- (ii) they mismanage the volume of air by inappropriate valving at the laryngeal level (Forner and Hixon, 1976; Whitehead, 1982).

Hixon, Mead and Goldman (1976) have provided data on respiratory behavior both in normals and hearing impaired speakers. They have used magnetometers to measure changes in the anterior - posterior dimensions of the chest wall during respiratory control maneuvers and speech. Hearing impaired speakers were found to be like hearing speakers in some respect and not in others. Respiratory activity for non-speech activities like tidal breathing was similar to normal. In addition, Forner and Hixon (1977) reported that hearing impaired speakers paused at inappropriate linguistic boundaries either to inspire or alternatively to waste air, and thus they produced fewer syllables per breath unit. Hearing impaired speakers were also found to initiate phonation at inappropriate lung volumes and to speak within a fairly restricted lung volume range.

Whitehead (1982) found that less intelligible hearing impaired speakers were often quite variable in management of airflow and they could not differentiate voiced and voiceless cognate aerodynamically. These data suggests in appropriate laryngeal gestures that could reduce airflow.

ARTICULATION:

Perhaps of all the speech production errors characteristic of the severely and prosoundly hearing imparted, the areas that has received the greatest attentions is that involving the articulation of consonants, vowels and diphthongs. Hudgins and Numbers (1942) comprehensive analysis of the articulatory skills of hearing impaired children is considered to be a classic work. These authors studied 192 subjects between 8 and 20 years, whose hearing losses ranged between 8 and 20 years. The articulatory errors were broadly divided into consonant errors and vowel errors.

CONSONANT ERRORS:

The most common error types observed were;

- 1) Confusion of voiced-voiceless distinction.
- 2) Substitution of one consonant for another.
- 3) Added Nasality
- 4) Misarticulation of consonant blends.
- 5) Misarticulation of abutting consonants.
- 6) Omission of word initial or word final consonants.

1. VOICING ERRORS:

One of the most frequency consonant errors found by Hudgins and Numbers (1942) was confusion of voiced-voiceless distinction. In subsequent studies, the direction of this error has sometimes been reported as occurring to the voiced member of the pair (Carr, 1953; Smith, 1975) and at other times to the voiceless cognates (Markides, 1970; Nober, 1967). Taken together these studies indicate that coordination of the articulators necessary for voicing contrast is an extremely difficult task for hearing impaired.

2. SUBSTITUTION ERRORS: Place and Manner of Articulation.

Another common error in the speech of the hearing impaired involves the substitution of one phoneme for another; frequently the substitution is to a phoneme with a similar place of articulation. There is general agreement that phonemes produced in the front of the mouth are often produced correctly than are phonemes produced in the back of the mouth. This makes sense when one considers that the relative visibility of articulatory gesture should be important to hearing impaired persons for whom there is reduced auditory information.

Nober (1967) analyzed correctly articulated consonants according to place of articulation and then ranked them from highest to lowest scores as follows: bilabials, 59%;

labiodentals, 48%; glottal, 34%; linguadentals, 32%; lingua alveolars, 23% linguapalatals, 18% and linguavelars 12% Smith (1975) and Gold (1978) have found that sounds produced in the middle of the mouth were more prone to error than were sounds produced in the back of mouth.

Nober (1967) also reported the following order for articulatory competence in terms of manner of articulation, again from best to worst glides, stops, nasals and fricatives.

Nonnasal phonemes were reported by Hudgins and Numbers (1942) to be nasalized and nasal consonants were often produced as stops. Other errors in manner of articulation have also been noted. Smith (1975) on his investigation on hearing impaired children found that they most often produced palatal plosives, fricatives, affricates and nasals. Glottals were frequently substituted for stops and fricatives showed a high rate of substitution too, but not from the plosives. Affricates were never substituted for other consonants but tended to be substituted by one of their components, usually the plosive components. Bilabial plosives, the glides and the fricatives /f/ & /v/ were often produced correctly.

The articulatory movements for both alveolar and velar sounds are visually obscure. More errors of the alveolar

and the velar sounds in a deaf child could be for the following reasons:

- 1) Alveolar sounds are produced in the middle than in the back of the oral cavity. Because of this, precise positioning of the articulators is necessary in order to differentiate correctly all the sounds with a medial place of articulation (Osberger & Mc Garr, 1982).
- 2) The activity of the velum produces very little proprioceptive feedback (Nickerson, 1975).
- 3) OMISSION OF PHONEMES:

Another frequently reported error in the speech production of the severely and profoundly hearing impaired is the omission of a phoneme. It may occur in the initial and or final position of words, also reported as non-function of releasing or arresting consonants respectively (Hudgins and Numbers, 1942; Markides, 1970; Smith, 1975).

Hudgins and Numbers (1942) reported that omission of initial consonants was more common than omission of final consonants. The consonants most frequently omitted from the initial position of words included /h, l, r, y, th, s/. Turning to final consonants, the authors point out several error patterns, dropping of consonants completely releasing the consonants into the following syllable, incomplete

Production whereby the phoneme uses its dynamic properties and becomes merely a passive gesture. The final consonants omitted in their study were /l, s, t, z, d, g, k/. These results are in agreement with Geffner (1980) who analyzed the spontaneous speech samples of young hearing impaired children.

However (Nober, 1967; Markides, 1970; Smith, 1975) have reported a greater number of consonants omitted from the final position of words than from either the initial or medial position.

In the consonant cluster errors, Hudgins & Numbers (1942) reported two forms: One or more components of the cluster were dropped or an adventitious phoneme, usually the schwa vowel was added between the elements. Smith (1975) tested consonant blends /p, t, k/ and /s/ in the speech production of older hearing impaired children (13 to 15 years old). Here again, there was frequent omission of one or more element in the blend environment was more likely to be omitted than the same phoneme occurring in a non-blend environment.

VOWEL ERRORS

The failure to produce appropriate vowel sounds has been noted as a problem by several investigators (Hudgins, Numbers, 1942; Angelocci, Kopp & Holbrook, 1964). The problem may take the form of a failure to differentiate one vowel sound from another or the production of diphthongs in place of vowels.

Hudgins & Numbers (1942) studied systematically the production of vowels and diphthongs in the speech of the hearing impaired. They classified the errors according to five major types. These include:

- 1) Substitution of one vowel for another
- 2) Neutralization of vowels
- 3) Diphthongization of vowels
- 4) Nasalization of vowels
- 5) Errors involving the diphthongs.

Either the diphthong was split into two distinctive components or the final member of the diphthong was dropped.

In their study, the first three were among the most common errors.

Boone (1966), Nober (1967) & Smith (1975) found that hearing impaired speakers produce back vowels correctly more often than front vowels and low vowels correctly more often than those with mid or high tongue position. Boone (1966) attributed the lower formant frequency (F2) for the deaf to the tongue being held too far back towards the pharyngeal wall.

In contrast, Stein's (1980) cinefluorographic study of vowels produced by hearing impaired speakers showed fronting of back vowels.

With respect to errors of substitution, hearing impaired speakers often confuse the tense, lax distinction or substitute

a vowel that is clearly related in articulatory position (Smith, 1975) although there is evidence to the contrary (Hudgins & Numbers, 1942; Markides, 1970).

SUPRASEGMENTAL ASPECT:

Speech of the hearing impaired is characterized by poor intelligibility. Metz et al (1985) studied the relationship between three measures of speech intelligibility and 12 segmental, prosodic and hearing ability parameters in 20 severely to profoundly hearing impaired speakers. The results indicated an independent primary and secondary roles for segmental and prosodic speech characteristics, respectively in determining intelligibility in hearing impaired speakers. Hence it becomes important to study the various suprasegmental aspects of hearing impaired speech.

TIMING AND RHYTHM:

Forner and Hixon (1977) reported that hearing impaired speakers paused at inappropriate linguistic boundaries either to inspire or alternatively to waste air, and thus they produced fewer syllables per breath unit. The rate of speech of the hearing impaired speakers is slow, because of excessive prolongation of speech segment and they tend to insert more pauses of longer duration in running speech than do hearing speakers. Calvert (1961) made measurements of phonemic

duration in the speech of the hearing impaired by spectrographic analysis of bisyllabic words. The results showed that hearing impaired speakers extended the duration of vowels, fricatives and the closure period of plosives upto five times the average duration of normal speakers. In a later study, Osberger and Levitt (1979) observed that syllable prolongation in the speech of the hearing impaired was due primarily to prolongation of vowels.

Stevens et al (1978), McGarr and Harris (1980) reported that deaf speakers failed to make the differences between the duration of stressed and unstressed syllables. But Weiss et al (1985) studied and compared contrastive stress production in language matched normal and hearing impaired children. The results suggest that both groups were not significantly different in terms of production of the prosodic cue used.

Hudgins and Numbers (1942) reported the following errors in rhythm:

- 1) Sentences broken up into unusual breath groups.
- 2) Word accents misplaced and normally unaccentuated syllables.
- 3) Adventitious syllables added.
- 4) Syllables omitted from polysyllabic words.

The information presented above shows that timing errors extend to phonemic as well as prosodic contrasts. Also it shows that hearing impaired speakers distort many temporal aspects of speech and thereby disrupt the rhythmic aspects of speech.

VOICE QUALITY:

In the speech of the hearing impaired individuals segmental errors have been studied in depth by a number of researchers (Hudgins & Numbers, 1942; Nober, 1967; Markides 1970; Smith, 1975; and Geffner, 1980). These studies have reported similar, if not identical patterns of segmental errors. Several investigators (Nickerson, 1975; Levitt et al 1976) have noted suprasegmental errors, such as abnormal voice quality, hypo or hyper nasality, poor timing and inappropriate intonation in addition to segmental errors.

There is general agreement on that one of the major sources of abnormal voice quality, in the speech of the hearing impaired individuals is the poor phonatory control. Calvert (1961) found that the terms most commonly selected by teachers of the deaf as descriptive of the voices of deaf children were “tense”, “flat”, “breathy”, “throaty” and “harsh”.

The poor phonatory control present in the speech of the hearing impaired individuals may be divided into two major types:

- 1) Excessively high fundamental frequency.
- 2) Little variation in fundamental frequency resulting in flat and monotonous speech.

1) Voice quality and fundamental frequency:

The role of the auditory system in the control of voice parameters has been studied by numerous investigators (Ringel & Steer, 1963; Mallard et al 1978). All these studies indicate that the auditory feedback system is a main channel for appropriate establishment and production of fundamental frequency. Fundamental frequency, subjectively called as pitch, has been a particularly difficult property of speech for deaf children to learn to control (Boothroyd, 1970). Martony (1968) suggests that this is because deaf children may lack a conceptual appreciation of what pitch is.

Several investigators (Anangelocci, Kopp and Holbrook, 1964; Boone, 1966; and Martony, 1968) have noted that deaf individuals are apt to have a relatively high average pitch.

Angelocci et al (1964) found that mean fundamental frequency of hearing impaired adolescents between 11 to 14 years was 43 years higher than that of the normally hearing subjects. Thornton (1964) however has reported essentially normal speaking frequencies for hearing impaired speakers.

Monsen (1979) in a group of 24 hearing impaired children, found that fundamental frequency was 297hz. This was within the range of normal hearing children.

Monsen et al (1974) observed similar findings in deaf adolescents. These studies made it clear that mean fundamental frequency range among hearing subjects is quite broad, and hearing impaired subjects appear in most cases to fall with in it. In the cases where they do not, the mean fundamental frequency is higher than normal. He found no correlation between speech intelligibility of hearing impaired adolescents and either mean fundamental frequency or mean amount of change of fundamental frequency or mean amount of change of fundamental frequent.

2) Voice quality and fundamental frequency variation:

Appropriate fundamental frequency variation (intonation) is another problem of voice that the deaf individuals have. Two major types of fundamental frequency variation in the speech of the deaf individuals have been noted.

- i) Lack of variation of fundamental frequency.
- ii) Excessive or erratic fundamental frequency variation.

Several investigators (Calvert, 1961; Hood, 1966; Martony, Hood and Dixon, 1969; Nandyal, 1981) noted that hearing impaired individuals often tend to vary the fundamental frequency much less than do normally hearing individuals.

Monsen (1978) measured the extent of variation of fundamental frequency variation and correlated it with intelligibility of speech. A low correlation of 0.22 was obtained between the amount of fundamental frequency variation and speech intelligibility.

Monsen (1979) while studying the manner in which fundamental frequency changes over time, using a spectrographic technique observed 4 types of fundamental frequency contours in the speech of the hearing impaired individuals. They are

- 1) falling contour (in which the fundamental frequency declines smoothly at an average rate greater than 10Hz per m.sec.);
- 2) short falling contour (in which the duration of the word is extremely short – less than 150 m. sec.);
- 3) falling flat contour (in which there is a rapid change of frequency at the beginning of the word, followed by a relatively unchanging flat portion);
- 4) flat contour (in which there may be a decline in fundamental frequency over the course of the word, it is less than 10Hz per 100 m.sec.).

Excessive variation of fundamental frequency has also been reported in the speech of the hearing impaired individuals. Nickerson (1975) thought that such variations are not simply normal variations that have been somewhat exaggerated but, rather pitch breaks and erratic changes that do not serve the purpose of intonation.

SYNTAX OF THE HEARING IMPAIRED:

There are mainly three methods of studying syntactic acquisition in the hearing impaired. First is the use of written language (Cooper, 1967; Odon, Blanton and Nunnaly, 1967; Quigley, power and Steinkamp, 1977; Wilbur, Quigley and Montanell, 1975; Quigley, Montanell and Wilber, 1977). Other methods available are the spontaneous speech sample and the imitated language.

Studies about sentence length, sentence quality (Goda, 1954), and types of sentences (Waldon, 1963) have shown lower performance of hearing impaired in comparison with normals. (Cited in Brannon and Murry, 1967).

Goda (1959) studied syntactical structure in the speech of normal, deaf and retarded adolescents. In response to sixteen pictures depicting everyday activities, normals and retarded yielded twenty word samples while deaf yielded only thirteen. Also they used more words and adjectives and fewer function words than the retarded. Gaffney (1977) tested deaf and normally hearing children aged 5 – 7 years on oral and or manually presented syntax test. It was found that children were acquiring the syntactic structures testes in much the same order ad normals, but they were doing so at a slower rate (cited in Geffner and Freeman, 1980).

Presnell (1973) tested hearing impaired children's comprehension and production of syntax in oral language. 47 hearing impaired children (5-13 years of age range) were tested on North-Western Syntax Screening Test and compared with normals.

In terms of expression, older hearing impaired group performed better than younger group. A greater change was noted between the ages 5-9 years. But the improvement was not as great as that of normals.

Brannon & Murray (1967) compared 30 normals and 30 hearing impaired children (12 to 18.5 years of age range) in terms of total output and syntactical accuracy. Fourteen coloured pictures depicting daily activities were the stimuli. Minimum of 50 words were obtained in response to the pictures. Considering the error classification system of word addition, word substitution, word omission and word order error, a total score of structural accuracy was obtained.

The hard of hearing group resembled the control group in its total output of words, but the deaf were lower in this. Differences between syntax scores were significant among all three groups. A moderate correlation was found between average hearing loss and total word uttered.

Wilcox and Tobin (1974) employed a repetition task to

investigate syntactic patterns of hard of hearing children (with mean age of 10 years). Mainly verb constructions were tested. The task was: (1) repetition with visual stimuli, (2) recall from pictures and (3) repetition without visual stimuli.

Both normals and hard of hearing tended to use grammatical constructions rather than non-grammatical approximations. Hard of hearing subjects obtained lower scores and tended to substitute simpler forms. The results showed that the difference was only a matter of degree.

Quigley, Power & Stein Kamp (1977) did a longitudinal study for six years about syntactic structure in the language of deaf children aged 10-18 years. Test of syntactic abilities containing 22 subtests was used to evaluate the children's knowledge of major syntactic structures in English. Different aspects tested were negation, question formation, conjunction, pronominalization, relativization, complementation and verb system. 450 profoundly deaf children were studied. Their performance was compared with sixty normals. Important findings of the study were:

- The order of difficulty of syntactic structures for deaf subjects was same as that for normals.
- Syntactic rules were not well established even among 18 year old deaf students except for simple transformations.
- Syntactic structure develop similarly (with respect to

developmental stages and syntactic rules) for deaf and hearing subjects.

- There was a strong tendency for deaf subjects to impose a S-V-O pattern on sentences. Another was to connect nearest noun phrase to verb phrase. They often had a number of rule generated structures not found in English.

Geffner (1980) administered ACLC and a syntax screening test to 65 (6 year old) deaf children. The syntax screening test contained items for checking negation, plurality, word order, answers for Yes/No questions, 'wh' questions. The tests were administered in preferred mode of communication (Manually or orally).

Results on ACLC suggested that deaf children were comparable to the children of younger age level. In items of negation, plurality and word order, 44% correct responses were obtained (while a 5 year old normal child would have got a perfect score). In response to questions, though the performance was poor (43% correct) the order of difficulty was similar to that seen in normals i.e. Yes/No questions were easier than 'Wh' type.

Vijayalakshmi (1981) found a wide gap between comprehension and expression performance with hard of hearing children using test of syntactic Abilities in Kannada.

ASSESSMENT OF SPEECH IN CHILDREN:

The evaluation component of a child's language programme typically includes procedures for assessing the child's language abilities to provide diagnostic information and to identify and describe areas of deficit (Rees & Shulman, 1978).

There is a wide variety of information that could be included in a language assessment and of procedures that could be used in exploring that information. The focus of any particular assessment will depend on the clinician's purposes, the nature of the child and doubtless the biases of clinician (Hubbel, 1981).

The various procedure of measuring the children's comprehension and production tests can be broadly divided into 5 categories:

- i. Standardized tests.
- ii. Naturalistic description.
- iii. Clinical observation
- iv. Interview techniques.
- v. Questionnaires.

The standardized tests used which children to assess speech and language behavior are shown in the chart. It also includes the development al schedules where major developmental achievements are sampled through an adult informant or through child activities.

Different standardized tests used to assess Speech and Language behavior. [Hutchinson et al, 1979]

GRAMMATICAL EMPHASIS		DEVELOPMENTAL EMPHASIS		COGNITIVE EMPHASIS		
Comprehension	Production	Combined	EMPHASIS	Comprehension	Production	Combined
Assessment of children's language comprehension	Bellugi's Negation Test	Communication sequence inventory.	Communication Evaluation Chart Denver Developmental Screening test.	Full range picture vocabulary test	Environmental language inventory	Basic concept inventory
Miller Yader Test of grammatical comprehension	Berry Talbolt Explanatory Test of grammar	Northwestern syntax screening test.	Houston test for language development. Preschool language scale.	Peabody picture vocabulary test	Environmental pre-language battery	Boehm test of basic concepts
Test for Auditory comprehension of language	Developmental sentence analysis	Hichigan picture language inventory	Receptive expressive emerging language. Reynall developmental language scale.	Vocabulary comprehension scale		Illinois test of psycho-linguistics abilities. Person's language sample
	Carrow's elicited language Inventory	Test of psycho-linguistics abilities	Utah test of language development			Children's language process inventory
	Language, Assessment remediation & Screening procedure	Test for acquisition of syntax in Kannada.	Verbal language developmental Scale.			

Naturalistic Description:

This procedure consists of collecting the data of children's language production, comprehension and cognition in a naturalistic setting – child's home and analyzing it. This method has been found to yield a wealth of information and has been used by many investigators such as Brown (1960), Bloom and Lahey (1978), Miller (1978). Among the Indian studies of the naturalistic descriptive type are Thirumalai, (1977), Sreedevi (1976), Prema (1976) and Roopa (1980).

Clinical Observation:

This includes observing the child's behavior during the clinical situation. It may be structured or unstructured and included observation of the non-linguistic variables such as reduced attention span, distractibility, liability, rapport, disorientation etc. This method supplements the information in the standardized lists and gives full pictures of an individual.

Interview Technique:

The information is interviewed of the child's speech, language and overall development. This method can be used independently or in conjunction with other procedures. The responses given by the informant can be taperecorded or written down. The receptive Expressive Emerging Language scales for

children between 0 and 3 years uses the parental interviewing technique.

Questionnaires:

A set of questions either open or close ended related to a particular behavior to be assessed is called a questionnaire.

Elliot and Ambruster (1967) administered the questions they had framed to parents whose children were enrolled in a school for the deaf. The response of the questionnaire was 89% and indicated a major difference between the severely hearing impaired group and other group with additional learning problems.

Abbed et al (1970) conducted a two stage screening programme, with parents doing the first stage with the aid of a checklist. The second stage consisted of testing by the professionals of those children whose parents had answered the questionnaire. The first stage yielded 58% of communicative disorders. Results of the second stage, an abbreviated clinical examination, sampling speech, language, auditory behavior and developmental history indicated a high degree of association between low physical measurements and communicative problems.

Roman (1980) compared mother's description of their preschool children's language with the child's demonstrated skill.

Results indicated that parents could identify their preschool children's language skill. The correlation was found between the language ages derived from a parent informant scale and language ages derived from tests administered directly on children.

Gleason and Blood (1982) examined the parent's perception of their child's hearing abilities. They prepared a 17 item questionnaire. A high correlation was found between the parental reports and ontological examination. Kessler (1983) has reported a case where a parent dairy was used as a component of an assessment of the child's expressive language. The author has found this method very useful.

The above studies support the contention that parents can be reliable sources of information regarding their child's speech and language abilities.

Suma (1985) developed a questionnaire on assessment of speech by the parents. The results supported the earlier studies. There have been many acquisition studies reported in India involving the parents (Thurumalai, 1972; Sreedevi, 1976; Prema, 1979; Roopa, 1980). But there are very few studies which involve the parents in the assessment programme of their child's speech.

An assessment programme involving the parents can give a wealth of information both to the clinician and the parents

regarding the child's speech. Also it helps in monitoring the child's progress.

The present field study has attempted to fulfill the need to some extent. The procedure of the study is described in the following chapter.

METHODOLOGY

The study was designed to find out, if the parents of hard of hearing children and normal hearing children are able to assess their children's speech, using the questionnaire.

Development of Questionnaire:

The questionnaire used in this study was a modified version of a questionnaire used for assessing children's speech by their parents developed by Suma (1985).

This questionnaire was planned to elicit information from parents. Identifying information included child's name, age, sex, number of siblings and child's order of birth. Information about family background included items about parent's name, education, occupation and socio-economic status. It also included information about the mother tongue, languages known and languages spoken with the child.

The questionnaire consisted of 16 questions of both open and close ended types and were developed in Kannada (see Appendix- A).

Based on the literature, the following areas significant for speech development were included:

- Movement of the articulators.
- Respiratory process.
- Sounds, words and sentences the child used.

- Intonation.
- Intelligibility

The questionnaire was given to a group of students in the Pre-University Course and to the students of new admission into B.Sc. (Speech & Hearing) course to check for the following in terms of:

- clarity of the instructions and the questions,
- ambiguities , if any.

Based on the general response patterns, the questions were modified. The revised set of questionnaire followed the same process.

SUBJECTS:

The parents who knew to read and write Kannada were selected as subjects and volunteers for the study. These parents formed a homogenous group with respect to linguistic, socioeconomic status and religious background.

The revised set of questions was given to two groups of parents:

Groups	No. of completed forms received
Normal children	40
Hard of Hearing children	33

40 children in normal hearing group and 36 children in the hard of hearing group were divided into 8 age groups - 0-1 year, 1-2 year, 2-3 year and so on till 7-8 years. Each sub-group had 5 subjects except for 0-1 year age group of hard of hearing children where only one subject was available, and 1-2 year age where 2 subjects were available.

Normal children: Identified by Audiologists and Speech Pathologists, as having no hearing and speech problem.

Hard of hearing children: Those who had been identified as having hearing loss of severe to profound degree and of sensorineural nature. Children who wore hearing aids and attended the speech therapy programme in a speech and hearing centre were also included.

PROCEDURE:

The questionnaires were distributed individually to parents through the speech and Hearing professionals coming from various part of the Mysore City. The parents were instructed to answer the questions that were applicable to their child's speech behavior. As the questionnaire was given to the parents, the child's speech was taperecorded and assessed by the experimenter. Their observations were recorded and later compared with the parents responses.

ANALYSIS:

A descriptive analysis of the acquired data was done. Also percentage of correct consonant articulation relative to age was computed and depicted in a tabular form.

RESULTS AND DISCUSSIONS

The results of parent's responses of normal and hard of hearing children can be classified under two headings:

- 1) Observation of parent's responses to the questions.
- 2) Parent's reports.

These will be discussed separately.

Observation of parent's responses to the questions:

1. Parents of the normal hearing children could identify and differentiate the cry patterns of their children.

Only one hard of hearing child in the 0-1 year age group was present and the mother reported that she could differentiate the cry patterns during 0-2 months of age (Question -I).

2. Children of both the groups could perform the actions of question II after 2 years of age. However, the hard of hearing children could not perform on the last three actions indicating reduced diadochokinetic rate.

This supports the view of Calvert (1961). According to him the speech of the hearing impaired has been reported to be slow and labored. Failure of majority of hard of hearing children in the items of diadochokinetic rate would be attributed to reduced speaking rate.

3. Hard of hearing children from 3 years onwards could perform on all the motor activities mentioned in question III as normal children. This could be attributed to the fact that motor activities can be observed and imitated using different types of feedback like tactile, visual, kinesthetic etc. But in the phonation task it was found that hard of hearing could sustain the phonation for a lesser duration compared to the normal children.

Hudgins (1946) found that hard of hearing children used short, irregular breath groups with one or two words and breath pauses that interrupted the flow of speech at inappropriate places. In addition there was excessive expenditure of breath on single syllable, false grouping of syllables and misplacement of accents. Yanagihara and Koibe (1967) attributed reduced phonation duration in some hard of hearing children to improper coordination between respiratory and phonatory system.

4. The normal children of four years and above scored 100% on all the speech sounds (except blends) given in the Question IV. All the blends were acquired by 5 years of age (See Table – I)

In no age group could the heard of hearing score 100% on all the speech sounds. The children had difficulty with one or more speech sounds in all the age groups.

TABLE – I

Normal Hearing Group

Speech	0 – 11	1 – 1.11	2 - 2.11	3 - 3.11	4 - 4.11	5 - 5.11	6 - 6.11	7 - 7.11
Sounds	Months	Years	Years	Years	Years	Years	Years	Years
a	80%	100%	100%	100%	100%	100%	100%	100%
i	60%	100%	100%	100%	100%	100%	100%	100%
e	80%	100%	100%	100%	100%	100%	100%	100%
o	40%	100%	100%	100%	100%	100%	100%	100%
ai	0%	100%	100%	100%	100%	100%	100%	100%
au	0%	100%	100%	100%	100%	100%	100%	100%
ya	0%	80%	100%	100%	100%	100%	100%	100%
ha	0%	100%	100%	100%	100%	100%	100%	100%
va	0%	80%	100%	100%	100%	100%	100%	100%
pa	40%	100%	100%	100%	100%	100%	100%	100%
ta	20%	100%	100%	100%	100%	100%	100%	100%
ta	0%	20%	40%	80%	100%	100%	100%	100%
la	0%	20%	80%	100%	100%	100%	100%	100%
la	0%	20%	60%	100%	100%	100%	100%	100%
ra	0%	0%	60%	80%	100%	100%	100%	100%

Speech	0 - 11	1 - 1.11	2 - 2.11	3 - 3.11	4 - 4.11	5 - 5.11	6 - 6.11	7 - 7.11
Sounds	Months	Years	Years	Years	Years	Years	Years	Years
sa	0%	0%	80%	100%	100%	100%	100%	100%
sa	0%	0%	80%	100%	100%	100%	100%	100%
ca	0%	20%	60%	100%	100%	100%	100%	100%
ja	0%	20%	80%	100%	100%	100%	100%	100%
ka	60%	80%	100%	100%	100%	100%	100%	100%
ga	40%	80%	100%	100%	100%	100%	100%	100%
ma	80%	80%	100%	100%	100%	100%	100%	100%
na	0%	60%	100%	100%	100%	100%	100%	100%
Kripa	0%	0%	0%	40%	70%	100%	100%	100%
Skrew	0%	0%	0%	40%	60%	100%	100%	100%
Vicks	0%	0%	20%	60%	80%	100%	100%	100%
Pravaha	0%	0%	0%	40%	80%	100%	100%	100%
Riksha	0%	0%	0%	60%	100%	100%	100%	100%
Grahana	0%	0%	0%	40%	60%	100%	100%	100%
Brush	0%	0%	0%	50%	80%	100%	100%	100%
Blade	0%	0%	0%	60%	100%	100%	100%	100%

Speech	* 0 - 11	1 - 1.11	2 - 2.11	3 - 3.11	4 - 4.11	5 - 5.11	6 - 6.11	7 - 7.11
Sounds	Months	Years	Years	Years	Years	Years	Years	Years
a	-	100%	100%	100%	100%	100%	100%	100%
i	-	66.6%	80%	100%	100%	100%	100%	100%
e	-	66.6%	100%	100%	100%	100%	100%	100%
o	-	100%	100%	100%	100%	100%	100%	100%
ai	-	66.6%	100%	100%	80%	100%	100%	100%
au	-	66.6%	80%	80%	100%	100%	100%	100%
ya	-	33.3%	60%	40%	80%	100%	80%	100%
ba	-	33.3%	40%	40%	40%	40%	100%	100%
va	-	0%	60%	80%	100%	100%	100%	100%
pa	-	66.6%	60%	80%	100%	100%	100%	100%
ta	-	33.3%	60%	60%	80%	100%	100%	100%
ta	-	0%	0%	0%	40%	80%	60%	80%
la	-	0%	20%	20%	40%	60%	100%	100%
la	-	0%	0%	0%	20%	0%	40%	60%
ra	-	0%	0%	0%	0%	20%	40%	60%

Contd.

Speech	*0 - 11	1 - 1.11	2 - 2.11	3 - 3.11	4 - 4.11	5 - 5.11	6 - 6.11	7 - 7.11
Sounds	Months	Years	Years	Years	Years	Years	Years	Years
sa	-	0%	0%	20%	40%	60%	80%	100%
sa	-	0%	0%	0%	20%	40%	60%	80%
ca	-	0%	20%	40%	60%	100%	80%	100%
ja	-	0%	20%	40%	60%	40%	60%	80%
ka	-	33.3%	60%	80%	100%	80%	100%	100%
ga	-	33.3%	40%	40%	80%	80%	80%	80%
ma	-	33.3%	80%	80%	100%	100%	100%	80%
na	-	0%	40%	60%	80%	100%	80%	100%
Kripa	-	0%	0%	0%	0%	20%	40%	60%
Skrew	-	0%	0%	0%	0%	20%	20%	40%
Vicks	-	0%	0%	20%	40%	40%	80%	100%
Pravaha	-	0%	0%	0%	40%	0%	20%	40%
Riksha	-	0%	0%	0%	0%	20%	20%	60%
Grahana	-	0%	0%	0%	0%	0%	0%	0%
Brush	-	0%	0%	0%	0%	20%	20%	40%
Blade	-	0%	0%	0%	40%	40%	60%	60%

* Only one subject in this age group.

Less than 100% success was seen on the cluster sounds (See Table –II).

The responses of the normal hearing group of Question IV are in agreement with the studies of Menyuk (1971) and Templin (1975). Menyuk (1971) reported the mastery of the following consonants by age four: /b/, /m/, /n/, /f/, /w/, /h/, /p/, /g/, /k/, /j/ & /l/. In addition to these individual speech sounds, the following initial consonant clusters are reported by Templin (1975): /st/, /sm-/, /Sn-/, /Pr-/, /Dr-/.

The findings obtained for the hard of hearing group supports the study of Hudgins & Numbers (1942). They reported misarticulations of consonant blends. Their study together with other studies (Nober, 1967; Markides 1970) suggests that coordination of the articulations necessary for voicing contrast is an extremely difficult task for the hard of hearing children.

5. No differences were observed between the two groups in the performance on activities involving imitation of environmental sounds and pronoun (Question V, VI & XI).

6. For Questions VII, IX & X which included items to evaluate use of nouns, adjectives, prepositions and verbs, the responses were more descriptive in the hard of hearing group than in the normal group.

These descriptive responses in the hard of hearing group could be because the parents of hard of hearing children are in touch with the speech and hearing professionals which might have made them more sensitive to their children's speech and are usually accustomed to giving such information to the professionals.

Based on their responses it was possible to identify-

- a) sound substitutions, and
- b) the grammatical categories which had not been acquired by their children.

7. For Question XII, parents of normal children reported "where" and "what" questions at 2 years of age and all 'Wh' questions at 3 years of age. In the hard of hearing group responses were variable. These variables were not consistent with age.

Roopa (1980) reported use of "what", "where", "who", "Why", "How" and "Whose" at four years of age. Basavaraj (1981) reported "Why" and "who" in the 3 ½ - 4 years age group and "What" and "How much" in the 4 ½ -5 years old children. Roopa (1980) used spontaneous speech elicitation method and Basavaraj (1981) used TASK test to find out the age of acquisition for the Wh-questions. Even though in the present study the age for the Wh- questions has been reported based on the parent's responses to the

questions. The results seem to be in good agreement with the reports of other investigators where the professionals did the evaluation.

8. In both the groups, most of the children were found to have higher scores on object naming task compared to other items included in the question VIII such as body parts, colours etc.

This supports the view of Nelson (1973). He reported that names for the salient objects and events in a child's world constitute the major portion of his vocabulary. It is also possible that parents are able to observe this item to a greater extent compared to other items.

9. The difference for the hard of hearing and the normal group was most marked for verbal behavior. The minimum age when the child stated humming and singing songs was found to be 2 years for the normal children.

Of the 33 hard of hearing children –

- a) The responses were negative for singing prayers and poems in twenty of the children.
- b) Seven children were able to repeat poems on stimulation.
- c) Six children could recite the poems and prayers spontaneously.
- d) The responses were “No” for singing film songs in all the thirty three hard of hearing children.

The marked differences between the two groups for question XIV could be because the parents of hard of hearing children concentrate more on the immediate communication needs of their children rather than on other activities such as music. It is also possible that the response might have reflected the bias of the public regarding the hard of hearing children, that they cannot learn to sing.

Parent's Report:

The parents of normal children reported that after answering questions, they could observe their children's speech behavior more closely and meaningfully. This indicates that as information become available to the general public and as parents enter the professional field in increasing numbers, they can be called upon to play a significant role in the early identification of the speech problems in children.

The parents of the hard of hearing children reported that a checklist such as the present one for the parents would be helpful in evaluating the child's progress periodically and also could be used as a baseline for the intervention programme.

As the parents have indicated, the questions can be used with children, to note the progress they have made in speech, before and after wearing hearing aids and also could be used as a baseline for the intervention programme.

Examining the questionnaire revealed the child's level of speech. To this extent objective of the study is fulfilled and further studies can be taken up. Based on the information given by the parents, further investigation can be carried out.

From the discussion, it can be seen that the information provided by the parents is in agreement with the studies reported in the literature. Hence, the following conclusions seem warranted.

- It is feasible to collect information from parents about their children's speech development through the questionnaire method.
- It is possible for the professionals to seek information on the child's level of speech from parents.

SUMMARY AND CONCLUSION:

The aim of the study was to find out the ability of the parents of the hard of hearing and normal children to assess their children's speech using the questionnaire method.

The questionnaires were distributed to 100 parents of normal hearing and hard of hearing children of which 40 questionnaires from normal hearing group and 33 questionnaires from hard of hearing group were received. The responses of the parents were collected and later the child's speech was examined by the Speech and Languages Pathologists.

A descriptive analysis of this data was done.

The following conclusions seem warranted.

1. It is feasible to collect information from parents about their children's speech development through the questionnaire method.
2. It is possible for the professionals to know the child's level of speech based on the information given by the parents.
3. Based on the parent's responses, it was possible to differentiate the speech of hard of hearing children and normal children.

Recommendations for future research:

1. The questions can be administered on a larger normal population to different age groups representing different linguistic backgrounds.
2. The questionnaire may be tried out on other speech disordered children. Eg. the Mentally Retarded, the Cerebral Palsied etc.
3. The grammatical categories and other structure may be dealt with in greater detail.
4. A cassette version of the questionnaire can be made and the difference in responses for the recorded and the questionnaire version can be found out.
5. Similar questions in other Indian languages can be prepared.

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- APPENDIX -

ಮಗುವಿನ ಹೆಸರು

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ವಯಸ್ಸು

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ಗಂಡು : ಹೆಣ್ಣು

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ಅಕ್ಕ ತಂಗಿಯರ ಮತ್ತು ಅಣ್ಣ
ತಮ್ಮಂದಿರ ಸಂಖ್ಯೆ

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ಈ ಮಗು ಎಷ್ಟನೆಯವನು:ಳು

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ವಿದ್ಯಾಭ್ಯಾಸ

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ಮಾತೃಭಾಷೆ

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ಮಗು ಮಾತನಾಡುವ ಭಾಷೆ :ಗಳು

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ಮಗುವಿನ ಜೊತೆ ಮಾತನಾಡುವ
ಭಾಷೆ:ಗಳು

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ತಂದೆಯ ಫೆಸರು

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ವಿದ್ಯಾಭ್ಯಾಸ

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ಕುಟುಂಬದ ಒಟ್ಟು ಆದಾಯ

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I. ನಿಮ್ಮ ಮಗುವಿನ ಅಳುವಿನಿಂದ ಅವನಿಗೆ : ಅವಳಿಗೆ

ಹಸಿವಾಗಿದೆ

ಭದ್ರವಾಗಿದೆ

ಮುಜುಗರವಾಗುತ್ತಿದೆ

ನೋವಾಗುತ್ತಿದೆ

ಎಂದು ಗೊತ್ತಾಗುತ್ತದೆವೆಂದಾ ?

ಗೊತ್ತಾದರೆ ಹೇಗೆ ಗುರುತಿಸುತ್ತೀರಾ ?

II. ನಿಮ್ಮ ಮಗುವು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವುದನ್ನು ನೀವು ಮಾಡಿದ ಹಾಗೆ ಮಾಡುತ್ತಾನಾ:ಳಾ ?

“ ಹಾರು: ಇಲ್ಲ ” ಎಂದು ತಿಳಿಸಿರಿ.

- 1) ಅ.....ಎಂದು ಬಾಯಿ ತೆಗೆಯುತ್ತಾನೆ : ಳೆ.
- 2) ತುಟಿಗಳನ್ನು ' ಉಾ..... ಮತ್ತು 'ಒ..... .. ಶಬ್ದದಲ್ಲ ಉಚ್ಚರಿಸುವಾಗ ಮಾಡುವಂತೆ ಮಾಡುತ್ತಾನೆ : ಳೆ.
- 3) ತುಟಿಗಳನ್ನು ಕೂಡಿಸುತ್ತಾನೆ: ಳೆ, ಉದಾ : ಪ
- 4) ನಾಲಿಗೆಯನ್ನು ಬೊರಗೆ ಚಾಚಿ ಒಳಗೆ ತೆಗೆದುಕೊಳ್ಳುತ್ತಾನೆ: ಳೆ.
- 5) ನಾಲಿಗೆಯನ್ನು ಒಂದು ತುದಿಯಿಂದ ಇನ್ನೊಂದು ತುದಿಗೆ ಅಡಿಸುತ್ತಾನೆ: ಳೆ.
- 6) ನಾಲಿಗೆಯನ್ನು ಮೇಲೆ ತುಟಿಗೆ ತಾಕಿಸುತ್ತಾನೆ : ಳೆ.
- 7) ನಾಲಿಗೆಯನ್ನು ಕೆಳತುಟಿಗೆ ತಾಕಿಸುತ್ತಾನೆ: ಳೆ.
- 8) ಪ ಪ.....ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.
- 9) ಪಟ ಪಟ..... ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.
- 10) ಪಟಕ ಪಟಕ..... ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.

III. ನಿಮ್ಮ ಮಗುವು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವುದನ್ನು ಮಾಡುತ್ತಾನಾ: ಳಾ ?

“ ಹಾರಾದು : ಇಲ್ಲ ” ಎಂದು ತಿಳಿಸಿರಿ.

- 1) ಕೆಳಗಿರುವುದನ್ನು 5-10 ಸೆಕೆಂಡುಗಳಷ್ಟು ಹೊತ್ತು ಹೇಳುತ್ತಾನೆ: ಳೆ.
 - ಎ) ಅ.....
 - ಬಿ) ಈ.....
 - ಸಿ) ಉಾ.....
 - ಡಿ) 'ಎ.....
 - ಇ) 'ಒ.....
- 2) ಕೆಳಗಿರುವುದನ್ನು ಉಚ್ಚರಿಸುತ್ತಾನಾ: ಳಾ ?
 - ಎ) ಬೆಲಾನು
 - ಬಿ) ಕಾಗದಗಳ ಚೂರು
 - ಸಿ) ನೋವಿನ ಗುಳ್ಳೆ
 - ಡಿ) ಮೊಂಬತ್ತಿ

V. ಅನುಬಂಧ ಪದ್ಯಗಳನ್ನು

- 1) ಅನುಬಂಧ ಪದ್ಯಗಳಿಂದ
- 2) ಉದಾ: ವಿಜಯಲಕ್ಷ್ಮಿ ವಿಜಯಲಕ್ಷ್ಮಿ, ಎಂದೂ ಬೆಕ್ಕಿಗೆ, ನಾಯಿಗೆ ಬಾಬೆ ಬಾಬೆ ಎಂದು - - - - -
- 2) ಅದರ ಹೆಸರಿನಿಂದ ಕರೆಯುತ್ತಾನೆ: ಕೆ ಉದಾ: ನಾಯಿ, ಬೆಕ್ಕು
- 3) ಅದೇ ಅರ್ಥ ಇದ್ದು ಬೇರೆ ಶಬ್ದ : ಮಗಳನ್ನು ಸಂಬಂಧಿಸಿದ ಪದ್ಯಗಳಿಗೆ ಹೇಳುತ್ತಾನೆ: ಕೆ. ಉದಾಹರಣೆ ಕೊಡಿ :

VI. ಅನುಬಂಧ ಪದ್ಯಗಳನ್ನು

- 1) ಅನುಬಂಧ ಪದ್ಯಗಳಿಂದ ಹೇಳುತ್ತಾನೆ: ಕೆ ಉದಾ: ರೈಲಿಗೆ ಚುಕ, ಚುಕ ಎಂದು, ಬನೆಗೆ ಬುರರರ - - - - -
- 2) ಅದರ ಹೆಸರಿನಿಂದ ಕರೆಯುತ್ತಾನೆ: ಕೆ ಉದಾ: ಬನ್ನ, ಕಾರು - - - - -
- 3) ಅದೇ ಅರ್ಥ ಬರುವ ಬೇರೆ ಶಬ್ದ: ಪದಗಳನ್ನು ಸಂಬಂಧಿಸಿದ ಪದ್ಯಗಳಿಗೆ ಹೇಳುತ್ತಾನೆ: ಕೆ. ಉದಾಹರಣೆ ಕೊಡಿ:

VII. ಕೆಳಗೆ ಕೊಟ್ಟಿರುವವನ್ನು ನಿಮ್ಮ ಮಗುವಿಗೆ ಹೇಗೆ ಕರೆಯುತ್ತಾನೆ - - - ಬರೆಯಿರಿ.

- 1) ಅಮ್ಮ
- 2) ಅಪ್ಪ
- 3) ನೋಡದವನನ್ನು (ಅಣ್ಣ - ತಮ್ಮ)
- 4) ನೋಡದವನನ್ನು (ಅಕ್ಕ, ತಂಗಿ)
- 5) ಅಜ್ಜ
- 6) ಅಜ್ಜಿ
- 7) ಚಕ್ಕವು, ಮಾಡ್ಯವು
- 8) ಎಕ್ಕವು, ಮೊಟ್ಟವು
- 9) ಬೇಲೆಯವರನ್ನು

VIII. ಕೆಳಗೆ ಕೊಟ್ಟಿರುವ ಪ್ರತಿ ವಿಭಾಗದಲ್ಲೂ ನಿಮ್ಮ ಮಗುವಿಗೆ ನಿಮ್ಮ ಪದಗಳನ್ನು ಉಪಯೋಗಿಸುತ್ತಾನೆ: ಕೆ. ಎಂಬುದರ ಸಂಯೋಜನೆಯನ್ನು ಹಾಕಿ

ಸಂಯೋಜನೆ

- 1) ಪದ್ಯಗಳ ಹೆಸರುಗಳು
- 2) ಉದಾಹರಣೆ ಹೆಸರುಗಳು
- 3) ಹೆಸರುಗಳ ಹೆಸರು
- 4) ಉದಾಹರಣೆ
- 5) ಬಿಟ್ಟುಕೊಡುವುದು
- 6) ತರಬೇತಿಗಳ ಹೆಸರುಗಳು

XII. ಅವನು : ಅವಳು ಪ್ರಶ್ನೆಗಳನ್ನು ಹೇಳಬೇಕಾದರೆ

- 1) ಭವನಿಯನ್ನು ಮಾಹಾಡಿಸಿ ಕೇಳುತ್ತಾನೆ: ?
- 2) ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳುತ್ತಾನೆ: ?
 - “ ಎಲ್ಲಿ..... ?
 - “ ಹೇಗೆ..... ?
 - “ ಯಾಕೆ..... ?
 - “ ಯಾವಾಗ..... ?
 - “ ಎಷ್ಟು..... ?
- 3)..... ?

XIII. ನಿಮ್ಮ ಮಗು ಎಷ್ಟು ಪದಗಳನ್ನು ಜೋಡಿಸಿ ಮಾತನಾಡುತ್ತಾನೆ: ?

- 1) ಒಂದು ಪದ ಉಪಯೋಗಿಸಲಿಲ್ಲವೆಂದು: ? ಉದಾ: ಅಮ್ಮ.....
- 2) ಎರಡು ಪದಗಳನ್ನು ಜೋಡಿಸಿ ಮಾತನಾಡುತ್ತಾನೆ: ? ಉದಾ: ಅಮ್ಮ, ನೀರು
- 3) ಮೂರು ಪದಗಳನ್ನು ಜೋಡಿಸಿ ಮಾತನಾಡುತ್ತಾನೆ : ? ಉದಾ:

ಅಮ್ಮ ನೀರು ಕೊಡು.

XIV. ನಿಮ್ಮ ಮಗು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವುದನ್ನು ಹೇಳುತ್ತಾನೆ: ?

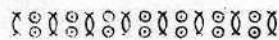
ನಂ.	ಹೇಳಿಕೊಟ್ಟಾಗ ಹೇಳುತ್ತಾನೆ: ?	ಕಾಡಿಸಿ ಜೊತೆ ಝಂಕರಿಸುತ್ತಾನೆ: ?	ಅವನಾಗಿ: ಅವಳಿಗಾಗಿ ಹೇಳುತ್ತಾನೆ: ?
1)	ಜೋಡುಗಳು		
2)	ಪದ್ಯ		
3)	ಚಿತ್ರದ ಪಾಡುಗಳು		
4)	ಶೋಲಕಗಳು		

XV. 1) ನಿಮ್ಮ ಮಗು ಮಾತಲ್ಲಿ ನೀವೇನು ಗಮನಿಸಿದ್ದೀರಾ ? ಅದನ್ನು ಬರೆಯಿರಿ.

2) ಸ್ನೇಹಿತರು ಮತ್ತು ಸಂಬಂಧಿಕರು ನಿಮ್ಮ ಮಗುವಿನ ಮಾತಿನ ಬಗ್ಗೆ 'ವನು' ಹೇಳುತ್ತಾರೆ ?

XVI. ಈ ಪ್ರಶ್ನೆಗಳ ಬಗ್ಗೆ ನಿಮ್ಮ ಅಭಿಪ್ರಾಯವನ್ನು ತಿಳಿಸಿರಿ:

ಟಿಪ್ಪಣಿ :- ಎಲ್ಲಾ ಪ್ರಶ್ನೆಗಳನ್ನು ಉತ್ತರಿಸಿರಿ, ನಿಮ್ಮ ಮಗುವಿಗೆ ಅನ್ವಯಿಸದೇ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ " ಅನ್ವಯಿಸುವುದಿಲ್ಲ " ಎಂದು ಬರೆಯಿರಿ.



- I. ನಿಮ್ಮ ಮಗುವಿನ ಆಳುವಿನಿಂದ ಅವನಿಗೆ : ಅವನಿಗೆ
ಹಸಿವಾಗಿದೆ
ಭರವಾಗಿದೆ
ಮುಜುಗರವಾಗುತ್ತಿದೆ
ನೋವಾಗುತ್ತಿದೆ

ಎಂದು ಗೊತ್ತಾಗುತ್ತದೆಯೇ ?

ಗೊತ್ತಾದರೆ ಹೇಗೆ ಗುರುತಿಸುತ್ತೀರಾ ?

II. ನಿಮ್ಮ ಮಗುವು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವುದನ್ನು ನೀವು ಮಾಡಿದ ಹಾಗೆ ಮಾಡುತ್ತಾನಾ:ಳಾ ?

“ ಹಾರು: ಇಲ್ಲ ” ಎಂದು ತಿಳಿಸಿರಿ.

- 1) ಅ.....ಎಂದು ಬಾಯಿ ತೆಗೆಯುತ್ತಾನೆ : ಳೆ.
- 2) ತುಟಿಗಳನ್ನು ' ಉ..... ಮತ್ತು 'ಒ..... .. ಶಬ್ದದಲ್ಲ ಉಚ್ಚರಿಸುವಾಗ ಮಾಡುವಂತೆ ಮಾಡುತ್ತಾನೆ : ಳೆ.
- 3) ತುಟಿಗಳನ್ನು ಕೂಡಿಸುತ್ತಾನೆ: ಳೆ, ಉದಾ : ಪ
- 4) ನಾಲಗೆಯನ್ನು ಬೊರಗೆ ಜಾಜಿ ಒಳಗೆ ತೆಗೆದುಕೊಳ್ಳುತ್ತಾನೆ: ಳೆ.
- 5) ನಾಲಗೆಯನ್ನು ಒಂದು ತುದಿಯಿಂದ ಇನ್ನೊಂದು ತುದಿಗೆ ಅಡಿಸುತ್ತಾನೆ: ಳೆ.
- 6) ನಾಲಗೆಯನ್ನು ಮೇಲೆ ತುಟಿಗೆ ತಾಕಿಸುತ್ತಾನೆ : ಳೆ.
- 7) ನಾಲಗೆಯನ್ನು ಕೆಳತುಟಿಗೆ ತಾಕಿಸುತ್ತಾನೆ: ಳೆ.
- 8) ಪ ಪ.....ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.
- 9) ಪಟ ಪಟ..... ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.
- 10) ಪಟಕ ಪಟಕ..... ಎಂದು ಶೀಘ್ರವಾಗಿ ಪುನರುಚ್ಚರಿಸುತ್ತಾನೆ: ಳೆ.

III. ನಿಮ್ಮ ಮಗುವು ಕೆಳಗೆ ಕೊಟ್ಟಿರುವುದನ್ನು ಮಾಡುತ್ತಾನಾ:ಳಾ ?

“ ಹಾರು : ಇಲ್ಲ ” ಎಂದು ತಿಳಿಸಿರಿ.

- 1) ಕೆಳಗಿರುವುದನ್ನು 5-10 ಸೆಕೆಂಡುಗಳಷ್ಟು ಹೊತ್ತು ಹೇಳುತ್ತಾನೆ: ಳೆ.
 - ಎ) ಅ.....
 - ಬಿ) ಈ.....
 - ಸಿ) ಉ.....
 - ಡಿ) 'ಎ.....
 - ಇ) 'ಒ.....
- 2) ಕೆಳಗಿರುವುದನ್ನು ಉಡುತ್ತಾನಾ:ಳಾ ?
 - ಎ) ಬೆಲಾನು
 - ಬಿ) ಕಾಗದಗಳ ಪೂರು
 - ಸಿ) ನೋವಿನ ಗುಳ್ಳೆ
 - ಡಿ) ಮೊಂಬತ್ತಿ