Hearing Impairment
Acknowledgements

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Ms. Rekha Roy (Editor)
Dr. S.S. Bhutada
Mr. A.K. Sinha
Mr. Satyendra Kumar
Ms. Alka Sapru Joshi
Dr. Geeta Rao
Mrs. Sarawathy Narayan Swamy
Dr. Mani E. Rao
Ms. Anjali Kant
Dr. Vijayalakshmi Basavaraj
Ms. Joan D’Mello
Dr. (Sr.) Rita Mary
Mr. R. Rangasayee
Dr. Ramacharya
Ms. Geeta Mukundan
Dr. N. Rathna
Dr. M.N. Nagaraja
Ms. Prabhati Mishra
Mr. Ramgopal Srivastava
Dr. Leelavathy Patrick
CHAPTER 14

HISTORICAL PERSPECTIVES

INTERNATIONAL PERSPECTIVES

Education of deaf has deep rooted history which parallels technological development and attitudinal changes of society from time to time. Deafness existed from time immemorial, but the deaf were thought to be retarded. Thus, for many years, no efforts were made to try to educate the deaf. Pedro Ponce de Leon of Spain, in the late 1500's, was perhaps the first to demonstrate that deaf can be taught and they are capable of learning. The first noted school for the deaf started in France during 1700's. The manual approach to teaching the deaf dominated the mid 1800's.

Special education of the deaf saw its dawn through Abbe de l'Epee in Paris, Thomas Hopkins Gallaudet in USA, Pedro Ponce de Leon in Spain, Jacob Periere in France, Samuel Heinicke in Germany and Thomas Braidwood in England. Most of them built up a lucrative profession. But the first teacher and other pioneers started as paupers, toiled half starved and died unnoticed. 1884 to 1904 were the years of struggle for the special educators of the deaf.

NATIONAL PERSPECTIVES

The first school for the Deaf was started at Mazagaon, in the then Bombay Presidency in 1884. The laurels go to Dr. Heaurue for conceiving the idea of a school for the deaf. He sought the help of Lord Ripon for establishing a school for the deaf. His attempts turned fruitful and a school was founded by Dr. Leo Meurius, the Roman Catholic Archibishop of Bombay and Rev. Goldsmith was posted as its first Principal. The arrival of Mr. T. A. Walsh gave a great impetus to education of the deaf. He rendered his services as a fully qualified teacher, at the Bombay Institute for the Deaf & Mute. As he was engaged for over 20 years in Ireland and Belgium, he could do full justice to the profession. However, as the other Fathers of the Society were not trained teachers of the deaf, signs and writings were used as the medium of teaching. Thus, the school was a non–oral school. The State of Bengal came next with the foundation of "Calcutta Deaf & Dumb School" (CDDS) in May 1892. Late Jamininath Banerjee was the first Principal who had an opportunity to be trained at the National College of Teachers of the Deaf, London, England and in Gallaudet College in U.S.A. He was the pioneer in starting the Teacher Training Programme for the teachers of the deaf in India, and this served as the only training centre in our country. A. C. Chatterjee & S. N. Banerjee succeeded as second and third principal of CDDS & Teacher Training Department. February 1896 saw the establishment of the third school at Palamcottai, South India, headed by Ms. Florence Swainson of Church of England, Zenana Missionary Society. The school was named "Florence Swainson School for
the Deaf". The Bombay Institute at Mazgaon had started well under the direction of Rev. Fr. Goldsmith, but its progress slowed down with his retirement. However, with the inception of CDDS of Calcutta, the management was entrusted to an influential and sincere committee. The selfless teachers helped to tide over difficulties.

Some of the other schools which started during the early 1900 are the following:

1. School for the Deaf-Mutes at Ahmedabad in 1908;
2. Bhonsle Deaf & Dumb School at Nagpur in 1915;
3. Mukh Vidyalaya at Baroda in 1909;
4. Barisil Deaf & Dumb School and Dacca Deaf & Dumb School in Bengal in the years 1911 & 1916 respectively.
5. Mukh Vidyalaya at Baroda in 1909.
6. C.S.I. School & Little Flower Convent at Madras in 1912 & 1926 respectively.
7. School for the Deaf & Blind at Mehsana in Baroda in 1913.

To quote at length from the address delivered by the Rev. Dr. W. S. Urquhart, opening the inaugural session of the Convention of the Teachers of the Deaf in India on 19th April, 1935:

"Amidst the confusions of our modern world, which frequently give cause for pessimism, one of the most helpful signs of progress is the changing attitude towards those who, from birth or because of particular accident, have been greatly handicapped for the struggle of life. In more primitive societies such disabilities were often looked upon as the manifestation of a mysterious or ruthless fate, or even as an indication of the displeasure of God. In consequence, it was thought to be our duty simply to acquiesce in this harsh decree of destiny, or the warning was given that it was impious to try to interfere with the decree of God. We were under an obligation rather to enforce it, and sometimes, in more sinister minds, this enforcement took the form of prosecution of the unfortunate who were afflicted in this particular way."

"But things have changed in this respect, and the helplessness of any section of the community is regarded as a challenge to our growing social and humanitarian sense. We are under an obligation to help and not to hinder."

"It is not conceivable that we should leave those who suffer in this way to be a burden on the society. If we are to pay any attention to the Law of Compensation, this demands that because of their need and helplessness, when unassisted, we should make a special effort on their behalf to restore them to an equality with other members of society who are not so grievously handicapped" (Urquhart, 1935). Thus the beginning was made.

By the time India became independent in 1947, there were 38 schools for the deaf. Except for the Nagpur School, the teachers in other schools were trained at the Calcutta Deaf & Dumb School (CDDS).

Another notable feature of this period was that, in 1935 the Convention of the Teachers of the Deaf had come up on the lines of the Convention of the American Instructors of the Deaf. The aims & objectives of the Convention were:

- To urge for the compulsory education for the deaf-mute.
- To stimulate public interest in order to establish more schools.
- Removal of legal disabilities of the deaf-mute regarding inheritance etc.
- Research organisation for better teaching.
- After care organization to find employment and to follow up the deaf after they leave the school.
- To establish ‘Home’ for the unemployed deaf-mute.

**PIONEERS IN EDUCATION OF THE HEARING IMPAIRED**

The stalwarts who worked in the deaf organisations and rendered enormous services for the welfare of the deaf were Dr Shilandernath Banerjee, Shri A.C. Sen, Shri T.C. Das, Shri B.K. Chakravarty, Shri Evelyn Khan, Shri T.P. Kuppu Swamy, to name a few. They also conducted seminars, exhibitions and educational get-togethers. To create public awareness and to focus the needs and problems of deaf-mutes, they had published a magazine "The Deaf in India" under the editorship of Late A.C. Sen for many years with a subsidy from the Ministry of Education, Government of India. The articles were contributed by eminent scholars like Dr. P.T. Kerridge, Dr. I.R. Ewing and Mr. A.W. Ewing of Victoria University. Some professors from American universities added lustre to the journal. This was the prime instrument to exchange views and clarify doubts on academic questions for the teachers of the deaf. Apart from this academic purpose, it also served as an instrument to catch the eye of the government as well as the public in the cause of the deaf.

Some of the other known pioneers in the field of rehabilitation and education of the hearing impaired in India were: Shri Jamininath Banerjee, Founder - CDDS; Shri Umesh Chandra Dutt; Shri Atal Chand Chatterjee; Ms. Mohini Mohan Majumdar; Bholanath Ghatak; Kalidas Battacharjee; Narendra Kr. Basu; Dr Pradhan Bose; Dr Harisadhan Dutt; Mr C W Bolton; Fr. F.J. Rowe; Mrs. Elizabeth Morgan; Nirmal Chand Chaturvedi; Shaligram Chaturvedi; B.H. Gandhi and R.C. Sen.

After the second World War, the school for the deaf in Lucknow was entrusted with a new responsibility of providing vocational education to the war-deafened soldiers. By 1948, most of them were rehabilitated after the successful completion of vocational training. Thus, between 1940 and 1948, the country saw unusual developments in the area of the education of the deaf. This was the time when the country was confronted by the world war. Struggle for independence and communal riots following separation of India and Pakistan affected the movement.

**POST INDEPENDENCE SCENARIO**

Since the attainment of Independence, the schools for the deaf continued to be organised by voluntary agencies. The Central Government and the State Governments gradually started paying increasing attention to education as a vital factor to national progress. Article 45 of the Constitution emphasizes that the State shall provide free and compulsory education for all up to the age of 14. Article 46 states that 'The State shall promote with special care the educational and economic interests of all the weaker sections of the people and shall protect them from social injustice and from all forms of exploitation.'
State Government and Municipalities also started special schools for the deaf in many states. But, the number of schools has remained inadequate compared to the number of children between the age group of 0-14 years.

A Teacher Training College was started in Lucknow in 1947. It was the first and the only training centre in India, which had been approved by the State Government Education Department. Sri S.N. Banerjee served as its first Principal. The Ministry of Welfare started a separate cell for the Hearing Handicapped and a special officer was appointed in the 1960's to look after the welfare of the handicapped. Apart from sanctioning grant-in-aid, the Ministry of Welfare extended many provisions to the handicapped; for example, reservation of seats in different courses, supplying suitable aids to the needy, providing accommodation, scholarships for academic growth etc. In 1964, Kothari Commission recommended the establishment of special schools in every district.

AIISH was established on 9th August, 1965 in Mysore. This Institute contributed a lot by starting manpower development courses in the field of Audiology and Speech Therapy. Similarly, a course was started at B.Y.L. Nair Hospital, Bombay in July, 1966. The All India Institute of Speech and Hearing has contributed in early identification, fitting of hearing aids, giving speech therapy, conducting the camps, identifying the hearing handicapped, guiding and counselling the deaf and their parents for follow up action, etc. The camps held particularly in South India created awareness among the general public that the hearing handicapped, the so called deaf mutes, can also be taught to speak, read and write. They were instrumental in experimenting need based integration of the hearing handicapped children in normal schools.

Rehabilitation centres were established under the Ministry of Labour and they worked for rehabilitation of disabled including the hearing handicapped in almost all states (except the North Eastern States). They undertake assessment for service placement of the disabled and special employment exchanges are providing employment opportunities to them.

In 1981, International Year of the Disabled was celebrated throughout the country. These celebrations improved public awareness enormously. The number of institutes for the hearing impaired increased from 100 to 350.

ESTABLISHMENT OF AYJNIHH

In 1983, Ali Yavar Jung National Institute for the Hearing Handicapped was started under the Ministry of Welfare, Government of India as an apex body for the hearing handicapped. It is located at Bombay and its Regional Centers are in New Delhi, Hyderabad and Calcutta, and a state collaborated centre in Bhubaneshwar. They have taken up large scale manpower development, research, training, early identification, assessment etc.

Most of the special schools for the deaf impart education upto the primary level only. Very few schools in cities like Bombay, Madras, Delhi, Calcutta etc. give education upto Std. X. Two schools in Madras are offering education upto Std. XII.

Till recently, there was no standard curricula in these special schools. Each school followed its own curriculum and taught through oral-aural method. Now the schools adopt the syllabus of respective state government from Std. I onwards. Each school has its own syllabus for pre-school education. There is an exaggerated emphasis on academic education irrespective of the ability of the child. Provision for imparting vocational training is very inadequate, traditional trades alone are taught.
In 1974, the Central Government introduced a scheme called 'Integrated Education of Disabled Children', in normal schools. In theory, the plan appeared good but in actual practice it was found difficult to implement. A few schools in urban areas have tried to implement the scheme. But, the concept of integration varies from school to school. Some normal schools teach deaf children in a separate classroom and run special classes for them, while some others encourage the hearing impaired children to join hands with normal children only in certain activities such as drawing, physical training, sports etc.

TEACHER TRAINING PROGRAMMES

The educational programmes for the deaf are successful only if there are sufficient number of trained teachers of the deaf. The first training centre for the teachers of the deaf was established in Calcutta in 1986. Later Training Centres for the teachers of the Deaf were started in Lucknow, Ahmedabad, Madras, New Delhi, Hyderabad and Bombay. Meanwhile S.N. Banerjee and A.C. Sen had left for higher studies in Clarke School for the Deaf (USA) and Gallaudet College (USA), to specialise in Education of the Deaf. After returning from the U.S.A., they continued training teachers from Bangladesh, Indonesia and Nepal. With A. C. Sen as the second Principal of Government Lady Noyce School for the Deaf at Delhi started a Teacher Training College in 1961. Lucknow and Madras had already started teacher training colleges besides educating the deaf. These training institutions started pre-vocational subjects, training them for better post-school trade training. There were also in-service training courses conducted in various parts of the country in clearing the backlog of untrained teachers.

Some of the other Training Colleges for Teachers of the Deaf are the following:

1. The Training College for Teachers of the Deaf, Aishbagh, Lucknow, U.P.
2. Training College for Teachers of the Deaf, 293, Acharya Prafulla Chandra Road, Calcutta- 700 009.
3. Education Audiology Research Centre, Nepean Sea Road, 67, Punam, Bombay-400 023 (since 1963).
7. Training Institute of Stephen High School for the Deaf and Aphasics, 15, Dadiseth Road, Chowpatty, Bombay–400 007.
12. The Clarke School for the Deaf, Madras–4 (18 Months' course)
13. The Oral School for the Deaf, 4-B Short Street, Calcutta–16 since 1982 (3 Months' evening classes, twice a week).
14. Shri Sant Bhanudas, Maharaj Sandha, Wardha.
18. Helen Keller Institute for the Deaf, Bombay-16. Regular and In-service Training from the current year.
19. AYJNIHH, Bandra (West), Bombay-400 050.

It was the setting up of AYJNIHH in Mumbai in 1983 that gave an impetus to the Teacher Training Programmes and other technical services for the deaf in the country. Presently there are more than 30 teacher training centres for the deaf in the country. For the first time in India, on an average, nearly 500 teachers of the deaf pass out of these institutions every year with D.Ed (HI); B.Ed (HI) and M.Ed. (HI) degrees.

THE RCI ACT

In 1992, the Rehabilitation Council of India (RCI) Act was passed. The RCI is now responsible for training policies, standardization of training courses, recognition of institutions and training courses and the maintenance of a registry of Rehabilitation Professionals. RCI has also started a 'Bridge Course' for experienced teachers of the deaf who do not have a regular certificate or diploma.

UNIVERSITY EDUCATION FOR THE HEARING IMPAIRED

Though there have been cases of individual deaf students pursuing university education in India and outside India, the first post-secondary (pre-university or +2) course for the deaf was started at Little Flower School, Madras. The first college for the deaf (Arts & commerce) was started in 1993 at St. Louis College for the Deaf. This is affiliated to the University of Madras. A college (study centre) was set up at Vallakom, Kerala, in collaboration with CSI School for the Deaf, and is also a centre of the IGNOU (Indira Gandhi National Open University).

FUTURE PERSPECTIVES

During the 1900s, with introduction of electronic hearing aids, use of residual hearing became more prominent. During a short time several schools using lip reading were also started and became quite dominant. However, they were mainly teaching adults. During the late 1960's, it became widely recognised that children who are deaf of hard to hearing and their families must have access to educational efforts before the normal school-entry age. Most early intervention programmes emphasize parental involvement in the educational process.

The role of parents and family involvement in the intervention programme of a new born with hearing impairment is crucial. The basic components related to early intervention include immediate counselling to help the parent adapt to the diagnosis and provide a forum in which they can express and work through their feelings, fitting the infant with hearing aids and encour-
agement should be given to the early development of a rich symbolic communication system between infants and family members. Early identification and intervention allow the family members to feel that they are doing all they can to assist the child. Such a program provides direct intervention with the child and a psychotherapeutic counselling experience for the parents to help them achieve satisfactory emotional adjustment to the birth of an infant with hearing impairment (First and Polfrey, 1994). In 1980, a new awareness developed for the importance of the family in the successful habilitation of the child. Early intervention is viewed as providing support not only to the child, but also to the child’s family and extended family. Thus, thrust was given to start and run parent-infant programmes and pre-school programmes. Effective implementation of these programmes which strengthen the foundations for quality education is now the trend in the area of Education of the Hearing Impaired.
CHAPTER 15

INCIDENCE AND MAGNITUDE OF HEARING IMPAIRMENT

MAGNITUDE OF THE PROBLEM

India is the second most populous country in the planet and covers an area of 3.28 million sq kms(N-S=3214km, E-W=2933km). She has varying geographic, climatic, linguistic, socio-economic dimensions along with vibrant political, cultural and religious ethos. After the freedom struggle that saw a nationwide movement setting aside the inherent differences among people in different walks of life, the will of the people is yet to converge to achieve the nation building task in a sustained manner. The bygone years of democracy in India under socialistic, and secular policies have created a better infrastructure and attitude in the country to address the needs of persons with disabilities today than ever before.

WORLD SCENE

There are well over 123 million persons with hearing loss (41 or more decibels, in need of special services) of the approximately 6 billion world population and this category ranks second among persons with severe activity limitation (WHO, 1998). Majority of them are said to be living in South Asian Countries.

BRIEF HISTORY OF CENSUS IN INDIA

Census of persons with speech and hearing impairment in India are being collected either separately as deaf, and dumb or together as deaf-mutes. According to the Census Report of India 1931 there were 2,31,000 deaf-mutes in India, and it had a rider by M.W M.Yeats, the then Census Commissioner, that the figure was only indicative and the methods of data collection were not convincing to the authorities then. Only in the International Year of the Disabled Persons in 1981, the Census Bureau resumed keeping count of persons with disabilities.

CLASSIFICATION OF DATA

The available data on the incidence and/or prevalence of speech and hearing impairment either exist independently as an entity or co-exist along with the causative details.
A common type of classification of such data may be as follows:

- Geographical, i.e. according to the area or region.
- Chronological, i.e. according to occurrence of hearing impairment over defined stretch of time. (Often such data are discrete in nature.)
- Qualitative, i.e. according to the type of hearing impairment, whether it is conductive, sensori-neural, mixed, functional or central type of deafness.
- Quantitative, i.e. according to degree of hearing loss.
- Socio-Economic, i.e. according to social, religious or economic background of persons with hearing impairment. (This data is more relevant to a secular, democratic developing country.)

**VARIATIONS IN DEFINITION**

The definition of hearing impairment, the purpose of the study, transparent and opaque agenda, methodology involved in such studies have been faithfully reflected in the figures arrived at in various reports. The NSSO defined the hearing disability as a person's inability to hear properly. A person was treated as having hearing disability if he/she could not hear at all or could hear only loud sounds or could hear only shouted words or could hear only when the speaker was sitting in the front, or would usually ask to repeat the words spoken or would like to see the face of the speaker. Perhaps "mild" disability has been left out taking into account only the 'observable and obvious disability'. The Planning Commission, and the Persons with Disabilities Act (1995) have adopted the definition that a person shall be deemed to be deaf if he/she has loss of 60 decibels or more in the better ear in the conversational range of frequencies.

Rehabilitation Council of India considers hearing impairment as loss of 70dB and above in the better ear or total loss of hearing in both ears.

Different definitions have been adapted in various studies now. It is impractical to lay hands on them now and it calls for an in-depth study for commonly agreed definition.

**GEOGRAPHICAL DATA**

The report of the 47th Round of NSSO, 1991 estimates that there are 32,42,000 persons with hearing impairment in India.

Table 15.1 gives the incidence and prevalence of disability gender-wise and for urban and rural areas, based on NSSO 1981 & 1991 surveys.

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence Rural</td>
<td>595</td>
<td>498</td>
</tr>
<tr>
<td>Urban</td>
<td>386</td>
<td>325</td>
</tr>
<tr>
<td>Incidence Rural</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Urban</td>
<td>14</td>
<td>11</td>
</tr>
</tbody>
</table>
One can notice that both the prevalence and incidence of hearing disability have reduced since 1981 census.

Given below (Table 15.2) is the incidence of Hearing Impairment among children in the age group of 0-12 years and gender disparity by States (India: Human Dev. Report, 1999)

<table>
<thead>
<tr>
<th>Region/State</th>
<th>0–4 yrs</th>
<th>5–12 yrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>North:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haryana</td>
<td>170</td>
<td>121</td>
</tr>
<tr>
<td>H.P.</td>
<td>147</td>
<td>1712</td>
</tr>
<tr>
<td>Punjab</td>
<td>138</td>
<td>340</td>
</tr>
<tr>
<td>Upper Central:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bihar</td>
<td>406</td>
<td>941</td>
</tr>
<tr>
<td>U.P.</td>
<td>128</td>
<td>190</td>
</tr>
<tr>
<td>Lower Central:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.P.</td>
<td>190</td>
<td>303</td>
</tr>
<tr>
<td>Orissa</td>
<td>270</td>
<td>859</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>56</td>
<td>281</td>
</tr>
<tr>
<td>East:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N.E. Region</td>
<td>353</td>
<td>409</td>
</tr>
<tr>
<td>West Bengal</td>
<td>1128</td>
<td>3474</td>
</tr>
<tr>
<td>West:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>—</td>
<td>100</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>270</td>
<td>742</td>
</tr>
<tr>
<td>South:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.P.</td>
<td>95</td>
<td>821</td>
</tr>
<tr>
<td>Karnataka</td>
<td>666</td>
<td>629</td>
</tr>
<tr>
<td>Kerala</td>
<td>34</td>
<td>567</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>64</td>
<td>672</td>
</tr>
<tr>
<td>All India:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Person</td>
<td>279</td>
<td>763</td>
</tr>
<tr>
<td>Gender Disparity</td>
<td>1.05</td>
<td>0.87</td>
</tr>
</tbody>
</table>

- In 0–4 year age group highest prevalence is recorded in West Bengal (1128) followed by Karnataka (666) and Bihar (406).
- In 5–12 year age group an alarming high level 3474 per lakh is recorded in West Bengal as against 1712 in Himachal Pradesh and 941 in Bihar.
- Kerala and Gujarat have maintained the problem of hearing loss at a minimum level at 0–4 year and 5–12 year age groups respectively.
- Crude estimate of the size of the population suffering from hearing impairment in India is 0.3 million in 0–4 year age group and 1.5 million in the 5–12 year age group as per the India: Human Development Report, 1999.

**CHRONOLOGICAL DATA**

The age-wise distribution per 1000 persons with hearing impairment is given in Table.15.3 (NSSO, 1991).

It is inferred that majority of the persons with hearing impairment are sheltered in rural areas, and are above the age of 60 years. Also, the aging population is a growing phenomenon world over. It is estimated that India has over 6% of its population in the geriatric group. Studies have shown that over 60% of this group have audiological impairment with or without poor
speech perception ability. That over 25% of those above 60 years continue to economically contribute to the family and the community is worth noting. Hearing impairment is a containable problem among all problems of the geriatric population, if properly treated.

The figures given above highlight hearing problem among various age groups in India. The uncontained population growth in conjunction with increased life span have resulted in increased non-productive consumers viz. the young and the old. This group not only adds to the disability number but also decrease the per capita income.

Reports indicate that 1/100 or 1% of children are born with hearing impairments (Kameswaran, 1985). It means that about 50 children with Hearing Impaired are born in a district of 20 lakh population, and about 60 children are born deaf everyday in India.

**QUALITATIVE DATA**

The eleven District Rehabilitation Centres created to provide disability rehabilitation services in rural areas have provided educational services to over 26,412 children with disabilities. (DRC Scheme, Proceedings of the Review Meeting, 1997). A concerted effort made in Jagdishpur (U.P.) DRC project area with UNICEF assistance (Ratnesh Kumar, 1993) is noteworthy in this context. In Jagdishpur DRC area, of the 2,09,566 children, 3339 were children with disabilities, amounting to 15.9 children with disability for every thousand children surveyed. Interestingly, of the 4049 children with disabilities recorded in primary, high schools and higher secondary levels out of 2,71,428 surveyed, 82% of children with disabilities are in primary schools. (the reason could be the greater awareness created by the DRC scheme, and high dropout rate).

The children with locomotor disability constituted 35.7%, 17.3% had speech and hearing disability, 5.8% had visual disability, 9.8% were slow learners, while 1.4% were multiple handicapped. The Pulse Polio Campaign and the Blindness Control Programmes have already tilted the ratio of incidence and prevalence of childhood disabilities. The District Primary Education Programmes(DPEP) is likely to reveal this trend with empirical evidence.

Another population based on the study in the DRC scheme (Chinglepet District) shows that of all persons reporting to be hearing impaired, 5% had conductive loss, 27% had mixed loss and 68% had S.N. loss. Among 2086 school children screened for hearing loss(S.Nikam,1970) 3.07% had bilateral conductive loss, 0.67% had unilateral conductive loss, and 0.19% had unilateral and bilateral sensorineural loss each.
A number of localized studies have shown varying prevalent rates from 1% to as high as 40% (Misra et al, 1961; Gupta, 1967; Kameswaran, 1967; Sinha et al, 1964; Rao, 1961). While Sinha et al (1964) studied iodine deficiency in endemic areas Rao (1961) blamed fluorosis as a cause for higher incidence of deafness in his population. Kacker, Gupta and Tandon (1975) in a study of vit.A deficient population of Khols block found a prevalence of 40% (approx.) hearing impairment, and found 1 in 1000 to have a CSOM among children in a public school. The regional peculiarities are known to influence the geographical spread of hearing impairment (Hinch Cliff, 1964).

A report from NIMHANS (1999) shows that well over 35% of children with learning disabilities had Central Auditory Processing Disorders, in addition to one fourth of those above 60 yrs who suffer from some degree of CAPD. This problem further complicates remediation when it co-exists with peripheral hearing disorders. The authors have reported elsewhere the findings of a study jointly conducted with Institute Voor Doven, Nederlands, on children in Special Schools in Chennai that about 20% of the enrolled children with hearing impairment have additional handicaps (Multi Handicapped Hearing Impaired-MHHI).

**QUANTITATIVE DATA**

A DRC study also shows that of all persons who report for audiological remediation, 2% had mild loss, 25% had moderate hearing loss (41-55dB), 19% had moderately severe loss (56-70dB), 42% had severe loss (71-90dB) and 12% profound loss. Each village had on the average 6 persons with hearing impairment (SD = 1.65). The averages indicate the prevalence of hearing impairment in our country.

**SOCIO-ECONOMIC DATA**

Table 15.4 gives an indication of percentage of population under different religious sects in India (NSSO, 1996).

<table>
<thead>
<tr>
<th>Religion</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>82.00%</td>
</tr>
<tr>
<td>Muslims</td>
<td>12.12%</td>
</tr>
<tr>
<td>Christians</td>
<td>2.34%</td>
</tr>
<tr>
<td>Sikhs</td>
<td>1.94%</td>
</tr>
<tr>
<td>Buddhists</td>
<td>0.76%</td>
</tr>
<tr>
<td>Jains</td>
<td>0.40%</td>
</tr>
<tr>
<td>Others</td>
<td>0.39%</td>
</tr>
<tr>
<td>Not Stated</td>
<td>0.05%</td>
</tr>
</tbody>
</table>

Table 15.5 shows the spread of hearing impairment in children among various economic, social and religious groups.
Table 15.5: Social Groups and Incidence of Hearing Loss (per lakh)

<table>
<thead>
<tr>
<th>Social Group</th>
<th>0-4 yrs</th>
<th>5-12 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>STs</td>
<td>158</td>
<td>576</td>
</tr>
<tr>
<td>SCs</td>
<td>385</td>
<td>1272</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Religion</th>
<th>0-4 yrs</th>
<th>5-12 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>264</td>
<td>689</td>
</tr>
<tr>
<td>Muslims</td>
<td>324</td>
<td>1328</td>
</tr>
<tr>
<td>Christian</td>
<td>295</td>
<td>590</td>
</tr>
<tr>
<td>Other minorities</td>
<td>501</td>
<td>764</td>
</tr>
</tbody>
</table>

Table 15.5 shows that the SCs and Muslims have greater prevalence of hearing impairment. However, further studies are needed in this aspect.

HOUSEHOLD INCOME AND INCIDENCE OF HEARING LOSS

There is evidence that the prevalence of disability is highly correlated with poverty and social disadvantage caused by the skewed distribution of society available resources. The 50th round report of NSSO 1993-94 showed that there are 320.3 million people below poverty line. The poverty ratio was 36 and the hunger ratio was 14-16% in some major states in the country. Table 14.7 shows incidence of hearing loss across income groups.

Table 15.6 Income-wise Incidence of Hearing Loss (per lakh)

<table>
<thead>
<tr>
<th>Household Income Group</th>
<th>0-4 yrs</th>
<th>5-12 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto Rs 20,000</td>
<td>298</td>
<td>922</td>
</tr>
<tr>
<td>20,001 - 40,000</td>
<td>274</td>
<td>639</td>
</tr>
<tr>
<td>40,001 - 62,000</td>
<td>255</td>
<td>530</td>
</tr>
<tr>
<td>62,001 - 86,000</td>
<td>203</td>
<td>496</td>
</tr>
<tr>
<td>Above 86,000</td>
<td>206</td>
<td>295</td>
</tr>
</tbody>
</table>

There is a gradual decrease in the incidence of hearing loss with increase in household income.

FUTURE PERSPECTIVES

The problems and issues of persons with hearing impairment, though well known, have always been set aside. There is a prevention programme for the locomotor impairment, there is a prevention programme for blindness, but there isn’t any for hearing impairment - a physical disability considered as greatly awesome even by no less a person than Hellen Keller. No wonder that the available evidence on incidence and enormity of the problem is grossly inadequate. The problems of hearing impairment have to be given priority in the national agenda and
their precise estimate, nature, type, degree, age of onset, socio-vocational and economic factors, will have to be gathered in the light of implementing the *Persons With Disabilities Act, 1995*. While doing so, addressing the professional idealism with a human face is the need of the hour.

The four kinds of needs of our target population will have to be assessed. They are:

- **Normative need**: The need as defined by professionals.
- **Felt need**: The need where individuals have indentified what they want. People cannot have a felt need for things that they do not know exist.
- **Expressed need**: This is where people say what they need. That is, they turn a felt need into a request or demand (prioritised).
- **Comparative need**: This is identified by comparing two similar groups or individuals, rather than making a judgement against normative standards.

The need identification will have to be done through a combination of an Epidemiological approach, Socio-economic approach, Behavioural approach, and a Community participation approach (Elizabeth R. Perkins et al. 1999).

All hearing impairment are not the same. Common clinical experience in audiological, otological and special educational practice suggest that individuals with similar audiometric profiles will both describe and exhibit a wide range of hearing difficulties (Noble, 1978; Jackson, 1982; Gate House, 1990; Kramer et al, 1995; Nagaraja, 1996.)

An impairment not corrected leads to limitation of activities (disability) using the impaired organ and which if left uncorrected leads to limited participation in social life (handicap) irrespective of the age of onset. A child with mild hearing loss if left uncorrected, behaves like a severely hearing impaired person. Sometimes, even worse. The impact of impairment is also influenced by age, gender, social class, culture, location, household production, health, attitudes of the community towards support facilities and above all, availability of quality services.
Incidence and Magnitude of Hearing Impairment

The country has been encapsulated in a phase of transition in its economic and social environment, irrespective of its political choices. The budget is deficit. The balance of payment is high, while the Human Resources Development strategies in the field of disability rehabilitation—the techniques, technologies and training targets—are excessively based on wisdom that has emerged from developed economies and thus ineffective though efficient. In any case, there are only 5288 professionals (RCI, 1996) in the field of hearing impairment.

Only when resources are inadequate, a problem is perceived as enormous and incongruable. The spread of the problem across the 6 lakh villages is adding to the complexity of service delivery. Empowering Panchayat Raj Institutions, not only to keep count but also to keep track of promoting the quality of life of persons with hearing impairment, is a felt need.

Whenever natural justice can emerge at the societal level, it happens even without an external catalyst. The concept of social justice has great relevance in facilitating natural justice. (Equality rendered to every citizen spontaneously in a given society is referred to as natural justice.)
CHAPTER 16

MEASURES INITIATED FOR PREVENTION AND EARLY IDENTIFICATION OF HEARING IMPAIRMENT

INTRODUCTION

Hearing is one of the important factors which determines the 'quality' of the life we lead. Hearing impairment invariably has adverse effects on leading a 'quality' life in the affected individuals. Irrespective of the age of onset of hearing impairment, it comes in the way of the individual utilising his potentials to the maximum, be it in terms of speech and language acquisition, educational achievement, vocational placement or spiritual pursuit, if not attended to on time.

INCIDENCE AND CAUSES OF HEARING IMPAIRMENT

The incidence of hearing impairment in India is quite alarming. Even though the exact figures are not available, several studies have documented the incidence of hearing impairment to be between 6.8% (ICMR Study, 1983) to 37% (Jain, 1967) (Table 16.1).

<table>
<thead>
<tr>
<th>Reported by/year of study</th>
<th>Population studied</th>
<th>Type of loss</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bhatia &amp; Mishra, 1961</td>
<td>General Population</td>
<td>Hearing Impairment (HI) in general (otitis media being a major factor).</td>
<td>15 to 17% children in India</td>
</tr>
<tr>
<td>2. Gupta (1965)</td>
<td>General Population</td>
<td>HI in general</td>
<td>35.4%</td>
</tr>
<tr>
<td>6. ICMR multicentre study 1983</td>
<td>Rural area</td>
<td>Hereditary HI</td>
<td>24%</td>
</tr>
<tr>
<td>---do---</td>
<td>Urban area</td>
<td>HI in General</td>
<td>10.7%</td>
</tr>
<tr>
<td>---do---</td>
<td>Hearing impaired in rural area</td>
<td>HI in General</td>
<td>6.8%</td>
</tr>
<tr>
<td>---do---</td>
<td>Hearing impaired in urban area</td>
<td>Conductive HI</td>
<td>48%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sensorineural HI</td>
<td>41.7%</td>
</tr>
</tbody>
</table>

(Contd.)
A World Health Organisation (WHO) (1980) report summarizes the main causes of hearing impairment in India as: *Infections, Neglect and Ignorance*. Among the underlying causes are low socio-economic conditions, inadequate health care and nutrition. The major causes of hearing impairment are given in Table 16.2. Prevention of hearing disability has to deal with overcoming these three basic causes.

**Table 16.2 The Major Causes of Hearing Impairment**

<table>
<thead>
<tr>
<th>Nature of Cause/ Time of Affection</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Prenatal</td>
<td>T- Toxoplasmosis, O - Syphilis, bacterial meningitis, R - Rubella, C - Cytomegalo virus, H - Herpes</td>
</tr>
<tr>
<td>N</td>
<td>Bacterial meningitis</td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>E Natal/ Prenatal</td>
<td></td>
</tr>
<tr>
<td>C Postnatal/ T, O later in life</td>
<td>Measles, Mumps, Chiken pox, Meningitis, Encephalitis, Diphtheria, Tetanus, Whooping cough, Pneumonia, Middle ear infections.</td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td></td>
</tr>
</tbody>
</table>

2. Prenatal

Malnutrition of the pregnant mother. 
Non-immunisation of the pregnant mother and post pubertal female for vaccine preventable diseases. 
Unaware of Rh incompatibility factor. 

| N | Less satisfactorily managed diseases during pregnancy e.g. T.B. Malaria, |
| E | Epilepsy, requiring the administration of ototoxic drugs. |

(Contd.)
### Nature of Cause/Time of Affection

<table>
<thead>
<tr>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deliveries in less satisfactory and poor hygienic conditions, inviting infections and trauma.</td>
</tr>
<tr>
<td>Non-professionals handling the complicated delivery resulting in prolonged asphyxia/trauma/infections.</td>
</tr>
<tr>
<td>Non-immunisation of the child for vaccine preventable disease (of the kinds mentioned under INFECTIONS).</td>
</tr>
<tr>
<td>Neglect or unsatisfactorily managed Ear, Throat and Nose infections. Less satisfactorily managed diseases (such pneumonia, malaria, typhoid and resulting in possible ototoxicity during the treatment with drugs such as aminoglycocides e.g. Streptomycin, Gentamycin, Kanamycin, etc, Quinine preparations, dieuretics etc.</td>
</tr>
<tr>
<td>In addition to the above mentioned conditions, the following may be prevalent.</td>
</tr>
<tr>
<td>Excessive exposure to loud noise without any ear protection.</td>
</tr>
<tr>
<td>Unsatisfactory living conditions/styles resulting in head/ear trauma.</td>
</tr>
<tr>
<td>Non-availability of facilities/neglect of head and ear tumors.</td>
</tr>
<tr>
<td>I. General public ignorance</td>
</tr>
<tr>
<td>There is a general public ignorance regarding the importance of drinking 'clean water, eating nutritious food and breathing 'clean air', lack of which are the causes for most of the diseases. In addition to these, the following areas of ignorance are specific to hearing impairment :</td>
</tr>
<tr>
<td>Ignorance regarding the hereditary hearing impairment resulting in promotion of consanguinous marriages inspite of the increased risk.</td>
</tr>
<tr>
<td>The importance of nutrition health and immunisation of the pregnant mother regarding hygienic safe deliveries.</td>
</tr>
<tr>
<td>The importance of nutrition and immunisation of the newborn, infants and children.</td>
</tr>
<tr>
<td>Seeking early help for any disease/trauma/condition.</td>
</tr>
<tr>
<td>II. Government and private sector administration</td>
</tr>
<tr>
<td>In addition to the ignorance regarding I, the following appears to be relevant regarding:</td>
</tr>
<tr>
<td>The cost effectiveness of undertaking preventive measures compared to the cost involved in starting rehabilitative measures.</td>
</tr>
<tr>
<td>The cost effectiveness of promotion of manpower development to undertake effective preventive measures.</td>
</tr>
</tbody>
</table>

*(Contd.)*
MEASURES INITIATED FOR PREVENTION AND EARLY IDENTIFICATION OF HEARING IMPAIRMENT

<table>
<thead>
<tr>
<th>Nature of Cause/Time of Affection</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The need to effectively implement the rules and regulation to control noise in public places/industries.</td>
</tr>
<tr>
<td></td>
<td>III. The medical/paramedical fraternity</td>
</tr>
<tr>
<td></td>
<td>As hearing impairment is not a 'life threatening' condition, several causes of hearing impairment (such as, the nature and dosage of drugs used, the method of administration of the drug, the effective follow up to control the disease/condition) which can be controlled by medical professionals go beyond their control, at times. This may be due to:</td>
</tr>
<tr>
<td></td>
<td>- Non inclusion of these aspects in their curriculum at under graduate/post graduate levels.</td>
</tr>
<tr>
<td></td>
<td>- Lack of opportunities to attend Continuing Education Programme and lack of other facilities (such as books and journals etc.) to up-date themselves regarding these issues.</td>
</tr>
</tbody>
</table>

LEVELS OF PREVENTION OF HEARING IMPAIRMENT

According to the WHO document of 1980, three levels of prevention are defined as follows:

- **Primary prevention** which includes the action aimed at preventing the impairment from occurring e.g. immunisation against Rubella and other preventive diseases, genetic and congenital deafness education, hearing conservation programme in the workplace, public and physician education regarding the use of Ototoxic drugs.

- **Secondary prevention** which includes action to be taken once an impairment is present either to cure the disease (eg. Otitis media and bacterial mastoidities meningitis), to stop its progress or to reverse the damage to the hearing by otological surgery. (micro ear-surgery)

- **Tertiary prevention** includes habilitation and rehabilitation aimed at compensating for the hearing impairment by the use of amplification, educational measures, education of parents, special education, vocational training and social integration to diminish the consequences of the hearing impairment.

Among the major causes of hearing impairment, the primary preventive measures can be taken with respect to Infectious diseases, Ototoxicity, Metabolic disorders, Genetic factors, Noise pollution and Trauma.

**NATIONAL AND COLLABORATIVE EFFORTS FOR PRIMARY PREVENTION OF HEARING IMPAIRMENT**

The national and collaborative efforts for prevention of hearing impairment are a part and parcel of the general measures undertaken for prevention of all the disabilities and those for promotion of health of children and adults, some of which are the following.

**National Measures for Immunisation**

Expanded Programme of Immunisation (EPI) was launched by the WHO in 1974 and it was implemented in India in 1978 with the collaboration of WHO. This is also one of the programmes
incorporated in the National Health Policy of 1983. Universal immunization programme is aimed at control of vaccine preventable diseases namely Diphtheria, Pertussis, Neonatal Tetanus, TB and Polio Myelitis and Measles. Hearing impairment is a sequelae of some of these infectious diseases or they are acquired due to ototoxic drugs administered to manage these conditions. Implementation of this programme is resulting in reduction in the incidence of hearing impairment to some extent by controlling the post natal and later life affection by infectious diseases mentioned in Table 16.1.

National Iodine Deficiency Disorder Control Programme (NIDDCP)

Iodine deficiency is reported to result in several disorders like goitre, mental retardation and hearing impairment. This national programme was started in 1986 with the aim of 100% iodisation of salt by 1992. The Outreach and Extension programme of AYJNIHH, Mumbai participated in the project where in the population of Sikkim were screened for hearing. In the pilot study (Roy et al., 1991), it was found that 42.27% of the iodine deficient population studied had hearing loss, especially for the higher frequencies of 3, 4 and 6 KHz.

NIDDCP program helps in prevention of hearing impairment by addressing to the causes mentioned under NEGLECT in Table 16.1.

Child Survival and Safe Motherhood (CSSM) Programme

This programme was launched in 1992–93 as a seven year project with the financial assistance of World Bank and the UNICEF. The aims and objectives of the project were:
- Sustaining and strengthening Universal Immunisation programme, Oral rehydration therapy to control diarrhoea and Prophylaxis scheme.
- Improving the maternal care at community level by providing training to the Traditional Birth Attendance (TBA) and disposable delivery kits to the pregnant woman.
- Control of Acute Upper Respiratory Tract Infection (AURTI) for children below five years of age.
- Setting-up of sub-district level First Referral Units (FRUS) for improving emergency cases.

These projects are aimed at hygienic deliveries and immunisation of the new borns which helps in early detection and control of infections. This in turn prevents the side effects of infection and also of the ototoxic drugs which are necessary to control the infection. Thus, it helps in controlling the causes mentioned under NEGLECT in Table 16.1.

National Nutritional Policy

This was launched in 1993 by the Department of Woman and Child Development, Government of India. Under this policy, the project of Integrated Child Development Services (ICDS) was implemented. In this project supplementary nutrition is provided to children below 6 years of age, pregnant women and women in 15 to 41 years age groups: This was launched with the assumption that safe motherhood can prevent the number of disabilities. (as mentioned under the factor of NEGLECT in Table 16.1).

National Programme to Overcome the Problems of Ignorance

National Information Centre of Disability and Rehabilitation (NICDR) was established in 1987. This is a nodal agency for creation of awareness regarding the causes and prevention of
disabilities, services available for such disabilities etc. This has a media cell which promotes the awareness in the general public regarding the disability. In collaboration with the national Institute of Disability and Rehabilitation Research (NIRR) of USA, District Rehabilitation Centre (DRC) project was taken up in 1985 for imparting training to DRC functionaries. As of now, there are 11 DRCs in the 10 states in India. The aims and objectives of DRC are:

- Surveys of disabled population
- Making early identification
- Medical intervention and surgical corrections.

In addition to DRCs, four Regional Rehabilitation Training Centres, also one each at Chennai, Mumbai, Cuttack and Lucknow have been established. The objects of RRTCs are:

- Training of village level functionaries
- Training of DRC professionals
- Orientation and training of state government officials/NGOs.
- Providing manuals to the State Governments/NGOs.

In addition to these, four National Institutes were established between 1976 and 1983, one each for Orthopaedically Handicapped, Visually Handicapped, Mentally Handicapped and Hearing Handicapped. These National Institutes have activities aimed at prevention of the respective disabilities. Community Based Rehabilitation (CBR) programmes are also being conducted by these institutes and centres for prevention of Hearing Impairment.

More than a decade back, Kacker (1988) showed the right direction for National Policies of our country with respect to primary prevention of Hearing Impairment. He remarked as follows:

"... In the foreseeable future, it is unlikely that a paralleled health structure can be developed within the financial resources currently available in conservation of hearing. The training of family members for maximal participation in health education needs a priority approach."

**PRIMARY PREVENTION MEASURES BY OTHER AGENCIES**

These measures are basically in the area of creating awareness in people regarding the measures which can be taken to prevent hearing impairment.

Ali Yavar Jung National Institute for the Hearing Handicapped (AYJNIHH), an apex national level body for the hearing impaired established in 1983 under the Ministry of Social Justice and Empowerment, Government of India, is actively involved in implementing primary preventive measures. As its headquarters in Mumbai and at its regional centres at New Delhi, Calcutta, Secunderabad and Bhubaneshwar, it regularly holds workshops to create awareness about the preventability of hearing impairment to a wide range of population including school children, teachers local administrators, medical professionals (belonging to various specialities) and also general public. It has held several public rallies on significant occasions such as 'World Day of the Deaf', 'Children's Day', 'International Day of the Disabled' etc., annually. By means of carrying and distributing posters, banners and pamphlets, public awareness is created.

The Outreach and Extension Department of the Institute has reached nooks and corners of India by conducting camps and also by establishing outreach extension services. It has
conducted several programmes to build up community awareness programmes regarding hearing impairment, alone. In these programs, the awareness campaign is directed to the target group of parents (of young children), community leaders and the youth (both male and female). Attempts have been made to study the impact of these programmes as well (AYJNIHH Annual Report, 1991).

The Institute has developed (in the Department of Material Development) a variety of awareness material regarding prevention, early identification of hearing impairment, and need for early intervention to suit all types of media. Audio and video cassettes are available for the electronic media (radio and TV), booklets, magazines, news letter, pamphlets, journals and press releases are available for press media. Audio video material in terms of folk songs/dance, (telling about causes of hearing impairment, preventive measures etc), street plays/drama, mime show, slide/film shows are available for theatre media. In addition to these, the Institute participates in all the major exhibitions (related to the area of disability) where in banners, posters, aids and appliances available for identification, diagnosis and rehabilitation of the hearing impaired are displayed. The Institute also conducts quizzes, debates, essay and group discussion competitions to highlight the causes of hearing impairment and the measures to be taken to prevent it.

RESEARCH AND CLINICAL ACTIVITIES WITH RESPECT TO PRIMARY PREVENTION

About 52% of the congenital deafness is genetically caused (WHO, 1988). Of the genetic hearing impairment, recessive deafness is estimated to be 75-88%. Manifestation of the affected recessive gene in terms of non-syndromic hearing impairment is more likely in children born to couples of consanguineous marriages. The prevalence of consanguinity is quite high in several parts of India (Table 16.3). Verma (1992) reports that the incidence of hearing impairment in non-consanguinous marriages is about 3.1 per 1000 whereas the incidence of hearing impairment in consanguinous marriages is 12.9/1000 (4 times higher).

<table>
<thead>
<tr>
<th>Reported by/year</th>
<th>Areas in India</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rajendra Kumar, et al 1992</td>
<td>General population Madurai</td>
<td>70%</td>
</tr>
<tr>
<td>Deshmukh, 1972</td>
<td>In Ichalkaranji</td>
<td>46.4%</td>
</tr>
<tr>
<td>Rajendra Kumar, et al 1992</td>
<td>In Madras</td>
<td>37.6%</td>
</tr>
<tr>
<td>Roy, R., 1992</td>
<td>In Mumbai</td>
<td>16%</td>
</tr>
<tr>
<td>Kacker et al 1992</td>
<td>In Delhi</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Note: Verma (1992) reports that the incidence of Hearing Impairment in non-consanguinous marriages is 3.1/1000 whereas the incidence of hearing impairment in consanguinous marriage 12.9/1000 (4 times higher)

Hereditary hearing impairment is potentially amenable for primary prevention. As of now, the genes causing hearing impairment have not been mapped, even though genes causing several syndromes with associated problem of hearing impaired have been localised. The Institute (at the Department of Audiology) is involved in an Indo-US project on "Mapping Genes for Non-syndromic Hearing Loss the India Protocol" in collaboration with AIIMS, New Delhi.
In the Audiology clinic of the Institute, genetic counselling (preliminary) is offered with the intention of preventing the birth of hearing impaired child in the 'At Risk' population. Table 16.4 and 16.5 show the genetic risk in profound childhood deafness of unknown cause and risks for children when both parents have profound childhood deafness. (Fraser, 1976; Bieber and Nance, 1979; Verma, 1992). These guidelines are followed while doing Genetic Counselling.

**Table 16.4 Genetic Risks in Profound Childhood Deafness of Unknown Cause**

<table>
<thead>
<tr>
<th>Affected relative</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>One child only: Environmental factors carefully excluded</td>
<td>1 in 10</td>
</tr>
<tr>
<td>One child only: consanguinity present</td>
<td>1 in 4</td>
</tr>
<tr>
<td>Two affected children</td>
<td>1 in 4</td>
</tr>
<tr>
<td>One parent + one child</td>
<td>1 in 2</td>
</tr>
<tr>
<td>Parent + sib (s) of parent only</td>
<td>1 in 100</td>
</tr>
<tr>
<td>Sib (s) of parent : parent unaffected</td>
<td>&lt; 1 in 100</td>
</tr>
</tbody>
</table>

**Table 16.5 Risks for Children when Both Parents have Profound Childhood Deafness**

<table>
<thead>
<tr>
<th>Number of children</th>
<th>0</th>
<th>1 Unaffected</th>
<th>1 Affected</th>
<th>2 affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parents related</td>
<td>&gt; 1/2</td>
<td>1 in 10</td>
<td>ALL</td>
<td>ALL</td>
</tr>
<tr>
<td>Parents unrelated but from same minority ethnic group</td>
<td>&gt; 1/2</td>
<td>1 in 10</td>
<td>ALL</td>
<td>ALL</td>
</tr>
<tr>
<td>Parents unrelated not from same minority ethnic group</td>
<td>1 in 10</td>
<td>1 in 20</td>
<td>&gt; 1/2</td>
<td>ALL</td>
</tr>
</tbody>
</table>

**ROLE OF OTHER NATIONAL INSTITUTES AND NGOs**

Awareness campaign activities to overcome the problem of Ignorance in preventing hearing impairment are also undertaken on a regular basis by several other National Institutes such as All India Institute of Speech and Hearing, (Mysore), All India Institute of Medical Sciences, (New Delhi), Institute of Speech and Hearing, (Bangalore), etc. students of speech and hearing are involved in such campaigns at several places (Basavaraj et al, 1997), besides Ayodhya Charitable Trust, Pune (since 1970) through free Deafness Detection Camps. Indian Speech and Hearing Association (ISHA) has declared 4th April as National Speech and Hearing Day. The students and professionals undertake public awareness campaigns regarding prevention and early identification of hearing impairment on that day.

**ROLE OF RCI**

Recently, RCI has initiated a nation wide orientation programme for the Primary Health Centre (PHC) Medical Officers. This is a commendable venture as it aims at orienting the doctors who are the sole referral agents in the rural areas, in the area of prevention, early identification and referral of the disabled. AYJNIHH, Mumbai and Ayodhya Charitable Trust, Pune are the centres to train the 'Master Trainers' as well as to conduct the orientation programme of the PHC doctors. Within a span of five months, AYJNIHH has arranged/participated in training the master trainers at Mumbai (Maharashtra) Panji (Goa) and Srinagar (J&K).
NATIONAL AND COLLABORATIVE EFFORTS FOR SECONDARY PREVENTION OF HEARING IMPAIRMENT

Secondary prevention deals with early identification and immediate initiation of intervention programme.

National Measures for Early Identification

Indirect secondary prevention measures of early identification are incorporated with the national programmes aiming at primary prevention. Rural health services have been developed, under which a sub-centre is provided for every 5000 population in plains and every 300 population in hilly/tribal areas; one primary health centre is provided for every 30,000 population in plain area and 20,000 in hilly/tribal areas; upgraded community health centres are provided to cover a population of 80,000 to 1.20 lakh.

In each of these centres, there are trained grama sevikas, anganwadi workers, multi purpose workers and 'vikalanga bandhus,' nurses etc. Even though this skeletal infrastructure is available to undertake early identification to the best of the knowledge of the authors, there are no national measures/policies for early identification of hearing impaired as yet in India.

Role of Other Agencies in Secondary Prevention

There is a general agreement by professionals that hearing impairment should be recognised as early in life as possible so that the remediation process can take full advantage of the plasticity of the developing sensory system (i.e. maximum utilisation of the crucial critical period), so that the child can enjoy normal and holistic development like his/her hearing peers.

The crucial critical period is the first three years of life. On an average, the identification age of hearing impairment remains around three years of age. Lowering the age of identification is a challenge even in the U.S.A. The Healthy People 2000 initiative (U.S. Department of Health and Human Services, 1990) set a goal to reduce the average age at which children with significant hearing loss are identified to no more than 12 months of age by the year 2000. We have a long way to go in this regard.

The concept and need for early identification and prevention is not new for India. The All India Institute of Speech and Hearing, Mysore had developed brochures, handouts and films touching on identification, prevention and intervention in 1960s itself. Nikam and Dharamraj attempted infant screening way back in 1971. Basavaraj et al (1984) carried out a newborn screening project in Bangalore. Neonate screening of NICU babies is under way at both Wadia Children's Hospital, Mumbai and AIIMS, New Delhi. This may also be going on in other major hospitals as Bihar is undertaking new born screening using Behavioural Observation Technique.

Satyendra Kumar, as part of his masters dissertation, in 1975, developed a 'Mass Auditory Screening Test' that was administered through radio broadcasting. The results were encouraging. AIJNIHH also adapted it to Television and the hearing screening test entitled 'Aek Khel Sunaneka' (Title in Hindi) was telecast several times on Doordarshan. The Video of the same programme is used at camps, exhibitions and during other outreach activities. Even though it is a good screening procedure and also helps in creating awareness regarding hearing impairment, it is not used extensively as infrastructure of follow up service is not available.
There are sporadic reports about several NGOs carrying out school screening programs to identify hearing impairment in school going population.

Ashok Kumar initiated the development of a high risk register as part of his Masters dissertation in 1982.

Manufacturers of audiological equipment in India, had on sale paediatric hearing screening devices such as—The Reactometer by M/s Elkon Private Limited, Mumbai, Paediatric Handheld Warbler by M/s Arphi Electronics Pvt Ltd., Mumbai Chennai and the Crib-o-gram by M/s. Calipsonic, Mumbai. However, these devices have hardly been used.

In addition, several individual research papers and ICMR funded research projects and the US Aid projects have reported on the incidence/prevalence of hearing loss, with a view to sensitize the issue and need for early identification, intervention and prevention of hearing impairment.

**ROLE OF AYJNIHH**

In 1985, a three year project on "Screening of preschool children for early identification and intervention of hearing impairment" was undertaken at the Ali Yavar Jung National Institute for the Hearing Handicapped, Mumbai, funded by the UNICEF.

A brief description on the achievements of the project is as follows:

*Focus 1:* A high risk register was developed. (Appendix - 1) The training manual prepared for the same explained each of the risk factors so that the technical jargon was made easy for use by trained personnel who attend to home delivery/mother baby care units.

Literature shows that risk registers are used as a first stage for other screening strategies. However, its disadvantage has been that 50% of the new borns with congenital hearing deficits may not have a risk factor and are missed by this screen. The positive point has been that it is an easy and economical test to administer.

Additionally, a hearing screening test using noise makers with known acoustic characteristics and which are locally available was developed. It was meant to screen the hearing of children from birth to 3 years.

Physiological response (e.g. startle, eye blink etc.) and/or a behavioural change (e.g. head turn, cessation of activity etc.) to sound stimuli were considered as indicators of possible auditory response (Appendix - 2). A manual giving step-by-step instructions on administering and interpretation of the results and a video tape (in Marathi) were developed as part of the training manual.

As hearing impairment may be acquired in early childhood, development of school entry hearing screening procedures were also considered important. Hence, other tests, namely, 'The Scratch Test' (Appendix - 3) and the Mass Auditory Screening Test' (Appendix - 4) were developed which are simple and economical.

Though each of these techniques have their own limitations, the bottom line is that an ever vigilant, pluralistic approach must be taken to screen and identify hearing impairment in young children.

*Focus 2:* It was felt that "concern about the child's hearing status" by parents, family members, rural health volunteers, nurses and doctors would help identity the hidden handicap of hearing impairment. Educating the above personnel using brochures, posters would be simple
and inexpensive, although the effectiveness of these strategies has not been extensively evaluated. The following brochures were prepared to implement this strategy of early identification.

1. Hearing impairment: early identification at home
2. Look for and observe
3. Early identification of hearing impairment - tips to medical professionals.
4. A video on:
   a) Hearing screening using noise makers;
   b) Scratch Test
   c) Mass Auditory Screening Test
5. Manuals covering the topics of item 4
6. Slide presentation of items 1 and 2

Brochures and TV spot on 'care of ears', have also been prepared by AYJNIHH, Mumbai. These brochures and video films are available at the Institute. Manuals have not been printed as yet.

Focus 3: The training module for orienting the existing target personnel in the rural areas was developed (available at AYJNIHH, Mumbai). The base line work of suspecting a hearing impairment was assigned to community health volunteers, parents and anganwadi workers. Simple tools like the High Risk Register, screening with noise makers, Scratch Test were used by the multipurpose workers and school teachers. Further, the medical doctor was expected not only to monitor the identification programme but was given indepth awareness about the tests conducted by each of the functionaries as well as the interpretation of the test results in order to certify the degree of hearing loss. Simple, low cost, hand held battery operated hearing screening devices were developed. Prototypes are available at the Institute.

Other Activities

The Outreach and Extension Unit of AYJNIHH is also working towards early identification of hearing impairment and initiation of early intervention by conducting camps, establishing extension service centres, training personnel at these centres and providing hearing aids to the identified children. Parent-Guidance Programmes also are conducted to ascertain satisfactory follow up work.

Early identification of hearing impairment in neonates and infants is done at the Audiology Clinic of the AYJNIHH head quarters and regional centres. Thanks to the referrals from the Pediatricians, Neurologists and Otolaryngologists. State of the art technology is used in screening/diagnosing hearing impairment, which includes Oto-acoustic Emission measurements (OAE), Auditory Brainstem Response (ABR) measurements, Immittance measurements etc. State of the art technology (eg. Insertion Gain Measurements) is also utilised in fitting hearing aids.

The successful early intervention, Parent Infant Programme (PIP) is underway. This programme caters to hearing impaired children below three years of age. Frequent parent guidance meetings are conducted to effectively implement early intervention programme.
ROLE OF OTHER INSTITUTES AND CENTRES

Other National Institutes such as AIISH, Mysore, TNMC and BYL Nair Hospital, Mumbai, AIIMS, New Delhi, PGIMER, Chandigarh etc. and several NGOs such as Institute of Speech and Hearing, Bangalore are also engaged in carrying out activities of early identification and intervention similar to that mentioned under AYJNIHH activities. Sporadic reports of NGOs running successful Infant and Preschool Programmes are also noted.

In a glaring contrast to the programmes implemented eventhough minimal for early identification of congenital hearing impairment and hearing impairment in children, there are hardly any policies/programmes for the early identification of noise induced hearing impairment in adults or hearing impairment in the geriatric population. They are left to fend for themselves. The industries which have concern for conservation of hearing of their employees can be counted on one's fingers. There are no laws regarding occupational hearing loss. However, Dr. Ramazini Research Inst. of Occupational Health Services-Pune, is making efforts in this direction.

FUTURE NEEDS

Some future needs specific to secondary prevention of hearing impairment are:

1. Formulation of a national consortium for universal new born hearing screening which can engage the following strategies:
   a) engage in activities to publicise training materials, conduct workshops and on-site assistance to hospitals to establish universal screening programmes;
   b) increase professional and public awareness through print media, broadcast/telecast nationwide programme; and
   c) identify the most viable screening technique, provide feedback to technology developers and close supervisions of personnel to increase screening reliability and efficiency.

2. Region-wise action committees by net working of NGOs and GOs.

3. Training of master trainers utilising the existing information. The training to be undertaken by national institutes. These master trainers would in turn work with the grass root level workers.

4. Strengthening the NGOs and activating parent groups for the purpose of follow up, early intervention and prevention.

5. Prevention of hearing loss (including noise induced hearing loss) to be part of school syllabus for children.

6. Formulating a national committee consisting of the UNICEF, ISHA, National Institutes and leading NGOs.

7. Evolving early identification and prevention information centre to promote prevention of congenital and acquired hearing impairment in children as well as Noise Induced Hearing Loss to highlight the hearing conservation measures.

8. Determining the ratio of diagnostic services and its access to a given population which would enable planning of a recommended/ideal model programme.
Measures for Education of the Hearing Impaired

About two decades ago, the average age of identification/initiation of intervention was over five years. In the national scenario, hearing impaired children attending normal schools was a rarity. On the other hand, the percentage of hearing impaired children were only 1.5% as there were only 143 special school for the hearing impaired in the country (Narasimhan and Mukherjee, 1986). NGOs pioneered in starting special schools for the deaf a century ago. They continue to dominate the scene in establishing special schools. Of late, the Government of India has rightly recognised their role in rehabilitation of the disabled in general and they are promoted in their cause by means of funding their activities and recognising their contribution.

The scenario with respect to the education of the hearing impaired has not changed drastically. Inspite of the policy of Integrated Education for the Disabled (IED) initiated by NCERT in 1974 under the Ministry of Human Resource Development, the number of children attending normal schools has not gone up in rural and semi urban areas. There are now about 540 to 550 special schools. The majority of them are situated in major cities. The percentage of children attending these schools have gone up only to about 3%. Most of these schools have less than 100 children enrolled and only a couple of schools such as Lady Noyce School for the Deaf, New Delhi and Little Flower Convent, Chennai have up to 500 students.

The National Open School (NOS) was started in 1998. Provision for language exemption is made (so that the hearing impaired can study only one language) in the Persons with Disabilities Act, 1995. A couple of colleges for the hearing impaired have been started in Chennai and Kerala. However, a lot remains to be done with respect to the education of the hearing impaired. The school dropout rate is significantly high even today.

The pre-school movement for the hearing impaired in India was launched by AYJNIHH in 1990. The movement is gaining momentum with the collaborative efforts of the Institute through its Outreach and Extension Unit and other Government and Non-Government Organisations. 108 such programmes were to be operational all over India till 1994. The process of documenting the recent statistics is underway at the Department of Information and Documentation of AYJNIHH.

Measures for Employment of the Hearing Impaired

The important programmes designed and launched to promote the employment of the disabled in general by the Government of India are:

- Reservation of jobs in the public sector (1% each for orthopaedically, visually and hearing disabled.).
- Establishments of special employment exchanges and special cells in Government Exchanges to promote placement in jobs.
- Establishment of vocational rehabilitation centres to arrange for assessment, training and placement.
- A scheme of assistance to voluntary organisations for training and employment of disabled persons, including establishment of sheltered workshops.
There were only five vocational rehabilitation centres for the disabled in 1982 (Kacker, 1988). The Ministry of Labour, Government of India has started 17 such centres till date. However, AYJNIHH through its Social and Economic Rehabilitation Unit has collaborated with about 25 NGOs to start rural based/area based vocational rehabilitation programmes. There are several NGOs promoting vocational training for the deaf. However, these developments have not gone hand in hand with the improved intervention programmes resulting in 'under' or 'unsuitable' employment of the hearing impairment.

More details regarding activities/developments with respect to tertiary prevention of hearing impairment are covered under other papers of this monograph.

We, in India have a long way to go with respect to prevention and early identification of hearing impairment. Lets move ahead singing "... We shall overcome ...".
CHAPTER 17

SPOKEN LANGUAGE SKILLS OF CHILDREN WITH PRELINGUAL HEARING IMPAIRMENT: A PERSPECTIVE

INTRODUCTION

The ability to use language as a means of communication is recognized as the foundation of human civilization and development. In human species language is acquired naturally through listening to spoken language. It is on this foundation of spoken language abilities that individuals learn literacy skills. Thus, any factor interfering the nature and amount of opportunity that a child has for listening to spoken language will compromise with the acquisition of verbal language skills. From time immemorial hearing loss at birth is associated with the inability to speak. Several cultures utter the words “deaf and dumb” almost as if it were a single word. Most researchers, clinicians and educators would agree that the basic deprivation of pre-lingual deafness is not the loss of sound, it is the deprivation of language (Meadow, 1980). It is well established that language acquisition is greatly facilitated by communicative interaction between the infant and the mature language users where the acoustic linguistic information is transmitted to the brain through the auditory system. It is well accepted that amplification systems are not able to fully compensate for the hearing loss. The amplified auditory signal available to the child is often limited and distorted. Often rehabilitation approaches recommend the use of speech reading to compensate for the inadequate amplification system. However, many of the articulatory movements are not visible. Another approach is compensation by using written language symbols. However, it is known that most orthographic systems focus on segmental units involving phonemes and syllables. Furthermore, prosodic features are not available in the visual medium. Thus, the limitations of the amplification systems, nature of the hearing loss and limited information received through other modalities/systems, results in the hearing handicapped child suffer speech and language delays. Often speech and language disorders observed in pre-lingually hearing impaired children are referred to as a “secondary handicap”. The major thrust of most rehabilitation programmes for the pre-lingual hearing impairment is to provide an approach by which the secondary handicap can be prevented. This is especially true with programmes, which focus on “early” identification of pre-lingual hearing loss. If prevention is not possible then the habilitation programmes focus on facilitating the acquisition of speech and language skills.

In the post-lingual hearing impairment the basic deprivation is loss of sound, as the individual has already acquired sufficient language skills which the individual can main-
tain through literacy skills. However, the post-lingually hearing impaired person may be in danger of losing oral language skills if the amplification system does not provide sufficient cues for perception of speech and related features. Another vital factor to be considered while trying to estimate the extent of the hearing handicap in infants is the inter-relationship between perceptual, cognitive and linguistic processes. It is well recognized that language not only supports oral and written communication skills but also thinking, understanding, memorizing, perception etc. Current theories of language learning clearly recognize that some cognitive abilities develop before language based communication appears. As soon as language emerges, it starts dominating cognitive development. There is speculation that phonology and syntax may be acquired satisfactorily even in severe cognitive impairment, but semantics and comprehension are severely affected (Cossu and Marshall, 1990; Yamada, 1988).

Research in the area of specific language impairment, intermittent hearing loss, CSOM, phonological disorders and dyslexia has demonstrated that there is a complex interaction between perception, language and cognition. This interaction usually facilitates understanding of meaning of words and phrases for pragmatics (use of language), metalinguistics (thinking about language) and meta-pragmatics (thinking about appropriate style of communication) (Bench, 1992; Dodd, 1995; McComrik, 1993). A comprehensive view of speech and language abilities of hearing impairment needs to examine the relationship between the degree of hearing loss and verbal skills.

Logically one would expect a linear positive relationship between the degree of hearing loss and the amount of speech and language disorder. Generally it is accepted that the more severe the hearing loss, greater is the effect on speech and language acquisition. However, effective habilitation focus should be on specifics and not on generality. Rehabilitation professionals have observed sufficient exception to the above rule and feel a strong need to consider several factors other than degree of hearing loss, while predicting the final outcome (Liben, 1978). The degree and nature of hearing loss clearly results in impaired speech perception. The impaired speech perception interferes with language acquisition and cognition. This often has a cascading effect on reading-writing, metalinguistic skills, pragmatic skills and sociolinguistic difficulties. For developing an adequate management programme it is essential to understand the nature of verbal language of children with hearing impairment.

**SPEECH PRODUCTION BY THE HEARING IMPAIRED**

Generally it is agreed that speech of prelingually hearing impaired persons tend to have certain combination of features which sets it apart from the speech of others.

**Voice Disorders**

Fundamental frequency is generally reported as being higher in both males and females with prelingual deafness (Horii, 1982; Leder, 1987). However controversial findings have been reported by Whitehead (1987). Unusual voice quality has also been reported such as hoarseness, nasality and breathiness (Hutchinson & Smith, 1976; Whitehead & Barefoot, 1980). The hearing impaired children appear to maintain greater spectral noise for
sustained vowels and use greater vocal effort than their hearing peers. The prelingually deaf child is perceived to have greater nasality while speaking at a slower tempo. However, Fletcher and Daly (1976) did not observe a similar relationship. Boon (1978) suggested that the nasality might be due to retraction of the tongue body towards the pharynx. The presence of nasality may be attributed to inadequate visual feedback of velopharyngeal port action and the fact that there is very little proprioceptive feedback (Nickerson, 1975). Furthermore, children with profound prelingual hearing loss have problem of co–ordinating breathing for speech. Often they speak on both inspiratory and expiratory air-stream. They also may speak in short bursts of impaired air resulting in disorders of voice quality, lack of loudness control, stress, intonation and phrasing. All these errors add to the poor intelligibility of the person’s speech.

**Speech Sound Errors**

Most professionals working with children with prelingual hearing handicap often focus on consonant errors rather than on vowel errors. However, more recent research does not support the above conclusion. The reason for lack of focus on vowel errors may be related to the fact that consonants are more in number than vowels (Gold, 1980). Also the normal ear tolerates considerable variation in the vowel perception. Vowels carry more consonant cues than consonants carry vowel cues. However, more focused perceptual and acoustic analyses indicate that most vowels are very difficult for profoundly deaf child. The formant two appears to remain stable at 800 Hz irrespective of the vowel produced. There appears to be a tendency for substituting central vowels rather than use of the entire vowel space (Monsen, 1976; Shukla, 1989; Vasanta, 1995).

Most current researchers agree that vowel production is vital for intelligibility. Vowels carry considerable information regarding the adjacent consonant. Thus, early produced vowel will directly affect the adjacent consonant and prosodic features (Monsen, 1976; Osberger, 1987; Shukla 1989). Furthermore, the hearing impaired child has a tendency for prolonged articulatory contact, slow articulatory movement, and poor syllable formation. This tendency is reflected in the distortion of diphthongs where timing is crucial for perception.

Consonant omissions are routinely observed in the speech of the hearing impaired and more often observed at ends of words, phrases and sentences (Mencke et al, 1985; Markides, 1970). Addition of extra speech sounds are often observed. In general, the speech of the hearing impaired child has unusual segmentation and insertions which reduce intelligibility to a great extent. Surprisingly Abdelhamied et al (1990) observed that automatic word recognition of speech of the hearing impaired was possible. The authors speculated that speech of hearing impaired persons have their own norm and their errors are systematic in nature.

**Suprasegmentals**

Several suprasegmental features of speech are distorted in the prelingually hearing impaired child. The problems are in timing, pitch, breath and loudness control, intonation, voice quality changes and syllable stress (Whitehead, 1991; Tye–Murray et al, 1987). Similar findings have been reported by Indian researchers that their prelingually profound
hearing impaired subjects had insufficient inventory of speech sounds (Thirumalai & Gayathri, 1988). However, the less severely handicapped subjects had a better inventory closer to those observed in normal speech. However, these subjects did not produce the phonemes in the correct place.

**SPEECH PERCEPTION BY PERSONS WITH HEARING IMPAIRMENT**

No article on speech and language abilities of the hearing impaired children would be complete without the inclusion of speech perception skills of the hearing impaired child. With the development of the electro-acoustic hearing aid in the early 1900 it was expected that there would be shift from a manual approach to a more oral-aural approach to rehabilitation. However, earlier approaches to oral language facilitation gave considerable importance to the production aspect of speech rather than the perception of speech. e.g. extensive use of phonetic placement approach in speech teaching.

Thus, there was only a perfunctory assessment of the utility of the hearing aid for speech perception (Haycock, 1933; Calvert & Silverman, 1975; Ling, 1976). The development of the Ling’s 5 sound test for assessing the utility of the hearing aid for speech purposes may be viewed as a landmark development. Currently there is a vast body of literature on perception of various aspects of speech by the hearing impaired child (Thirumalai and Gayathri, 1989; Bench, 1992).

**Perception of Segmental Aspects of Speech**

Although hearing children use their hearing as the main channel for receiving speech, it is generally accepted that perception is greatly facilitated when they can see the talker’s speech mount, facial expression and gestures. (Miller, 1947; Festen & Plomp, 1990). This would be more applicable in the case of the hearing impaired child. So limiting the hearing impaired child’s access to only auditory stimuli and eliminating visual information regarding speech would not facilitate the child’s speech perception.

**Perception of Vowels**

In general hearing-impaired listeners recognize vowels better than consonants. Findings of various researches indicate a variety of vowel errors (Martin et al, 1972; Risberg, 1976; Fourcin, 1976; Bochner et al, 1988; Thirumalai and Gayathri, 1988; Bench 1992). They are:

- Researchers have reported that as hearing loss increases vowel confusion increases. However, this relationship is not linear. Those with 67 dB HL of hearing loss may be expected to obtain nearly 91% identification score. But identification scores drop rapidly for those having 73 dB HL of hearing loss and more. For those with 73-82 dB HL of hearing loss the vowels appear to be confused with vowels having similar F1. Those with hearing loss above 85 dB HL have been reported to have difficulty with vowels having similar F1 values and specially those with low frequency F1 value.
- Listening to formant transition cues in speech like material appears to be affected even in the low frequency domain in case of hearing impaired listeners.
The listener with moderate to severe hearing loss appears to have greater difficulty with vowels that are distinguishable by formants above 1500 Hz.

Perception of Consonants

Several researches have studied consonant perception. (Thirumalai and Gayathri, 1988 & 1992)

Their results indicate that:
- Perceptually pre-lingually hearing impaired persons have reduced ability to perceive consonant contrasts.
- Research indicates that hearing impaired subjects did use VOT for distinguishing surd-sonorant differences. However, additional acoustic cues enhanced their perception.
- Perception of /b/ and /d/ may be more difficult than /g/ for persons with sloping high frequency loss. Most hearing impaired individuals have difficulty in utilizing the fast changes in the higher part of the acoustic spectra which form an important acoustic cue for place of production.

It may be concluded in general that perception of vowels and consonants by hearing-impaired children is not simple and does not have a linear relationship with the degree of hearing loss.

Perception of Suprasegmentals

Very few researchers have focused on this area. Some of the tests developed assume that a child with profound hearing loss may be able to perceive the prosodic information although segmental information is not perceived by the individual. Most researchers agree that good auditory skill development is the foundations of prosodic skills. (Merklein, 1981; Erber & Alencewicz, 1976; Thirumalai & Gayathri, 1988; Bench, 1992)

More research is required on perception of voice and voice related features by the prelingual sensorineural hearing impaired individual as poor voice is a major contributor to poor intelligibility of speech in this population.

VERBAL LANGUAGE OF THE HEARING IMPAIRED

It is well established that pre-lingual sensori-neural hearing loss results in delay in speech and language development. There is a consensus of opinion that till the babbling stage there is no difference in the development of speech and language milestones of hearing children and those with hearing loss. However, recent researchers have observed that although gross differences in the early stages of speech development are not present, there is a qualitative difference in the nature of vocalization and of babbling of children with prelingual deafness. (Thirumalai & Gayathri, 1989; Oller et al, 1985; Mavilya, 1972; Bench, 1992). Mavilya (1972) observed that babbling was at its peak by 23 weeks but abruptly declined at 21 weeks. Furthermore, the deaf infant appears to produce limited repertoire of babbling compared to hearing children.
Furthermore, the continuity theory of babbling suggests that impaired babbling may lead to later speech, language and literacy related problems. Focus and analysis of nature of vocalization and babbling may greatly add to the early identification of hearing loss in many children. A vital factor which needs to be considered is the nature of child directed speech during the early stage of speech development. Thus assessment focus must include nature of child-adult (family) communicative interaction.

Finally, it must be recognized that it is not only the severe hearing loss which affects speech and language development. Even mild, unilateral or intermittent hearing loss in early infancy is known to interfere with speech and language development, speech and language skills vital for development of reading, writing and scholastic skills.

There are certain types of language disorders typical of the prelingual hearing-impaired child (Reed, 1986; Thirumali & Gayathry, 1988; Bench, 1992; Uma Subramaniam, 1993). They are:

- Acquisition of syntax is slow but generally follows the sequence observed in hearing children. They have particular difficulty with main verbs, medially embedded relative clauses, verb and noun endings. They tend to convert sentences into an S-V-O sequence and omit function words.
- With regard to semantics they have poor vocabulary and demonstrate conceptual deficits. They tend to use fewer words and limited types of words. Have difficulty with multiple meanings of words and words reflecting abstract concepts.
- Pragmatic skills are also affected with tendency to use less complex conversational initiators. Turn taking and listener related changes in conversation have been reported to be affected.

Finally, several researchers have focused on intelligibility of speech of hearing impaired children and its causes. The degree of hearing loss is negatively correlated with speech intelligibility. Intelligibility appears to be affected by both supra-segmental and segmental features of speech. Intelligence appears to be moderately correlated with speech intelligibility. Also intelligibility is not correlated with reading skills or age. However intelligibility appears to be correlated significantly with linguistic ability. Thus knowledge of rules of syntax, phonology and semantics appear vital ingredients for establishing intelligible speech in the hearing impaired child.

An attempt to profile the language skills of prelingually deaf child was attempted by Dalvi, in 1993. Receptive and expressive skills in the area of syntax and semantics were elicited using the Linguistic Profile Test (Hindi) in 24 prelingual hearing handicapped children in the age range of 6 to 12 years. All children had hearing loss greater than 70 dB in the better ear. The results indicated that:

a) In the area of syntax they had specific difficulty with certain rules. Most of the younger children used cardinal numbers to indicate plurals rather than regular morphemes or irregular forms. The older children had difficulty only with irregular forms. Generally all the children had difficulty with tenses. Future tense was relatively more difficult than past tense for these children. P.N.G markers were a problem. Few children could use conditional clauses but cues were required from the tester. Causatives, conjunctives and quotatives were extremely difficult for all the children. Most had particular difficulty with comparatives and participial construction.
b) In the area of semantics, the hearing impaired children demonstrated marked difference from hearing children. Most junior grade children were reported to have receptive and expressive difficulties with all semantic categories tested i.e., semantic anomaly, semantic contiguity, antonymy, synonymy and homonymy. Older children had problems in comprehending paradigmatic relations, syntagmatic relations, antonymy, homonymy and synonymy. None of the children had difficulty with naming, semantic discrimination and lexical category.

**NATIONAL SCENARIO**

Historically, there has been a strong tradition of “speech” focus to rehabilitation of the hearing handicapped in India. Most of the training program for Education of the Hearing-Impaired focus on verbal and written language skills of the hearing handicapped. Inputs from qualified Speech-Language Pathologists and Audiologists became more available in this area with the start of graduate and post-graduate programmes in the early 1960s (Sr. Rita Mary, 1990; Ratna, 1990). A major project to establish a residential institution for the speech habilitation of the hearing impaired children was undertaken by the Indian Statistical Institute, Calcutta and the Government of Tripura in 1969. The main aim of the project was to utilize the Selective Auditory Filter Amplification System (SAFA) developed by Professor Djordje Kostic (Mitter, 1990). Focused research on the effectiveness of K-SAFA (Kostic - SAFA) was conducted at the the Rehabilitation Unit of Audiology and Speech Pathology (RUAS), Dept. of Otorhinolaryngology, of All India Institute of Medical Sciences, New Delhi, in the period 1988-91. The project compared the benefits of K-SAFA to the conventional hearing aids used by Hindi speaking pre-lingually hearing-impaired children in the age range of 3-16 years. The project was expanded to include the product available from development in digital selective amplification system i.e. CUDLS (Customized Universal Digital Listening System) developed by University of New Mexico, Albuquerque. (Kacker, Basavaraj & Bahadur, 1995).

Their findings in general indicated that

- A larger number of subjects performed better on KSAFA-U as compared to their performance with their individual hearing aids.
- KSAFA-U was more beneficial to the subjects with poor speech discrimination scores (SDS < 50%).
- A majority of the subjects preferred the quality of sound as heard on KSAFA-U rather than on their individual aids.

As part of the project pre and post treatment comparisons were made of selective aspects of their subjects of speech such as voice deviance articulation disorder and expressive verbal vocabulary and syntactic development (Basavaraj et al, 1990; Basavaraj et al, 1989; Vasudeva et al, 1989.) A few post-doctoral research projects have been undertaken on acoustic analysis and perceptual analysis and phonological analysis of children with hearing handicapped at AIISH, Mysore and Osmania University (Natraja et al., 1991; Vasanta, personal communication).

In India there have been few studies reporting the nature of speech and language disorders of the pre-lingual hearing-impaired child. Majority of the research work focusing
on this area is available as unpublished master's dissertations. A few unpublished doctoral theses have focused on specific language features of persons with hearing impairment, such as, Acquisition of syntax by hearing impaired children (Subramnian, 1983) and Relationship between speech intelligibility of the hearing impaired and receptive and expressive factors (Ravishankar, 1985).

Due to dearth of professionals, geographic distances and a tradition of home based approaches, some attempts have been made to establish correspondence programmes by various organizations and parent training programmes (Basavaraj et al, 1987; Karbhari et al, 1997).

Several researchers have focused on linguistic analysis including acoustic analysis of speech of the hearing impaired in India (Jagdish, 1989; Bagul, 1991; Prema, 1994; Narashiman, 1992; Sarumathe, 1994; Bhatnagar, 1994; Seena, 1994; Ravishankar, 1985; Shukla, 1990; Vasantha, 1995; Nagaraja, et al, 1994).

At AYJNIHH, Mumbai the in the Department of Speech-Language Pathology, the clinical service delivery system focuses on the following management issues:

- Conducting a comprehensive assessment of speech and language delay.
- The assessment attempts to focus on differential diagnostic issues such as co-existence of other developmental language disorders along with the sensorineural hearing loss.
- Providing a comprehensive profile of the speech and language abilities of the hearing impaired child and the areas requiring immediate focus by the parents and other rehabilitation professionals. (Appendix I)
- Providing parent guidance programs and speech language therapy services. (Karbhari et al, 1992)
- Assessing the nature of speech perceptual capability of the child and its specific utility for developing speech skills of the hearing impaired child (work in progress).
CHAPTER 18

TRENDS IN PRE-SCHOOL EDUCATION

PRESCHOOL EDUCATION

Introduction

Gessel eloquently emphasizes how critical a stage is the pre-school age (between 0–5) in the overall development of children. The hearing child acquires language and speech during this period. The ability to observe, assimilate and reproduce which is so essential for learning the language is there in all children—and at its best during these formative years.

The concept of pre-school—was introduced as early as in the fifties by A.C. Sen (“Deaf in India—the Journal of the CTDI”, now NCED issues of 1950–52). A few enlightened educators of the deaf in India, even then, did realize the importance of early identification and intervention. It was expected to take off with the next generation—but it did not.

Coming to the chronological events in the development of the pre-school education movement, it is interesting to note how pre-school education lagged behind school education globally although linguists by then had established the first five years as the critical age for language and speech development. Educators know that communication skills development is the basis of education. Child psychologists and logopedics had the information that we learn language and speech as we grow with normal hearing based on a feedback system during the first five years of life. ENT specialists, paediatricians and neurologists must have had the knowledge of hearing, language and speech development in a child, that the organ of hearing is one of the first sense organs amongst others to develop and that the first cry at birth ascertains normal voice and speech organs.

The other interesting observation is that information like early catchment, parental education, parent-professional partnership, hearing aid technology etc. have been available but not accessed or have been accessed by very few during the last quarter of the century.

Correspondence courses for parents of hearing impaired infants from the John Tracy Clinic, educators from Common Wealth Society conduct short-term courses in metro-politian cities in India like Calcatta, Chennai and Mumbai. Dr Dercy Dale, Prof. Costich, Armin Lowe etc. among others brought the early identification wave with them during early seventies. A few NGOs formed by educators and parents namely Shruti, CITD, Vika Vidyalaya at Mumbai, SHIRC, SHRUTI, BSGK the rural wings of SHIRC, Oral School for the Deaf, Parents' Own Clinic, Prati Bandhi Kalyan Kendra at end around Calcutta, Balavidyalaya, CSI, Little Flower Convent etc. in Chennai and at Delhi totalling around a dozen programmes subsequently came up during the 1970's in India.

The All India Institute of Speech and Hearing and corporate houses like Arphi Electronics Pvt. Ltd. are contemporary organisations engaged in training professional and indigenisation of
simple clinical audiometers and hearing aids respectively. All these lit the lamp of early identification and fitment for urban elite children with hearing disability. However, education of the hearing impaired did not show positive change. AYJNIHH was established in 1983, creating manpower for both special education and speech and hearing under the same roof. The major objectives of AYJNIHH have been the education and rehabilitation of the hearing impaired.

The year 1998–1999 was taken up by AYJNIHH to study priority areas; the status of education versus facilities available, the need to improve the level of education, and reaching the untaught. It was a comprehensive study made in most of the States: Andhra Pradesh, Bihar, Delhi, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Tamil Nadu, West Bengal, Orissa, Rajasthan, Uttar Pradesh including Uttarakhand, Punjab, Himachal Pradesh and North Eastern States.

The Report recommended establishment of special schools in those areas where there were none. Accordingly, a proposal was submitted to the Ministry of Social Justice and Empowerment with a humble budgetary requirement for upgradation of 30 schools to start with. The intention was to systematically improve standards in the education of the hearing disabled. While waiting for the sanctions, AYJNIHH started a scheme of adopting local schools around its Headquarters and Regional Centres and went into collaboration at Delhi, Secunderabad, Calcutta and Bhubaneswar to strengthen the NGO run special schools. The strategy has involved gradual change - upgrade by one class in each or alternate years and lower the entry age to 3 years to maximise learning for the pre-school age group till the 7th standard. It has been, simply a need-based, cost effective scheme of upgradation of existing State Govt. & NGO special schools. There are more than 515 special schools of hearing impaired in India, functioning at various levels with poor to excellent infrastructure and staff by AIISH & NGOs. Outreach and Extension Unit (OESU) of AYJNIHH have started its programmes throughout the country during 1988-1999 itself. A few sporadic camp services were already popular. It was observed that in the Uttarakhand, the Northern Eastern belt and in a few under developed states schools for deaf children were not available. The OES team consisting of a special educator, psychologist, speech and hearing professional, social worker, media personnel, vocational counsellor, vocational instructor and headed by speech and hearing faculty initiated outreach services and training while creating a nationwide awareness campaign.

Pre-school Movement

At AYJNIHH, the study recommendation was slightly revised and the setting up of pre-schools in untaught areas was considered instead of the establishment of special school programmes. For establishment of special schools implementing the recommendations of the Status Report, this was with the help of the then newly born Outreach and Extension Service Unit (OESU) team of AYJNIHH creating a pre-school education movement during 1990 - 91 itself and for the next five years.

Quite a few regional and national orientation programmes, refresher courses for teachers and other allied professionals, continuation of education sessions in ISHA (Indian Speech & Hearing Association) and the revival of CRDI as NCED, made the movement a success. AYJNIHH started adding teachers training colleges, pre-schools, service centres, adopted schools and collaborated vocational training centres where there were none.

AYJNIHH has since established over 25 centres around the country. We shall need several more of such schools spread all over the country to set up a base to ensure better entry...
levels to sustain quality primary, secondary and higher education for the hearing impaired. In
order to strengthen and improve the programmes the Institute has evaluated the performance
of those centres initiated by OESD of AYJNIHH and oriented the teachers for achieving a
minimum uniform standard. OESU of AYJNIHH has minimized the urban - rural imbalance in
pre-school education though we have a long way to go in this direction.

It also got the Parent-Infant Programme started by highly trained paediatric audiologists and
educators at its headquarters at Mumbai during 1990. The AYJNIHH Parent Guidance Module
and Mother's Training Module in collaboration with Shruti School, Mumbai, are developed and
are ready for replication on a larger group with translation and adaptation to meet local requirements.

There are currently around 500 special schools at various levels. In keeping with the
existing policy of integrated education and the thrust towards higher education, AYJNIHH
initiated the first collegiate education imparting study centre in collaboration with CSI, Kerala,
at Trivandrum under IGNOU and Mahatma Gandhi University. AYJNIHH is now functioning
in collaboration with the second college of the Deaf, St. Louis at Chennai. AYJNIHH is also
accredited to National Open School. A few NGOs are also accredited under NOS and SOS.

According to NSSO and other state wise surveys and studies the figure of the educable
age group that have access to meaningful education is far from satisfactory. Not only is the
number of trained teachers of hearing impaired for the estimated target group less, the levels
of training of the teachers to be able to teach the hearing impaired is nowhere near the need
nor is it in any way comparable with that for normal hearing counterparts.

Till recently there were around 10 teacher training colleges (TTC) at one level of diploma
or certificate for all levels of education. The deaf have been imparted education through the 515
special schools of various sizes and qualities. Most of them facilitated the urban elite. The level
of education have been generally primary barring a few in mega cities offering secondary
education. A status study of education of hearing impaired in India observed that the special
schools were not even upto primary level in standard. They were taught by untrained teachers.
Hearing testing, fitment of hearing aids, repairs and maintenance of aids, wearing of custom made
earmoulds, classroom amplification, team approach etc., were all missing from the education
system of the deaf in India. The educational provision for the deaf is still patchy in India.

MANPOWER DEVELOPMENT

The presence of NIs in manpower development is already felt by the Nation at various levels
for rehabilitation of persons with disabilities as well as for training a new generation of professionals.
The creation of manpower depends on the quality and quantity of need. RCI and local univer-
sities have extended their support in maintaining quality, uniformity and recognition or affiliation
to some extent. There has been a gap mainly due to the time between the enactment of RCI
- Persons with Disabilities Acts and the establishment of NIs. Manpower has been developed
by few NGOs and the NIs much before the enactment of these Acts. B.Ed. (HI) were started
at the Headquarters, SRC and ERC, under the local universities of Mumbai, Osmaniabad and
Calcutta respectively to train teachers to teach at secondary and higher secondary levels. Quite
a few schools are now teaching the hearing impaired at higher levels. Many states have adopted
a one language formula. AYJNIHH, further, has gone ahead with M.Ed. (HI) training under
Mumbai University in order to generate master trainers who can walk towards the college
education of the deaf.
We should reach the services to the unreached and join hands in reaching the whole gamut of services to the yet to be reached, which include identification, diagnosis, fitment services, educational, vocational training, counselling and guidance, socio-economic rehabilitation, social security, sports and cultural life of persons with disabilities. The rules of the *Persons with Disabilities Act* may be simplified so as to be understood by the target group and their families. The implementing agencies should make all attempts to implement the act in toto at the earliest to benefit those for whom these acts are enacted. Techno transfer and indigenisation of technology should take place without further delay. Linkages and networking should give people access to information apart from other things. Government reservations for education, vocational education and job recruitments should be extended to semi-government and non-government sectors with mutually beneficial incentives. This may be included in national schemes. Policies for Persons with Disabilities should be an integral part of the existing all sector provisions as far as possible. Media should be seriously and scientifically sensitized towards persons with disabilities. NIs as autonomous, apex science and technology organisation should concentrate on research, training especially of master trainers, develop model services and strengthen the NGOs task force. Initiating NGOs where there is need and inculcating more than one disability rehabilitation and or composite rehabilitation in the next decade instead of strictly adhering to a specific disability appears to be the need of the new millenium.

**RESEARCH AND MATERIAL DEVELOPMENT**

Research is a very important component of education. The following research areas related to education have been taken by AYJNIHH.

- Development of an early identification kit and prototype
- Working out a pre-school curriculum
- Mothers training module
- Parent guidance

A considerable amount of research is now being carried out by the post-graduate students enrolled in the M.Ed. (HI) and M.Sc. (HI) courses of the Institute.

A lot of support material is constantly being developed by the MDD, Education, Speech, Audiology and SERD in support of various options of education for the hearing impaired.

**The Interpretation of the Persons with Disabilities Act 1995 for Education of the Hearing Impaired**

The Persons with Disabilities (Equal opportunities, protection of rights and full participation) Act, 1995 No. 1 of 1996 was passed unanimously in both houses of Parliament on 22nd December, 1995. There were peaceful campaigns and full media support.

The President of India put his signature and gave the assent on January 1st, 1996; and the Law came into force from 7th February 1996.

There are 14 chapters in the Act:

*Chapter I:* Preliminary: This chapter gives the title of the Act. The definition of various disabilities (eg. blindness, hearing impairment, institutions for persons with disabilities, leprosy cured, locomotor disabilities mental retardation etc.) are given in this chapter.
Chapter II: The Central Coordination Committee: This Chapter deals with the formation of the Central Coordination Committee (of the Central Government), identifies the members of the committee, the functions of the committee, the executive members and their functions are detailed in this chapter.

Chapter IV: Prevention and Early Detection of Disabilities: This chapter is an important chapter because it deals with the steps to be taken to prevent disabilities and the identification of disabilities at an early stage. The steps to be taken by the State Governments and Local authorities are stated in this chapter.

Chapter V: Education: As far as we are concerned this is a very important chapter because it deals with the various aspects of education of the children with disabilities. Some of the salient features of this chapter are:

- All the disabled children have right to free education in an appropriate environment till the age of 18 years.
- For the older children with disabilities the Government should make programmes for non-formal education.
- Research and designing of new teaching aids and assistive devices to be encouraged.
- The Government should set up "Teachers Training Institutions" for various disabilities to develop trained manpower for the special schools.
- The Government should prepare a comprehensive education scheme for the disabled, offer free transport facilities, arrange supply of books, give scholarships and arrange removal of structural barriers for persons with disabilities—including communication barriers.

SERVICE DELIVERY MODELS ABOUND

Our country has about 540 to 550 schools for the hearing impaired. The Government as well as Non Governmental Organisations run these schools. Some of the NGO’s are established and run by parents of hearing impaired children, some are run by religious organisations and the rest are run by others.

The State Government or the Central Government aids most of the schools run by the NGOs.

Some Hospitals and ENT Clinics in the country offer services to the hearing impaired children. However these are in clinical set-ups.

The All India Institute of Speech & Hearing, Mysore was established in the early sixties. Apart from manpower development in the area of Speech and Hearing, the Institute also has facilities for diagnosis, hearing aid fitment, earmould making and counseling and guidance for parents of the children.

The Ali Yavar Jung National Institute for the Hearing Handicapped set up in the eighties under the Ministry of Welfare has brought about a sea of change in the diagnostic facilities, manpower development, awareness creation, dissemination of knowledge and research. The Institute with its regional centres and collaborative centres is reaching many hearing impaired.

Prior to 1960s there were not many pre-schools. A few pre-schools were established in 60s and 70s, which enrolled younger children into their programs. Some of these pre-schools
are doing extremely well and are integrating a big chunk of the hearing impaired children into the mainstream of education. The pre-school movement by the NIHH is beginning to change the scenario of the education of the hearing impaired.

**SPECIAL SCHOOL CONCEPT: THE EARLIEST APPROACH**

It is just over a hundred years since the first School for the hearing impaired was established in the country. Initially most of the schools were attempting to train the children in some vocational course like carpentry, tailoring, embroidery etc.

Slowly the schools started literacy programmes. Then the schools were updated to high schools and higher secondary schools. In the recent past two colleges for hearing impaired have been opened one at Chennai in Tamil Nadu and one at Valakom in Kerala.

Until the 1970s the Special Schools admitted hearing impaired children only after they completed 5 years. As almost all the schools were residential schools, younger children were not taken in, and were asked to wait until they completed 5 years.

Some attempts were made in early sixties to make use of the Critical Age of the children. The EAR Society at Bombay, the All India Institute of Speech and Hearing at Mysore and the ENT Department headed by Dr. Y.P. Kapur in CMC Vellore brought about an awareness regarding the importance of Early Intervention Programmes.

One of the pioneering institutions specialising in Pre-school education, Bala Vidyalaya, was founded in 1969 by two mothers of hearing impaired children, Mrs. Menaka Parthasarathy and Mrs. Saraswathi Narayanaswamy. Bala Vidyalaya drew strength from the AIISH, Mysore and CMC, Vellore. The schools started preparing hearing impaired children who were diagnosed by these two Institutions and successfully integrated them into the mainstream of education. The heads of the other two Schools in the city, Sr. Andheas, the Principal of the Little Flower Convent, Chennai and Miss Amy Boyd, the Principal of CSI School for the Deaf, Chennai, offered their full support to Bala Vidyalaya.

In 1970s the Clarke School for the Deaf which also admitted younger children was founded by Ms. P Leelavathy. This is a Special School going upto high school level. Along with the academic subjects, yoga and dance is also taught to the children.

The Little Flower Convent, Chennai was originally offering a subsidised syllabus for children. The school updated their programme to the regular normal school curriculum upto 10th Standard. Later the school was made into a higher secondary school with the untiring efforts of Sr. Rita Mary.

The Oral School at Calcutta founded by Dhun Adenwalla, a mother of a hearing impaired child, is another proof of the contribution of parents.

Maharashtra and West Bengal had many schools started in 60s and 70s. Mrs. Kamal Sathe, again a mother of a hearing impaired child has done a lot of work through her school. Similar attempts by parents have been made in other states as well. Mr Abraham Tharakan of Kerala, father of twin hearing impaired boys has taken a keen interest in the welfare of the hearing impaired.

Today there are many schools that have pre-school facilities and they aim at preparing the children for better performance. However, only about 5% of the hearing impaired children are as of now enrolled in special schools.
INTEGRATED EDUCATION: A Viable Alternative

Our country has a huge population of hearing impaired children. According to the latest survey, 4 children per every thousand children born in India, suffer from severe to profound hearing loss.

The improvement in neonatal care is saving many pre-mature and low birth weight babies, who would not have survived a few years back. However, many of these children are later found to have hearing loss. Many babies with hydrocephalus are saved today by shunt surgery. Again, some of these children are later diagnosed as hearing impaired.

Thus the number of hearing impaired children is on the increase. Even though we talk about education for all children, it is not going to be possible to create the required number of special schools in the country. The reasons are:

- Special Schools are much more expensive compared to regular schools.
- Even though the number of hearing impaired children is high, they are scattered. At any given time, there may be only two or three hearing impaired children in a group of some 20 adjoining villages and it is not feasible to open a special school for them.

The best alternative is to make use of the infrastructure facilities already available for general education and to integrate these children into the mainstream of education.

However, all hearing impaired children cannot be immediately integrated into a regular classroom, along with their hearing peers. Hearing impairment is not like visual impairment or physical disability. The hearing impairment makes it almost impossible for these children to develop language and speech on their own. As every other development depends on linguistic skills, it is not advisable to attempt to integrate the children without prior preparation. To this extent, hearing impairment is not like Mental Retardation, where integration is very difficult.

Thanks to the development in technology, hearing impairment in children can be assessed even when they are infants, and they can be fitted with suitable hearing aids. Many makes and types of hearing aids are available in the local market. The government is giving aids free or subsidized aids to needy children. Through pre-school education, the children can be helped to listen, comprehend and speak. Proper help during the first 3 to 5 years can prepare and help the children to smoothly get integrated into the mainstream of education.

Nature of Service in Inclusive Education

The regular school may have to create a special class with a special educator who can monitor the progress of the hearing impaired children in the school. Such facilities are not available in our country right now.

Inclusive Education: The Growing Trend in Realising Education for All

Inclusive education will help hearing impaired children mix with their hearing peers and make use of the school facilities available near their homes. Teachers in regular schools can be empowered to help hearing impaired children who have mild to moderate hearing loss. The other children, however, will need some preparation to be able to comprehend others and to communicate.
Measures to be Taken for Improvements

Before we plan any strategy for implementation, to improve the education of the hearing impaired in our country, we have to bear in mind two very important factors:

- Most of our hearing impaired children are in rural areas, and most of our present facilities are available in cities.
- The conditions and requirements in our country are very different from the ones in the developed countries.

Therefore, we should develop models that too the facilities available in our country and also suit our needs.

Parent empowerment is a very important factor to be considered. The cultural and philosophical background of our country is well suited for hearing impaired children. Parents are willing to learn and give a helping hand to their child.

Using the mass media, parents can be helped to cope with the problems posed by their child's disability. Once the initial communication is established in the child, he will be able to benefit by the regular school system.

Once the child is enabled to use spoken language as the mode of communication, the child can pursue his education with his hearing peers. This will throw open a wide range of activities where he will be able to contribute his might and find himself equal to anyone else.
CHAPTER 19

PSYCHO-SOCIAL ADJUSTMENTS AND CONCERNS

INTRODUCTION

The psychosocial aspects of disabilities have been considered significant enough to merit separate attention. The aspects subsumed under the general term psycho-social typically include the social-emotional, personality and intellective variables that are likely to be affected when there is an impacting disability. Needless to say, the dimension of effect will depend largely on the degree of the disability and the age of the individual at the onset of the impairment. Other factors such as the presence of additional disabilities, the level of intelligence, the motivation of others and, of course, of the affected individual, are also to be considered when evaluating in what way and the extent to which disability affects the individual.

In order to identify the areas affected by deafness and to gauge the magnitude of the effect it has on psychological functioning it is also important to consider whether the hearing loss is sustained prelingually, i.e. prior to the acquisition of speech and language skills or whether it is of post-lingual onset, i.e. its occurrence post-dates the development of speech and language in the child. Prelingual deafness is usually estimated to have a more significant impact on development. This is true whether one considers childhood sequelae or long term consequences.

IMPACT OF PRELINGUAL DEAFNESS

The early years of children who have been deaf since birth or have been deafened shortly thereafter are marred by experiences that leave them confused and angry. Devastated parents vacillate between denial, anger, guilt and despair on the one hand and an overprotective love on the other hand as they look for magic cures. Parental reactions to the diagnosis of the impairment parallel the grief response that has been eloquently described by Kubler-Ross (1969). It is unlikely that deaf children can remain untouched by these parental experiences.

The vacuum deaf babies’ experience is best illustrated by Brazelton’s (1974) finding that mother’s voice is more soothing than her visual presence for infants. The crisis a deaf baby probably experiences when its cries do not appear to be needed is not easy to document or understand. But the attention-seeking behaviours and temper-tantrums demonstrated by these children when they are unable to make themselves or their needs understood are more understandable. Meadows (1980) in an extensive review of literature found incidences of emotional and behavioural problems ranging from 8% to 30%, which are considerably higher than that encountered in the general population of school-agers.
Even variables like the nature of the school the deaf child attends appears to be related to his/her psycho-social adjustments. In a recent unpublished dissertation, Jalvi (1997) reports that teachers rate hearing impaired youths attending integrated schools as having better social-emotional adjustment than their counterparts in special schools. Even in terms of intellectual performance while approximately 72% of deaf adolescents in integrated schools fell in the range of above average general intellectual functioning only 38% of those attending special schools were established to be functioning in this range. This raises some interesting issues. One could infer that, to start with, it is the brighter, better adjusted child who will find his way into an integrated school. However, it is also possible that integrated education itself may act as a catalyst in enhancing adjustment and cognitive potential.

From a psycho-dynamic point of view, ego development is viewed as being boosted by the ability to hear as audition permits the assimilation of oral-aural inputs from parents and other caregivers. The superego, too, which represents the moral arm of personality, grows from the internalized voice of the parents. A higher incidence of conduct and behaviour problems and a lacuna in moral development is hardly surprising in this context. This is probably one reason why many clinicians are not inclined to consider residential placements for young deaf children. A strong bond with the parents is even more vital for the child with a disability.

The problems of deaf youth also merit attention. The presence of other deaf youth can alleviate or aggravate some of these problems. Growing up with deaf youngsters can take away some of the loneliness and the pain of rejection and ridicule that the deaf often face. However, it also leads to the emergence of a deaf sub-culture that contributes to the failure of many deaf persons to develop culturally required social skills and graces.

Perhaps the greatest hazard of isolation in recent years is the way it impacts with the deaf adolescent's emerging sexuality. Deaf girls are frequently not allowed to access what is deemed as 'provocative' literature lest it may seduce them into promiscuity. Close, unsupervised contact with the opposite sex is taboo. Deprived of factual information and often starved for attention deaf adolescents run the risk of unwanted pregnancies, sexually transmitted diseases and HIV infection. According to one estimate that has extrapolated data on the HIV infection rate in the general population, over 1,93,000 deaf Indians may already be HIV positive (Gopinath, 1999). Gopinath's frightening revelations as pretending to be HIV positive and deaf, he looked for medical support should be an eye opener to rehabilitation professionals.

Great caution needs to be exercised with deaf youngsters as they are particularly vulnerable to abuse whether in the context of their homes or outside. Kennedy (1988) found from 156 questionnaire returned by teachers and social workers for deaf children and adults that 55% reported incidents of physical and emotional abuse and 32% of sexual abuse.

However, crimes against the deaf are only one side of the picture. Denmark (1985) found that of the 250 deaf patients who had been referred to him, 33 had been charged with criminal offenses against the person, of which 11 were sexual offences. There has not been much research to determine whether the deaf have a predilection towards any particular type of crime. However, their limited communication skills, impulsivity and acting-out behaviour may place some of them at greater risk of delinquent and criminal behaviour. Notwithstanding this, rehabilitation professionals need to remain alert to the possibility of deaf persons being used by criminals or being falsely implicated in criminal cases.

The presence of one disability may sometimes mask another. It is not uncommon to come across autistic children whose hyposensitivity to auditory stimuli may result in their being iden-
tified as deaf and fitted with hearing aids. But the clinician must remain alert to the possibility of children who are both deaf and autistic.

Other disabilities may also co-exist with hearing impairment. Mental retardation is one of the most frequently encountered additional disabilities. In one 3-month period, of 125 clients reporting to the clinics of the Department of Clinical Psychology, AYJNIHH, and for whom clinical details could be extracted, it was found that 89 (71%) were children presenting with hearing impairment. Of these 62 (70%) were established to have average or above average intelligence. Nominal developmental deficits and borderline intelligence was established in approximately 16% of the cases while 14% were clearly children and youth who were multiply handicapped presenting with both retardation and hearing impairment (Table I).

Table 19.1: Cognitive Status of 0–18 Year Olds with Hearing Impairment

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Average/Above Average Intelligence</th>
<th>Nominal Developmental Deficits/Borderline Intelligence</th>
<th>Mental Retardation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5 years</td>
<td>42</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>6 - 18 years</td>
<td>20</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

Many of the existing special schools do not appear to be equipped to deal with the challenge posed by these multiply handicapped children.

Among older deaf clients the paucity of language may result in vagueness and concretism. This sometimes leads to unwarranted assumptions about their mental health status. Infact, the rate of acute psychiatric illness, especially the affective disorders, seems to be lower in a prelingually deaf population (Altshuler, 1971). It is necessary, however, for clinicians to remain vigilant to unusual signs. Withdrawal, weeping spells and psychomotor retardation signal depression that requires immediate attention. Schizophrenia has also been documented in the deaf population. Expectedly, there is no evidence of auditory hallucinations except in partially or postlingually deaf schizophrenics. Critchley, Denmark, Warren and Wilson (1981) believe that what people describe are experiences that are analogous to auditory hallucinations. Though ideas of reference are common among the deaf there is no evidence that paranoid reactions or psychoses are more prevalent among the deaf (Thomas, 1981). Signs such as echopraxia, which is a tendency to meaninglessly imitate motor movements and gestures of others, usually points to deep, long standing psycho-pathology. However, even such behaviour needs to be interpreted with care because it could represent nothing more than an attempt to communicate.

Deafness affects cognitive functioning and academic performance as well. While early research suggests that the deaf showed somewhat lower performance on standard intelligence tests, most current research indicates that there are no significant cognitive deficits, only cognitive differences (Myklebust, 1964). This view grew out of the belief shared by Myklebust and some of the other theorists of the period including Vygotsky that language is dominant over and proceeds cognition. Thus, limitations in language can potentially limit intellectual development particularly in terms of abstract thinking. Piaget, however was convinced about cognitive dominance. This would appear to negate the idea of any particular difference between the deaf and people with normal hearing in terms of cognitive competence. Needless to say, performance measures can be used as a index of the true intelligence of the deaf.
Psycho-Social Adjustments and Concerns

In spite of the fact that the deaf are not intellectually inferior to hearing people academic retardation is common. This is hardly surprising in view of problems like the late detection of the impairment and the inability to avail of (adequate) hearing aids. Limited language, experiential deficits and inadequate time spent on specific subject teaching is also thought to be responsible for the considerable under-achievement manifested by deaf school-agers. Levine (1981) appears to accept the lower achievement levels of deaf children even while suggesting that a reading and arithmetic level of fourth or fifth grade in older school-agers suggests at least average mental capacity.

Academic retardation in the face of average intelligence is as frustrating an experience for deaf adults as it is for deaf children. It effects on deaf adults is compounded by the fact that they can look at themselves and others and estimate what could have been.

Very few deaf adolescents go to mainstream colleges and universities. Deaf adults, then, have to content themselves with remaining unemployed, or, best, underemployed and underpaid. Lack of higher education and inadequate vocational training is only part of the problem. Unrealistic expectations of the deaf and their families and poor work attitudes are also responsible for their inability to locate or hold-on-to jobs. Socio-economic rehabilitation is a must to provide some measure of self-worth and autonomy to deaf adults.

Other concerns of deaf adults centre around finding suitable life partners. Most families would prefer to see a deaf member contract a marriage with a deaf person with approximately the same kind of hearing loss and communication skill as it is believed that it eases marital adjustments. Further, those whose deafness is clearly established to be non-genetic in origin would like to preclude the possibility of having a deaf child by marrying a person with non-genetic deafness. Clearly, one deaf person in the family is enough!

IMPACT OF POST-LINGUAL DEAFNESS

Post-lingual deafness or deafness acquired after at least functional speech and language skills have been acquired poses a very different challenge. The primary concern, irrespective of the age of the affected person, is coping with the depression and agitation that follows the trauma of discovering the deafness. Adequate counselling at this stage is imperative. If the grieving persists psychiatric help might be indicated.

In childhood a major concern following sudden onset deafness is the preservation of speech as speech output and intelligibility both reduce. This may contribute to difficulties in establishing mutually satisfying peer relationships. Learning difficulties involving reading and spelling, some very subtle, may develop and lead to failure adding to the child's growing sense of frustration.

Deafness at any age challenges the emotional resources of the family. Adults who acquire deafness wonder whether they will be able to hold onto jobs. It is common to find retrenched persons talking of financial difficulties and changes in their life styles. Communication dwindles to the functional and latent marital problems often emerge.

In older affected persons it can become difficult to tell whether the problem they face are a part of the social disengagement that is often encountered in old age or whether these are a consequence of the hearing loss.
ASSESSMENT AND INTERVENTION

An important concern of the families of the deaf is the availability of 'good-enough' diagnostic and therapeutic services. A part of these services is the psychological assessment which aims at providing a comprehensive, psycho-social profile of the individual in the context of his or her life situation. Clinical psychologists provide the family and other rehabilitation team members with information about the developmental status of the young child, about intelligence, aptitude and achievement and neuropsychological functioning. Social-emotional aspects and personality are also looked into as and when required. It enables diagnosis in the interest of remediation and placement programming. It permits the clinician to evaluate future outcomes.

Considerable care has to be exercised in test selection. Performance tests are usually the tests of choice with untimed tests being preferred to timed ones especially with deaf children who do not appear to appreciate the need for speed. Clinicians must make certain that clients have understood test demands otherwise false 'ceilings' might be reached. The health status of the client and the presence of additional disabilities must be considered. The test situation and the degree of 'test sophistication' also merit special attention.

The benefits of parental involvement even at this stage are enormous. A good case history is half the battle won. The clinician in the course of history taking may enhance the information level of the parents. Clinicians must enlist parents as allies in the rehabilitation process. It ensures the consolidation of what is introduced in the clinic or in the classroom. It ensures responsible decision making.

Psychotherapeutic intervention for deaf clients and guidance and counselling for their families, as and when required, is essential to rehabilitation programmes. Fortunately many deaf people and their families manage to get by with minimal support. There are however, many who require sustained, individualized therapeutic or counselling services. Play therapy, behaviour therapy, modifications of psycho-drama, supportive psychotherapy, guidance and counselling are among the most commonly utilized therapies, offered to deaf persons and their families.

This remains the ideal. However, the fact is that there is a paucity of well oriented mental health professionals who can work with deaf people and their families. There is an urgent need for short-term training programmes to prepare professionals to address the needs of persons with hearing impairment.

In summary, the deaf cannot and must not be treated as a homogeneous group. There are many variables that go into shaping the individual. While genetic and biological factors provide the blue-print, exogenous factors play a very crucial role in giving shape to the emerging self. It is the responsibility of all members of the rehabilitation team to assist deaf people to transit from their position as victims of the past who are living in the present to individuals who can move freely towards a more dynamic and compelling future.
CHAPTER 20

VOCATIONAL TRAINING AND SOCIO-ECONOMIC REHABILITATION

INTRODUCTION

The winds of change have swept across the area of socio-economic rehabilitation. Rehabilitation professionals have started taking cognisance of the fact that habilitation/rehabilitation remains a myth unless it is translated into a skill or a job that permits persons with disabilities to establish and/or maintain a modicum of economic self-sufficiency.

In this respect many exciting developments have been taking place in recent years. There has been a search for a greater understanding of the ways in which disability impacts vocational development. There has been a concerted effort on the part of non-governmental organisations (NGOs) and Governmental Organisations (GOs) to revise and update vocational training programmes by eliminating redundant vocations and including newer areas that are, both more appropriate and more in demand. This has involved extensive market research and surveys to establish local needs. Alternative approaches to vocational placement are being explored as the dynamics of the great urban-rural divide is finally being acknowledged as a reality in the Indian context. Perhaps, the most laudable feature is the greater acceptance of the right of persons with disabilities to self-determination. In this connection, it must be pointed out that though roughly 80% of India’s population lives in its villages, paradoxically 80% of rehabilitation services are concentrated in urban areas where 20% of the population requiring this support lives.

FACTORS DETERMINING VOCATIONAL CHOICE

Intelligence, aptitude and interest are the core triad determining vocational choice. But the infrastructure, built on this base or blueprint, is a reflection of vocational/professional training, the availability of jobs and the extent to which a particular vocation is seen as being able to meet the aspirations of the individual.

Then is the role of the family and influence of socio-cultural factors. Parental expectations play an important role in the selection of a vocation for persons with disabilities as they do for normal hearing persons. The socio-economic status of the family colours their outlook as to the kind of vocation that a family member with a disability can and should choose. Very often these attitudes mitigate against good adjustments because they preclude many vocational options that are, technically speaking, more within the range of abilities that the affected individual actually possesses or the skills he/she has been able to acquire. The inculcation of the right attitudes to work are, hence, a necessary part of any vocational training programme.
EMPLOYMENT OPTIONS

When the issue of the rehabilitation of persons with disabilities is examined closely it becomes
necessary to study the available employment options. In the Indian context as in the West, there
appear to be four options. The implications of these four options adapted from Schalock and
Kiernan (1990) are depicted below:

Competitive Employment

No special, ongoing support is provided. The resources are the same as that available for any
worker.
- Wages are at the prevailing rate.
- Other workers do not have any disabilities.
- Ongoing supports are not required by the worker to maintain employment.

Transitional Employment

For workers who require time-limited supports and services but are expected to be able to
manage on their own after a time.
- Wages may be less than the prevailing rate.
- Other workers do not have any disability.
- Time limited job–related supports are required to maintain employment.

Supported Employment

For persons with more severe disabilities who need long term supports such as aids, specialized
training and environmental modifications in their work place.
- Wages may be less than the prevailing rate.
- Most workers do not have any disability.
- Ongoing support to maintain employment.

Sheltered Employment

For persons who are severely disabled and require not only aids and appliances and help in
securing modified/specialized training and employment but also a sheltered environment since
they cannot work in the community.
- Wages are usually considerably less than the prevailing/minimum rate.
- Most workers have one disability or the other.
- Job modifications are made to enable them to function.
- Close supervision is provided to ensure the safety of the worker.

The deaf in India, those who are self employed and those who are a part of the organized
work force, tend to be distributed in the first three categories. Given the nature of hearing
impairment, there is usually no need for the fourth option, viz. sheltered employment, as there
is for persons with mental retardation.
ROLE OF GOs, NGOs AND LEGISLATION

Vocational training for the disabled in India is not new. Families groomed their disabled children to help in the traditional family occupation, whatever it was, e.g., farming, pottery making, carpentry, tailoring etc. Then came a hiatus. The concern for the disabled started with a few people with a vision about a better future for the disabled and grew into a political movement. This was reflected in the setting up of vocational training centers with NGO effort. These were frequently small outfits but known for their down-to-earth and pragmatic approach. Local trades would be taught at different levels and self-employment was encouraged. It is noteworthy that many schools have also begun offering vocational training. In the East, Speech and Hearing Institute and Research Centre, set up in 1978, has gone on to add vocational training in the traditional arts and crafts. A short term vocational instructors training course is also offered at one of its branches. In the Western region, NGOs and GOs offering courses like caning, cookery, shele craft and dress making are making their presence felt. The K.L. Institute for the Deaf at Bhavnagar offers more advanced options like computers and photography. Even in the far flung Northern reaches of the country like the J & K, institutions have begun vocational training including diverse courses such as chalk and candle making and printing technology. The South offers many more programmes. But a lot of work remains to be done both in terms of upgradation of technology and in terms of a wider choice of programmes.

The setting up of Vocational Rehabilitation Centers (VRCs) by the government appears to have formalized these efforts. There are currently 17 VRCs that are working towards the training of persons with disabilities, while the Training Centre for Adult Deaf (TCAD) at Hyderabad under the administrative control of AYJNIHH, works exclusively for the hearing impaired. The work of these VRCs is augmented by 22 special employment exchanges and over 40 special cells in ordinary employment exchanges which cater to persons with blindness, deafness and orthopaedic handicaps. NGOs like National Association for Equal Opportunities for the Handicapped, headquartered at Mumbai, also offer vocational training to the deaf who train along with persons with other disabilities. However, the fall-out, in retrospect, appears to be that years have rolled by without a change in the trades taught or in the technology used. Disabled persons are in danger of becoming victims of the same system that had set out to liberate them. There is today, a growing pre-occupation with the concept of “quality of life”. One aspect of the quality of life is “quality of work life” that Kiernan & Knutson (1990) go on to describe as the worker’s sense of involvement in the work, their awareness that their contribution makes a difference to services or to what is produced and that their contribution is valued by society.

With the inception of the Socio-Economic Rehabilitation Department (SERD) of AYJNIHH the scenario, especially in terms of government involvement has undergone an even more dramatic change. Within the last 10 years or so the Institute had roped in more than 20 GOs and NGOs as collaborators and utilized the infrastructure and personnel already available with them to training the deaf in various trades ranging from the agro based rural trades like straw craft at CSI School for the Deaf at Valakom, Kerala and leaf plate making at Gram Vikas Seva Sanstha at Jagdishpur in Uttar Pradesh to the computer course at the Badhir Bal Kalyan Samity at Bhilwara in Rajasthan (Appendix). Any GO and NGO can become a collaborator and details of the same can be had from the Institute. In fact, more collaboration has been solicited and 250 applications have been received. SERD and TCAD have been working towards identifying areas for self-employment and jobs in the government and private sector. Collaborative meeting
with T.V., refrigerator, scooter, bicycle and construction companies have been organized by AYJNIHH and its Regional Centres.

In response to the prevailing climate of change, the government has directed its efforts towards creating more jobs for the handicapped and providing relief to disabled workers and their families. It is interesting to note that the office memorandum issued by the Ministry of Home Affairs, Government of India, on the subject of reservation of posts for handicapped persons (1% reservation for the three categories: the blind, the deaf and the orthopaedically handicapped) (Refer OM—No.39012/6/77-ESst (SCT) was issued in 1977. In 1985) permanent deafness with hearing impairment of 71 decibles and above or permanent and total loss of voice was included as a permanent physical disability for the purpose of deduction of Income-Tax under section 80U/(Refer communication No.6227/F.No. 133/64/84/Ministry of Finance, Department of Revenue Dated 17th July, 1985). By 1990, the Ministry of Personnel Public Grievances and Pensions had issued instructions to all government offices that holders of Group ‘C’ and ‘D’ posts should be posted at or near their native place.

Among the most significant developments in the recent years is the Persons with Disabilities Act, 1995 that exhorts rehabilitation professionals and members of the community to ensure that persons with disabilities get equal opportunities to be trained in the field of their choice; to employment; to fair wage; to equitable treatment at their work place and to career advancement. A barrier free environment at the workplace; the modification of the machines and tools and the use of alternate modes of communication and signals; compensation to disabled workers and freedom from the threat of sexual exploitation with special reference to working women with deafness still require to be followed up so that the provisions laid down in the Act do not remain confined to paper. In this connection it becomes necessary to draw more attention to the position of women with disabilities. There is a tremendous need to identify jobs that they can conveniently do and engineer more secure environments within which they can work unhampered. A pragmatic view has to be taken keeping in mind the general status of women in India. It is the nation’s responsibility to take every step it can, towards safeguarding the integrity and interests of women and ensuring that they take their place as productive members of society. Perhaps the most significant landmark is the recent notification of the National Council for Technical and Vocational Training (NCTVT) recognising the upgraded TCAD, Hyderabad programme at par with any regular ITI. The NCTVT Act that had so far denied apprenticeship to hearing impaired persons has also been amended.

TRAINING PROGRAMMES FOR REHABILITATION PERSONNEL

The limited speech and language skills of persons with deafness makes it difficult for most counsellors and trainers without specialized training to work with them effectively. The development of more focused training programmes for vocational counsellors and instructors will be a step in the right direction and enable them to assess the employment options of the deaf more realistically. Training in sign language and the provision of interpreter services will help instructors to bridge the communication gap and enable the deaf to receive more effectively the inputs being provided to them. Vocational counsellors orient the deaf to pre and post placement discipline and rules and need to be able to work on the development of social skills of the deaf to ensure harmonious relationships within the work place. Rehabilitation officers need to be oriented to public relations and to liaison work with both government and public sector undertakings and
with private sector to generate new employment avenues and to stimulate attitudinal changes. Towards this, periodic orientation programmes can be organized by both NGOs and GOs inviting various organizations and companies to share their experiences in the training and employment of the disabled. Adaptations of the regular syllabi of various vocational subject for those who require it and preparation of training modules also needs to be stepped up.

OTHER DEVELOPMENTS

Perhaps the best index of changes in attitudes towards employing persons with disabilities is the number of persons actually employed by various agencies. No precise figures are available. Titan, a Tata enterprise, was adjudged the Best Employer of the Disabled for employing many handicapped personnel at various levels without any quality compromise at all. The Railways, HMT, SAIL, BHEL are also good employers. Some of the nationalised banks are now generously creating posts or filling up old vacancies with eligible hearing impaired persons. NHFDC and banks have come toward in a bigger way with loan schemes with low interest adding to the endeavors to improve the lot of the handicapped. Rural trade training and the training of vocational instructors in collaboration with Khadi and Village Industries Corporation which has a national network and the Vishwa Bharati University are all but a part of the holistic philosophy and multi-sectoral approach of AYJNIHH. It is hoped that in the years to come the efforts of all agencies, both GOs and NGOs, and the legislation enacted so far will contribute to the removal to the attitudinal and environmental barriers that act as impediments to the employment of the deaf and will open up new vistas of employment so that persons with hearing impairment truly become an integral part of the working force of the nation.

EMPLOYMENT ASPECTS

Introduction

"Work is central to lives of people. It has a significant impact on an individual’s values and motivation. A person’s work is undoubtedly one of the most decisive formative influences on a person’s character and personality. It is central to human's life" (Clarg. 1982).

The main theme of this section is to analyze the various factors concerning the employment opportunities for the Hearing Impaired persons in our country and to suggest strategies for preparing them for a life oriented education.

Employment after good education and proper training is the ideal rehabilitation of any youth whether he/she is able bodied or otherwise. This factor is very important for the hearing impaired also, since every step forward in their education and training is towards achieving a better placement in life. Any amendments in PWD Act or any other acts will not help the hearing impaired unless he is qualified well to meet the challenges facing the unemployment problem of our country. The hearing impaired youth will be frustrated unless we provide him/her, a well planned combination of quality education and intensive training in our specific field that is assigned to get decent placements in indoor or outdoor jobs. To achieve this aim, let us explore first the status of the hearing impaired in education, training and employment for the past three decades and also of their present situation.
Historical Perspective of Employment for the Hearing Impaired

Traditionally, people assumed that training the students in skills that are appropriate for a job entailing their limited communication and abstract symbolic demands, are sufficient. As a result, academic programmes for hearing impaired were characterised by memorization drill, and rote learning exercises which resulted in limited opportunities in employment. I am sorry to state that this practice is still continuing in many of the educational institutes even today. The hearing impaired is thus employed mainly in unskilled and semi-skilled jobs. The primary contributor to this unfortunate abysmal condition is the limited educational attainments of the hearing impaired. Integration of the hearing impaired into the schools for the hearing were limited and the university higher education were unheard with very few exceptional cases. This neglected situation prevailed earlier, even in advanced countries like UK and USA. However, by the year 1965, the legislators, the education and rehabilitation experts, the consumer advocates debated about condition of the educational standard and the rehabilitation facilities. They brought about a tremendous change in the Special School curriculum and vocational training and moved towards total rehabilitation. It widely opened the doors of normal schools, colleges and universities to the hearing impaired. Mainstream education and integration education for the deaf brought a drastic change in the lives of the deaf. The deaf community on the whole woke up from their slumber and demanded for their equal rights to education training and employment. In that context, the concept of advanced regional vocational and technical centres were established. At the same time the need for education beyond high School was also felt and it became an accepted need nationa wide. It became evident that rapidly developing technology required higher order of technical and verbal skills for participation in the work place. Thus a strong case was made for an educational thrust to link to the existing colleges and universities.

In India as well, it is our duty to fulfill the dreams of our hearing impaired youngsters of good education and training for decent job placements. The education for the handicapped is now a recognized field of study and the Government of India envisages that all the disabled must receive good education before proper rehabilitation. Although there is an awakening in the minds of people, proper execution of the plan and programmes towards the education of the hearing impaired in not fully achieved.

The Need for a Changed Approach for Employment

The very foundation must be strong from the school entry period. Prevocational courses must be need based in the secondary and higher secondary level. Good counselling departments are to be established for the students. The school curricular and co-curricular activities must develop excellent work habits in hearing impaired students to develop their personality, social behaviour, academic and non-academic skills. These skill lead to a successful entry into the higher education and employment at par with the hearing people. In the open universities and technical setup, integration of the hearing impaired requires additional educational support and guidance. The special schools, colleges and universities must have dedicated individuals of demonstrated talents and integrity with commitment as educators and career counsellors to mould the hearing impaired students to achieve high degree of academic and technical talents.

The preparation of the deaf adolescents for the work force is a priority. The need to be a skilled worker has been clearly signalled by the market place. The greater risk for unemployment
and underemployment prevails in our country due to the negligence of proper educational system (authorities), parents, government bodies and the society as a whole. The vocational preparation and the knowledge of the same is very rudimentary in many of the places. Inadequate knowledge to understand the potentiality of the hearing impaired is the root cause for this setback. Career information must be collected and circulated; talents and aptitudes of the adolescents, their career awareness and vocational maturity should be identified, developmental lag must be traced out and solutions must be found to rectify the same.

**The Challenging Task of Employment of the Hearing Impaired**

Most of the young people between the ages 16 and 20 are faced with the important task of deciding their continuing education and possible career. This requires the individual to be aware of his or her interests, values and abilities that relate to specific occupations. Career maturity is to be developed most intensively during adolescent period. Educational strategies must increase the capacity and willingness to plan for the future.

The career development process occurs through a number of life stages during which time an individual's career pattern is determined by socio-economic levels, mental ability, personality characteristics and also by opportunity. Central to a synthesis of these factors is exploration. This exploratory behaviour may be facilitated by the support parents provide, the opportunities the society throws open and the governmental support. They may face a lot of conflicts like tension, frustration, ambiguity and uncertainty before making any decision and many difficulties can arise. The school, parents and the work place authorities must provide such confidence and support.

Many of the studies conducted suggest that deaf adolescents are vocationally immature compared with their hearing peers. Information about the world of work may be difficult for the hearing impaired to acquire. Incidental learning can take place by conversing with others, reading and socializing with the peer hearing group. So the habit of listening and communicating orally and socializing habits must be inculcated from the very childhood days. If not the hearing impaired student will not gain as much information from incidental learning as others and will have very reduced information base.

From the point of view of the family, it should be a learning centre where differential values towards various kinds of work to be discussed. The most important source of information is his immediate family. As we know, the vocational preparation and employment outcome for the people with hearing disability have been discouraging and their vocational adjustment has tended to be characterised by limited saleable work skills, low income under employment and unemployment. This fact highlights the need for improved academic and career education guidance services. This challenge is complicated by the non availability of career guidance, literature centres and community based directed education.

Therefore, the career development of hearing impaired students has become a priority for educational programmes. If exceptional children are to be successful at a job, they must possess the capacity and skills for that job. A sense of urgency and a sense of joy must be felt by all hearing impaired who continue to do hard work and grow with people of similar accomplishments and motivations and take pride in doing a job well.
CHAPTER 21
MANPOWER DEVELOPMENT

INTRODUCTION

For proper growth and development of an individual, education is a basic and essential ingredient. Education empowers an individual to lead a quality life. Disabled persons are no exception to this. Education is more a requirement for sensory disabled–hearing handicapped persons than any one else to make adjustments in their life. However, education presupposes normal development of early learning process, especially acquisition of language. Language becomes the bridge between the individual and his or her surroundings. Language allows communication and interaction with one’s environment. Congenital hearing handicapped children suffer from inability to communicate through language. Thus, successful education of hearing handicap also suffers because of their lack of proper communication ability. Therefore, successful education of hearing handicap depends on the early identification and rehabilitation of hearing handicap.

For successfully educating and rehabilitating persons with hearing handicap two categories of core professionals become very essential viz. speech and hearing professionals to undertake early identification, diagnosis, selection of aids and appliances, early speech and language intervention and therapy to develop communication in the deaf. The other professional required are special educators. Further, the special educators could be of two categories, first are teachers for class room teaching and training at pre school and school levels and the others are needed for vocational training. In addition to these core professionals allied professionals like, psychologists, social workers, vocational counsellors, placement officers also play a crucial role in rehabilitation of the hearing disabled persons.

Ramacharya and Ganesh (1996) opined that “lack of trained personnel to identify the deaf at lowest possible age is a serious bottleneck in the rehabilitation of the deaf, especially in the rural areas.” His observation holds true even with respect to education of the deaf in urban areas. Several professionals seem to agree that non-availability of adequate number of properly trained professionals has mainly resulted in late age of entry of hearing handicapped in the schools. This has made education difficult to most hearing impaired not only in the rural but even in urban areas.

HISTORICAL PERSPECTIVE

The discipline of Audiology and Speech Pathology is in existence from 36 years. It has grown considerably over the years. This discipline had made no positive imprints in India till 1962-63. Jagdeesh (1993) reported that, “with the appointment of Charles Welho, M.A., as honorary Lecturer at Nair Dental College and Hospital, Bombay, in 1959, a beginning was made in meeting the needs of persons with speech and hearing problems. Later Mrs. Dorothy Nazreth
was appointed in 1960 to work with cerebral palsy children at the children’s orthopaedic hospital in Bombay”.

Rathna; Nikam; Roy; Jagdeesh; and Nataraja (1993) have all given many more historical details pertaining to events leading to establishment of centres and training programmes in the discipline of Speech and Hearing. Interested readers may refer to the monograph *Speech and Hearing in India: Thirty Years*, published on the occasion of its silver jubilee by ISHA.

**The Beginning of Speech and Hearing Training Programme in India**

The speech and hearing training in India started with return of foreign-trained professionals in early 1960’s. B.Y.L. Nair Charitable Hospital and TN Medical College started the first speech and hearing training course in July 1966. It was a Diploma programme in audiology and speech therapy that was later converted in to B.Sc. (AST). This was followed by a master level PG training programme. M.Sc. (Speech and Hearing) was started in Oct. 1966 at the All India Institute of Speech and Hearing (then called Logopedics) at Mysore. Dr. Rathna while explaining the reasons for starting masters training programme prior to start of basic graduate programme, emphasised the need for indigenous faculty to establish a new discipline, by drawing graduates from diverse related fields, like Psychology, Linguistics and basic sciences of physics and mathematics. Rathna (1993) recollects that these good students from allied fields after their post graduation in Speech and Hearing have not only become first indigenous professional faculty but also proven to be high level leaders in the field of speech and hearing.

The first graduate B.Sc. training programme started almost simultaneously at AIISH, Mysore, and TN Medical College, Mumbai in June/July, 1967. The B.Y.L. Nair Hospital at TN Medical College under the affiliation of Bombay University upgraded their earlier Diploma in AST to B.Sc. (AST) with intake capacity of 10 seats. The AIISH, Mysore started B.Sc. (Sp. & Hg.) with 15 students as intake and later increased it to 20 + 3(foreign) seats and now the present intake is 30 +(3) seats. Till 1986-87 the AIISH, Mysore and B.Y.L. Nair Hospital & TN Medical College, Mumbai, were only centres conducting training courses.

Without recording the contributions of the field of otolaryngology and otolaryngologists, it is not possible to justifiably trace the development of field of speech and hearing including training of professionals in India. Dr. Y.P.Kapoor, the then ENT specialist at C.M.C., Vellore, Dr.K.U. Shah and Dr. L.H. Hiranandani at Mumbai, Dr. Achutanand Sinha, the then Prof. of ENT at AIIMS, New Delhi, Dr.C. Subramanyam and Dr. Kameshwaran, Madras are few of the eminent ENT stalwarts who have contributed a great deal in the initial stages for the establishment of the profession. Dr.Y.P. Kapoor conducted a series of workshops that resulted in formation of the ISHA. Dr.A.K. Sinha at AIIMS, had undertaken a project on establishment of “Rehabilitation unit in audiology and speech pathology” under SRS project of USA. During late 1960’s and early 1970’s both at CMC Vellore and AIIMS, New Delhi, a one-year post matriculation diploma in audiometry was conducted till mid 70’s and was called Diploma in Audiology. While most of the training programmes conducted at ENT departments were of diploma level, the programmes conducted at AIISH, Mysore and B.Y.L. Nair continued to be graduate and post-graduate programmes. Gradually it was recognised that graduate speech and hearing professionals are far superior and better informed professionally than the diploma holders. This led to closing down of diploma training programmes in audiometry. From late 1970’s to early 1980’s the B.M. Institute at Ahmedabad conducted B.Sc. (AST) programme under Gujarat University and discontinued it later.
The Need for Short Term Courses

Many social organisations like Rotary clubs, Lions clubs and others conducted rural service camps, community awareness and public education programmes in a restricted way. Major training institutions and ENT departments held camps in nearby rural areas. AIISH, Mysore, was a pioneer in holding camps in different places in semi-urban areas. However, all these and could not cover many parts of the country specially north, east, and north-east areas. With the starting of AYJ National Institute for the Hearing Handicapped, in 1983 at Mumbai, by the Ministry of Welfare (now called Social Justice and Empowerment) short term training programmes, workshops and orientation programmes received a boost. This lead to planning of more programmes geared towards strengthening of NGO and voluntary organisations in order to take rehabilitation to rural areas. AYJNIHH devised short duration training programmes in the areas of ear mould making and hearing aid repairs. These programmes as well as refresher training programmes for the teachers and other professionals are held at AYJNIHH, its regional centres, collaborated centres and NGO and other voluntary organisations several times each year. Regular annual national seminars were held for providing NGOs and other voluntary organisations as a platform to air their opinions and to seek redressal with Government. This brought in a change of attitude in Government officials, professionals, educators and adult deaf, resulting in opening up of newer rehabilitation programmes and upgradation of existing programmes. They started slowly accepting that money spent on rehabilitation of the deaf is a long term investment rather than charity. AYJNIHH also received the feedback that graduates of speech and hearing therapists were not at all available to take up speech therapist, audiologist posts in schools for the deaf, especially at smaller places and townships. This made Ministry of Welfare to instruct AYJNIHH to evolve short term training programmes to meet the requirements of schools in rural and semi-urban places. Diploma courses of one-year duration emphasising more of practical exposure and work than theory were needed. Because of necessity of training more number of people to take care of routine daily activities and also to provide technician level personnel, such short term programmes become necessary.

Short Courses in the Area of Speech and Hearing Rehabilitation

At the stage when AYJNIHH was planned and started during 1982-83, with a population of 640 million in India having about 2 million hearing-impaired children below 14 years of age, the then existing 150 schools were totally insufficient. Further, even in these 150 schools more than 60% of the staff were under trained or untrained. Added to this, there were hardly any speech and language therapist or audiologist available to work in these schools. Mostly speech and language therapy and audiological services were available only in ENT depts. of a few major hospitals located in Metropolitan cities. The availability of speech therapists to schools and other centres was low as the number of trained speech and hearing graduates were only 30. The AIISH, Mysore, B.Y.L. Nair Hospital and TN Medical College, Bombay were the only 23 institutions training B.Sc. (Sp. & Hg.). Of these 30 graduates, 10 students had an opening to join M.Sc. (Sp. & Hg.) at Mysore and 3/4 could afford to go to USA/UK for higher studies. Therefore, hardly 12 to 15 candidates per year were becoming available to take up speech therapist/audiologist posts. Thus they were not opting to work in schools and smaller centres as pay and perks were comparatively lower in schools and educational institutions and social prestige was better in a hospital set up.
During that time the Ministry of Welfare was planning to start RRTCs and DRCs in all districts, if, their already started pilot centres were found to be economically viable. Therefore, keeping in view the non availability of trained B.Sc. (Sp. & Hg.) graduates to work in educational set ups and in smaller townships and rural areas, as well as to give effect to the instructions of Ministry of Welfare, AYJNIHH started one year duration diploma programmes. The Diploma in Management of Communication Disorders (DMCD) and Diploma in Education of the Deaf (D.Ed.) were started in 1985. The DMCD was aimed at producing speech and hearing assistants geared to take care of routine speech and hearing evaluation and therapy. They were supposed to work as assistants to graduate speech and hearing therapists wherever available or to independently perform routine basic duties at District and lower level centres, schools for the hearing impaired or M.R. children.

It was envisaged that this Diploma in Management of Communication Disorders programme now called Diploma for Speech & Hearing Assistants by RCI, will equip a person after training, to take care of following routine activities:

a) Hearing screening
b) Routine hearing testing
c) Earmould making
d) Minor repairs
e) Parent guidance, counselling
f) Speech and language intervention and therapy with hearing handicapped, M.R., delayed speech and language and misarticulation correction
g) Record keeping, organisation of public awareness camps, etc.

It was recommended that wherever possible and feasible, they will work as substitute teachers or teacher aides in schools. Therefore, the drawn syllabus for the course was on practical consideration and carried very less of theory. It can be said that it was envisaged as a predominantly practical course.

The DCD was first started in the Headquarter, Bombay, and was subsequently introduced by starting Regional Centres of AYJNIHH at Calcutta, New Delhi, Hyderabad and in collaboration with Panchayat Raj Department of State Government of Orissa at Bhubneshwar. Soon the Armed forces Medical Service visited the Institute, studied the course of DCD and requested AYJNIHH to train the Armed forces personnel at Bombay.

However, by 1988 the scene changed. The State Govts. did not include the post of speech and hearing assistant in their grant in aid schemes for schools for deaf or MR or spastics. Either they were not properly appraised or ignored the Central Government notifications or for want of finance or for whatever reasons State Govts. did not pay towards salaries of speech and hearing assistants. The DRC scheme was not extended to all districts as planned and no new DRCs started. Even in those DRCs and even in National Institutes, the Cadre and recruitment rules for post of Ear Mould and Hearing Aid Technicians were not changed from the existed Dental technician certificate to DCD. Thus, few of the schools who had selected and taken DCDs on their rolls had to manage them with their own resources or had to get them retrained as D.Ed and enrol or continue as teachers. In the meanwhile, in many schools where regular teachers could not be recruited for lack of availability of trained candidates, DCDs were acting as substitute teachers. This was wrongly construed as threat to trained educators.
Further, most of the ENTs found it economical to employ DCD trained persons as audiology assistants in their private clinics. This was very convenient to the ENT surgeons, as DCDs having limited theoretical background performed whatever that is asked to be carried out without questioning. Hence DCDs were better accepted with private ENT specialists and started taking up jobs in cities. This infuriated the members of the Indian Speech and Hearing Association to blame the DCD course as dilution of the professional standards and allowing DCD to practise privately in collusion with ENTs as non-professional. Hence, under pressure, though even now, it is true that enough of Speech & Hearing graduate therapists do not take up jobs in schools and smaller centres, DCD course was wound up in Bombay, Calcutta and Hyderabad and instead B.Sc. (Sp. & Hg.) was started at AYJNIHH Headquarters, SRC, Hyderabad & ERC, Calcutta.

Graduate, Post-graduate and Ph.D. Programmes in Speech and Hearing

Thus, as of today, the following institutes are carrying out the speech and hearing programmes.

Table 21.1: Courses in Speech and Hearing Impairment Offered by Various Institutions

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<tr>
<th>Name of the Institute</th>
<th>Intake capacity of the following Courses</th>
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<tbody>
<tr>
<td></td>
<td>B.Sc.</td>
</tr>
<tr>
<td>AIISH, Mysore</td>
<td>30 + (3)</td>
</tr>
<tr>
<td>B.Y.L. Nair &amp; T.N. Medical College, Mumbai</td>
<td>10</td>
</tr>
<tr>
<td>AYJNIHH, HQ, Mumbai</td>
<td>30 + (3)</td>
</tr>
<tr>
<td>AYJNIHH, SRC, Hyderabad</td>
<td>20</td>
</tr>
<tr>
<td>AYJNIHH, ERC, Calcutta</td>
<td>20</td>
</tr>
<tr>
<td>AYJNIHH, NRC, New Delhi</td>
<td></td>
</tr>
<tr>
<td>SNC, Mangalore</td>
<td>20</td>
</tr>
<tr>
<td>*KMC, Manipal</td>
<td>20</td>
</tr>
<tr>
<td>PGIMER, Chandigarh</td>
<td>06</td>
</tr>
<tr>
<td>AIIMS, New Delhi</td>
<td>06</td>
</tr>
<tr>
<td>*Gujrat University (2 years programme)</td>
<td>20</td>
</tr>
<tr>
<td>Ramachandra Medical college, Chennai</td>
<td>15</td>
</tr>
<tr>
<td>ISH, Bangalore</td>
<td>15 - 20</td>
</tr>
<tr>
<td>**Institute of Health Sciences Bhubneshwar</td>
<td></td>
</tr>
<tr>
<td>J.M. Institute, Patna</td>
<td></td>
</tr>
<tr>
<td>The Medical Trust Hospital, Cochin</td>
<td></td>
</tr>
</tbody>
</table>

* Either recognition from RCI has been withdrawn or not recognized.
** Institute started in 1999. Only 10 students reported to have joined at the time of writing of this chapter.

Other than this, there seems to be at least 3 more private medical trusts in Karnataka, which are planning to open shortly B.Sc. (Sp. & Hg.) programmes. Thus, as on date projected intake capability at graduate level is around 250 optimum but around 200 students join in actuality. This difference arises because, most of private institution charge donation or high fees as paid seats. Thus they may not be able to fill all seats. Many a times even in Govt. institutions, because of untimely dropping out of the course by students 2 to 3 seats may go vacant.
The intake for M.Sc. at a total of 46 seats, 23 at Mumbai and 23 at Mysore are completely utilised, in spite of difficulty in filling seats from reserved category candidates. However, for the present the SRC, AJNIHH, at Hyderabad has not been able to continue the M.Sc. course due to RCI clamping some restrictions and stopping it temporarily. As a result, the private colleges ISH, Bangalore and SNC, Mangalore were able to get maximum seats filled in their M.Sc. Courses. Similarly the high profile course of M.Phil. in speech pathology with 2 seats at NIMHANS, Bangalore has not yet been started.

There is a wide variation in the eligibility criteria for admission to courses. Since the course under Mumbai University (now shifted to newly created Maharashtra Health Science University) is with faculty of Medicine, the subjects of Physics, Chemistry and Biology at 12th standard are insisted upon and students with PCM combination are not taken to the course. Whereas in Mysore, Bangalore and Hyderabad since the courses are under faculty of science of respective universities, Physics, Chemistry, Mathematics or Biology both are acceptable for admission to B.Sc. (Speech & Hearing). Even the syllabus followed, though, is on similar pattern in terms of number of theory papers and break-up of theory and practical marks, there seems to be wide variation in depth of information covered and method of teaching. This difference is more pronounced in M.Sc. under Mumbai University and Mysore University. The Mumbai University in part II (Final year) provides for branching out for specialization either in audiology or speech and language pathology, whereas in Mysore, till to-day, it is a combined Master's degree in speech and hearing. It is reported that M.Sc. pattern of AIISH, Mysore is followed both at Mangalore and Bangalore. Now it seems the programme at Mangalore is under Rajeev Gandhi State Health University.

There are lot of talks, meetings and discussions going on in academic circles of speech and hearing about (a) the course at B.Sc. being upgraded to 4 years at par with P.T.&O.T. courses. (b) RCI stipulated rule that there should be six months internship at the B.Sc. (Sp.&Hg.) and 3 month at M.Sc. (Sp.&Hg.) levels. Objectives of internship, place where it should be held, supervisory staff needed, factors and points for assessment and supervision, minimum infrastructure needed for selecting institutions for internship, stipend or scholarship payable to internees during internship, should internship be soon after exam. before results are announced or later to etc. have all to be debated and answers thrashed out. Till then internship is not likely to become operable immediately.

Training Programmes in the Area of Education

According to Rathna (1993) “the discipline of education of the deaf actually far preceded in existence than the discipline of speech pathology and audiology. The area of phonetics and speech sciences is a part of our ancient history.” Establishment of “Bombay Institution of Deaf and Mute” the first school for the deaf, at Mazagaon, Bombay in 1855, has been heralded as the first organised efforts at rehabilitation of the deaf in India. Shortly after this, the school at Calcutta was started in 1893. The Calcutta school is reported as having started the first joint training programme for the teachers of the deaf.

Crawford & Pamela (1981&82) studied through a survey- deaf education in India and its instructional needs through personal interviews and questionnaires. They tried to collect data from 134 schools and 9 teacher-training programmes identified with the help of several sources of directories including that of the Gallaudet College, 1973. Of these numbers of schools and
teacher training programmes they could collect information only from 42 schools and 7 teacher training programmes. They published their findings in Hearing Aid journal in 1981 & 1982. Accordingly, the following information on teacher training programmes conducted by various institutions in different places became available.

Table 21.2: Teacher Training Programmes Offered by Various Institutions

<table>
<thead>
<tr>
<th>SL.</th>
<th>Institutions</th>
<th>Place</th>
<th>Duration</th>
<th>Intake</th>
<th>Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Training College for the Teachers U.P. of the Deaf</td>
<td>Lucknow</td>
<td>1 year</td>
<td>12-16</td>
<td>Hindi or English</td>
</tr>
<tr>
<td>2.</td>
<td>Teacher Training College (Lady Noyce)</td>
<td>New Delhi</td>
<td>1 year</td>
<td>15</td>
<td>Hindi or English</td>
</tr>
<tr>
<td>3.</td>
<td>Training Course for Teachers of the Deaf (Deaf Aid Society)</td>
<td>Bangalore, Karnataka</td>
<td>1 year (in service)</td>
<td>*</td>
<td>English</td>
</tr>
<tr>
<td>4.</td>
<td>Training College for the Teachers of the Deaf</td>
<td>Calcutta, West Bengal</td>
<td>1 year</td>
<td>10</td>
<td>Bengali or English</td>
</tr>
<tr>
<td>5.</td>
<td>The Central Institute of Teachers of the Deaf</td>
<td>Bombay, Maharashtra</td>
<td>1 year</td>
<td>15</td>
<td>Marathi or Hindi or English</td>
</tr>
<tr>
<td>6.</td>
<td>Training Course for the Teachers of the Deaf (The Education Audiology &amp; Research Society for the deaf)</td>
<td>Bombay, Maharashtra</td>
<td>1 year</td>
<td>*</td>
<td>Marathi or English</td>
</tr>
<tr>
<td>7.</td>
<td>University of Bombay</td>
<td>Bombay, Maharashtra</td>
<td>1 year</td>
<td>English</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>II</td>
<td></td>
<td>2 years</td>
<td></td>
<td>English</td>
</tr>
</tbody>
</table>

Note: *Information not available.

The other two institutions listed but details of information not available were C.S.I. Madras, who then trained teachers for employment in their own schools and not conducted regularly each year during that time. The other institution was Mook Badhir Vidyalaya, Poona, Maharashtra. Further, it was found that at that time there was no regulatory body which controlled the standard of training carried out by various centres as result there was no uniformity in between courses in terms of depth of curriculum followed.

Dr (Sr.) Rita Mary (1993), writing on the training of the teacher of the deaf in India, reported that the Tamil Nadu Government sponsored a training programme conducted at Little Flower Convent since 1973 every year. Besides D.Ed. (H.I.) an exclusive course created to meet the need for providing post primary and secondary teachers in 6 centres of AYJNIHH, it’s regional and collaborated centres. There were 8 other centres conducting teacher training programmes in 1993 as reported by sister Rita Mary.

The NGO run schools like Church of South India school at Valakam, KERALA besides running teacher training programmes also holds coaching classes for the deaf to take collegiate level training and courses from various boards including IGNOU.

As AYJNIHH started more and more collaborative centres, it was realised that (a) there is dearth of qualified professionals for these centres to appoint as Lecturers (b) the levels of practice teaching schools where the trainee D.Ed.s practice teaching was also very low. There-
fore, with concentrated efforts and persuasion of the Universities of Osmania at Hyderabad and Calcutta respectively, the B.Ed. (HI) training programme was started at SRC & ERC of AYJNIHH in addition to already running programme from 1987 at Bombay. This enabled several schools to upgrade their training levels to secondary levels. Further the Bombay university provided affiliation to conduct M.Ed. (H.I.) training from 1995-96 at AYJNIHH Bombay. Three batches of M.Ed. have been trained so far and fourth batch is under going training in current academic year 1999–2000. Other than AYJNIHH, Padmawathi Women’s University at Thirupati, The Rehamania Trust College at Calicut, Kerala are also conducting B.Ed. teacher training programmes.

The Rehabilitation Council of India, a statutory body established by Ministry of Welfare in 1992 by a parliamentary Act, is the controlling authority on standards of training both in the areas of Speech and Hearing and Special (teacher) Education. RCI has entrusted the responsibility of holding examinations to its recognised centres conducting D.Ed training to AYJNIHH. According to the annual report of AYJNIHH 1998–99, AYJNIHH conducted examinations for 23 centres across the country and 340 candidates appeared for the same held in May 1999. However, the list of institutions recognised by the RCI for conducting training programmes include the names of 31 centers recognized for conducting D.Ed.(HI) now called D.S.E.(HI) training programme. The RCI from time to time publishes the list of training institutions recognised by it and authorised to conduct various training programmes.

**STATUS OF SPECIAL EDUCATION AND TEACHER DEVELOPMENT IN INDIA**

**Introduction**

India is a vast country having diversity in Language, Religion, Caste, Creed with a rich cultural heritage in the background. The cultural background of this largest democratic country of this world gives a feeling of oneness amongst us inspite of the people coming from different walks of life.

The population of this land has crossed 1 billion now, the world's second highest populous country. When we, the people of India unitedly dream of a better future of the Nation we should think of the development of each and every section of its people including the minorities comprising of both backward classes and the persons with disabilities. Hence, our aim is to help this section of population to cope with the emerging situation of today's world through social, educational and economical developments.

**DISABLED POPULATION IN INDIA**

Since India is a populous country, estimating the number of disabled persons is not an easy task, because it varies a great deal depending upon the definitions, the methodology, the source and appropriate use of Scientific Instruments in measuring the degree of disability to identify the same. However, National Sample Survey Organisation of India (NSSO) in 1991 had undertaken a comprehensive countrywide sample survey to estimate the magnitude of persons with disabilities in India. According to the sample survey, about 1.9 percent of the total population of the country, i.e. 16.15 million persons have physical and sensory disabilities. This includes hearing impaired, blind and orthopaedically handicapped.
As per the report of the Rehabilitation Council of India on Manpower Development 1996, estimated on the basis of NSSO Report, the following are the population of children with disabilities in the educable age group of 5–14 years:

- Locomotor Handicap — 8.94 million
- Hearing Handicap — 3.24 million
- Speech Handicap — 1.96 million
- Visual Handicap — 4.01 million
- Mental Retardation — 9.00 million
- Cerebral Palsy — 3.00 million.

Right to Education

"All human beings are born free and equal in dignity and rights... everyone has the right to work ... every one has the right to rest and leisure... every one has the right to education . . ."

The above statements are embodied in the United Nations universal declaration of human rights. Accordingly, to follow suit, Government of India aims to impart education to each and every child of the country through different programmes including children with special needs. Since education is the beginning of empowerment, special attention is now given to the education of persons with disability.

In the prevailing conditions there are two types of educational programmes available in India for different categories of handicapped children, i.e. 1) Integrated education programme for children with mild disability in a regular school set-up under the Scheme of I.E.D.C. formulated by the Ministry of Human Resources Development, being implementing through S.C.E.R.T. and N.G.Os at State level, 2) Special School Programme for the severely disabled children in a special school set-up formulated under the Ministry of Social Justice and Empowerment, has being implemented through State Governments involving N.G.Os. Apart from this, children with disability within age group of 14-35 are given the opportunity to education through National Open School (NOS), an autonomous body under Ministry of Human Resources Development, Govt. of India, through the support of study centres. Such children can complete education as parallel to formal education.

Children with disability are getting opportunity for education through the aforesaid programmes by following types of educational intervention in accordance with their entry age. Now in India, stress is on Pre-school education for children with disability within the age-group 0-5 years.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–2 years</td>
<td>Parent-infant Training</td>
</tr>
<tr>
<td>2–5 years</td>
<td>Pre-school</td>
</tr>
<tr>
<td>5–8 years</td>
<td>Preparatory Classes</td>
</tr>
<tr>
<td>8–14 years</td>
<td>Remedial teaching through Non-Formal-Education set-up.</td>
</tr>
</tbody>
</table>

By the end of Eighth five year plan i.e. 1992–1997 there were about 22,000 Integrated Schools for 50,000 children and 1200 Special Schools for 55,000 children from different areas of disability in the educable age group 5–14 years.

The number of schools are quite inadequate to cater to the needs of the estimated number of school going children for educational rehabilitation. Hence, Manpower Development is essential to cater to the needs of special schools as well as Integrated Set-ups.
The aim of special education for the handicapped children is to enable them to realise their full potential, to provide a respectful place in the society and as far as possible to lead a happy and prosperous life. As we know, disability can be prevented and controlled to some extent and cannot be eradicated totally. In this above condition we can enable them to realise their best self by means of proper education with the available means of the Country, as a result of which they can also enjoy their Civil rights. There is no doubt that education is the basic requirement to foster the varied needs of disabled people and in educational programmes teacher is the focal point of irrefutable veneration regarded by the society.

Who is a Teacher? Role and Responsibility of the Teacher

Sir John Adam has very rightly described the Teacher as a "Maker of Man". He believes that a teacher only exercises a greater influence upon the minds of the young persons. A special teacher would not only be a maker of man but also of a society. No doubt, the teacher should possess some of the qualities, but the responsibility of a special teacher demands not only the above qualities but also he should be aware of the children's problems and the role of the school in the society in a wider perspective. To develop the same, the special teachers of the handicapped of a particular area should possess thorough knowledge on the subject matter which must be scientific. The teaching should be imparted on lines of related current trends in education and be research oriented so that they will possess up-to-date knowledge in the related study. Not only should the teacher take up the activities of early intervention parents' guidance and counselling through practical exposure in this field so that they would be sensitive towards the problems of the handicapped. they must also apply their own knowledge and skills from the very beginning as a responsible person.

School Based Staff Development

In India, the rehabilitation of disabled has witnessed a great deal of changes since last two decades in various aspects. The Century long struggle has miraculously given an impetus towards radical change in the situation of the special education since 1981, the International year for the Disabled. This happened probably due to two major facts, i.e. involvement of the Central Government in rehabilitation programmes of the disabled and secondly establishment of National Institutes in each areas of disability as the apex bodies to shoulder the responsibility through various rehabilitation measures one of which is Manpower Development.

The following National Institutes are involved in manpower development in general and Teacher development in particular:


In addition to the above Institutions, All India Institute of Physical Medicine and Rehabilitation (Mumbai), All India Institute of Speech & Hearing (Mysore) and National Institute of Rehabilitation Training & Research (Cuttack) are providing manpower development programmes. Apart from this, some other organisations in the voluntary sector also have taken up such works for different kinds of rehabilitation professions.
Teacher Training Programme

Teacher training programme will show the state of development of educational and rehabilitative programme for the handicapped in the country. The training programme is now a part of the National Educational Policy. But most of the special education programmes are a combination of several approaches and with differential emphasis based upon the age of the people, severity of the disability and the educational philosophy. On the other hand the major aim of the special education is to achieve social and vocational competency in the handicapped. Since India has large rural population and low literacy rate, work in the rehabilitation sector minimises the social and economic dependency of the handicapped. Remedial approach is yet to be practiced in India for the older age group children with disability due to non-availability of specific intervention programmes through ability training. The data given in Appendix 2 shows the status of trained manpower in the field of disability in India (Source: Report on Manpower Development 1996, Rehabilitation Council of India, Ministry of Social Justice & Empowerment, Government of India).

Education for All

India is a welfare state and it believes in the notion of "Education for all" irrespective of gender, caste, creed, religion and disability of the children. It is impossible to achieve Universal Elementary Education (U.E.E) unless efforts are made to identify the disabled children and provide them education according to their need. Moreover, Article 45 of the constitution emphasises that the state shall provide free and compulsory education for all the children upto 14 years of age. Not only that education is a subject in the concurrent list of Indian Constitution, both the Central and State Government have concurrent responsibility.

Now the most significant fact about education of the disabled children of India is that, it is widely available to them in comparison with yesteryears. Though the quality of education varies from school to school, the most important point is that no child today is denied an opportunity of get education.

Most of the Special Schools are run by NGOs, supported by either Central or State Government whereas almost all the Integrated Schools are run by Central Government through NCERT, SCERT and NGOs. They are supported by "UNICEF", Ministry of HRD and State Governments.

Pre-service Training Programmes

The Pre-service teacher training programmes carried out in India are as shown in the Table on p. 156. They are offered at National Institutes, diploma level courses are offered by State Governments and NGOs.

Undoubtedly, Teacher Training Programmes led to the establishment of a large number of special schools of quality as per the need. The allied professionals are also required to be trained to support the educational system, so that appropriate technology and suitable techniques could be incorporated in the educational programmes.

NCERT through its Regional Institutes started Multicategory Teachers Training Programme. The Primary School Teachers who are given the exposure in Multicategory Handicapped Training are being enrolled in Integrated Schools under I.E.D.C., i.e. Integrated Education of
Disabled Children Scheme and P.I.E.D. (Project Integrated Education for the Disabled). Even before the enunciation of the National Policy on Education in 1986, the Ministry of Social Justice and Empowerment started a scheme of Integrated Education for Disabled Children. Teachers of the Primary Schools were trained to be appointed at the Primary Education level. Teacher Training as well as Staff development Programmes were undertaken centrally, as well as at state levels.

<table>
<thead>
<tr>
<th>Name of the Course</th>
<th>Duration</th>
<th>Qualification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hearing impairment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. M.Ed.(HI)</td>
<td>One year</td>
<td>Degree</td>
</tr>
<tr>
<td>b. B.Ed.(HI)</td>
<td>One year</td>
<td>Degree</td>
</tr>
<tr>
<td>c. D.S.E.(HI)</td>
<td>One year</td>
<td>Diploma</td>
</tr>
<tr>
<td><strong>Multiple Handicap</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. M.Ed.(Multicategory)</td>
<td>One year</td>
<td>Degree</td>
</tr>
<tr>
<td>Spl. Edn.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. P.G. Diploma in Spl. Edn. (Multiple Disabilities)</td>
<td>One year</td>
<td>P.G.Diploma</td>
</tr>
<tr>
<td>c. Multicategory Teachers Training Programme</td>
<td>One year</td>
<td>Diploma</td>
</tr>
</tbody>
</table>

During 1995, DPEP (District Primary Education Project) programme was launched by DPEB (District Primary Education Bureau) under the Ministry of HRD. It has been implemented through the state branches, i.e. PEPA (Primary Education Programme Authority) with the involvement of State Governments in the respective states. At the district levels, district project officer mobilizes the block level team to work further in the cluster resource centres.

The aims of DPEP are:

- To attain minimum learning level of the children (including the children with disability) in primary education.
- Capacity building amongst children.
- Teacher training to teach children with disability.

Through these programs, the objectives of "Education for all" and "Universalisation of Elementary Education" could be achieved. It has been implemented in 14 States now in India. Another similar project implemented is by the DFID (Department For International Development), in collaboration with a British Agency. Its objectives are to encourage the girl child towards education, to control the drop-out rate in Schools, and enroll the children with disability and to bring the child labourers in the educational streamline.

**In-service Training Programme**

Usually in-service training is required for teachers to develop further professional competency, confidence and relevant knowledge. In order to understand problems of disability in emerging circumstances i.e. new challenges coming up in the social situations, in-service teachers training programme is highly essential for special teachers. A teacher is probably the foremost person...
to prepare the students for a new economic, social and cultural challenge in the life situation. Special Teachers are regarded as practical persons who work for the allround development of the disabled children who face multiple problems in the present day society. Hence in-service training is a most rewarding aspect for special teachers that provides subject knowledge, special educational knowledge and pedagogic skills.

Through the following Short Terms Courses the teachers are being up-dated with recent technical and professional knowledge in the related field.

a. **Refreshers Courses:** Refreshers Courses are being conducted from time to time by AYJNIHH, Mumbai, its RCs and other agencies for teachers with at least a few years of experience in teaching. The duration of such courses vary from one week to one month, mostly attended by Senior Teachers of Special Schools as well as Integrated Schools.

b. **Workshops:** Workshops on Specific topics are also conducted by AYJNIHH, Mumbai, its RCs and other agencies to improve the knowledge of professionals. These are also conducted for the Organisers of NGOs to make them aware of different policies and needs of children with disability. The duration of such programmes are usually of 2 to 3 days.

c. **Orientation Programmes:** Orientation Programmes are conducted to orient the rehabilitation workers such as attendants, care takers of schools and grass root level workers who handle Pre-School children under "C.D.P." (Child Development Projects) at district levels. Not only are the Non Formal Education workers and CDPOs oriented about the know-how of disability in order to handle them in the field, but also the rehabilitation workers are made aware of the problems faced by the disabled children, their basic needs and support they require. Accordingly, they are oriented to handle disabled children quite efficiently, after such Short Term courses. Orientation Programmes for the Parents of children with disabilities are also being conducted to strengthen their ideas, develop positive attitudes and understand the needs of their children so that they would face the society courageously when mainstreamed.

d. **Seminars and Conferences:** Through these, discussions take place on particular policies or issues on one platform. The issue based debates sometimes provide recommendations and suggestions to the Central and State Government for examination of pros and cons of the implemented policy. The teacher and associated staff of the disable children can definitely enlighten their knowledge through participation.

e. **Bridge Course:** Recently, the RCI. has started a short term training programme of one month duration known as Bridge course for the rehabilitation workers in India. The objective of the course is to train a backlog of an estimated 15,000 untrained, but experienced teachers across the country and with a view to complete this task before 2,000 A.D. RCI has started this course through certain organisations to orient and equip the rehabilitation workers working for the persons with disability in various organisations.

f. **Correspondence Courses:** Correspondence Courses are also being conducted for the parents and immediate family members of children with disability through learning packages/materials.
LEGISLATIONS AND POLICIES OF GOVERNMENT OF INDIA PERTAINING TO DISABILITY

The UN standard rules on the equalisation of opportunities for persons with disabilities express it in this way "States should have a clearly stated policy, understood and accepted at the school level and by the wider community (rule no. 6.6)". In the light of the UN rules, Government of India has enumerated a series of legislation, policies to foster special education in the country.


The National Policy on Education 1986 (NPE) is implemented to achieve the goal providing education to all including the disabled. This is regarded as fundamental to our alround development, material and practice. The objectives of the policy to integrate Physically and Mentally Handicapped with the general community as equal partners to prepare them for normal growth and to enable them to face life with courage and confidence. It envisages that wherever is feasible education for children with motor and other mild handicap, will be common with that of other.

Teacher training programmes will be reoriented in order to streamcine teachers of primary classes to deal with the special dificulties of handicapped children. Special schools with hostels will be provided as far as possible at district headquarters for the severely handicapped children. Voluntary effort for the education of the disabled will be encouraged in every possible manner.

The Plan of Action 1986

The Plan of Action (1986) also stresses that as education of handicapped in special schools is very costly, it will be ensured that only those children whose needs cannot be met in common schools be enrolled in special schools. Once the communication and reading-writing skills are acquired they will be integrated in regular schools.

The Narul Ismail Committee of Legislation for the Handicapped 1988 upholds the view that the states shall endeavour to provide free and universal education to Physcially and Mentally handicapped children. The state shall provide assistance to them for education and training at the secondary and higher secondary level. The committee emphasized integrated and special education both for the disabled children.

The Central scheme of Integrated education for the disabled children revised in 1989 proposes to provide educational opportunities for disabled children in regular schools. The State Governments in India have adopted the scheme and established cells for monitoring the same with relevance to the current policy guideline on special education.

Programme of Action 1992

Programme of Action 1992 stresses on the implementation of project 'Integrated Education for Disabled'. The innovative multcategory training of resource teachers has been institutionalised in the Regional Institutions of NCERT. The training programmes are run by NGOs, NIs and Universities.

The Ministry of Social Justice and Empowerment has to take steps to ensure recruitment of trained manpower in special schools and improve standards in these school through the National Institutes for the handicapped.
All in-service teachers should receive awareness input on education of children with disability in orientation programmes. The heads of institutions and educational administrators will also receive training. The Indira Gandhi Open University and NCERT should Plan credit courses on special education to equip general teachers to meet special needs. The NCERT training of resource teachers should be encouraged in UGC supported programmes. The AYJNIHH and its regional training centres have built up capacity to train single disability special teachers for special schools. Besides meeting demands of the new special schools, the existing untrained teachers will have to be trained and the backlog cleared by the end of VIII Plan. In-service training of special teachers will have to be planned in a way that each teacher receives three weeks in course's every four years. Efforts are being made to promote Special Education Units in Education Departments of Universities for training teachers to handle multi-category disabilities.

**Rehabilitation Council of India**

It has been mentioned earlier that in India rehabilitation of the disabled has been drawing the attention of the Central Government since 1981 (international year of the disabled).

In India, lack of required number of appropriate trained manpower has been one of the major constraints in the expansion of the rehabilitation services. Earlier the training programme in India in the field of handicapped were isolated and ad-hoc in nature with no standard syllabus. In fact there was no uniformity in the teaching curriculum run by various institutions at the under graduate, graduate and post graduate levels. Hence, Government of India decided in 1986 to set up a Rehabilitation Council under Ministry of Social Justice and Empowerment as an autonomous body. Later it had got the assent of the President and became an Act in 1992 and the Council to force with effect from June 1993.

The Objectives of RCI include the following:

- To regulate the training policies and programme in field of rehabilitation.
- To standardise training courses and ensure uniformity in various training centres throughout the country.
- RCI is empowered to grant recognition to institutions, universities and training centres and also to recommend the Government to withdraw it.
- Registration of rehabilitation personnel and maintain a list of these professions.
- To recognise and equalise foreign degrees, diplomas, certificates and awards.
- To collect informations on a regular basis on education and training in the area of disabilities from Institutions in India and aboard.
- To encourage continuing education by way of collaboration with organisations.

**Persons with Disabilities (P.W.D.) Act, 1995**


The PWD Act, 1995 is a very comprehensive Act. Chapter 5 dealing with Education and 9 dealing with Research and Manpower Development of this Act are of particular relevance to
us as we are here to exchange our experience on teacher development. These chapters promise free education for all disabled children up to 18 years of age, child-centered education in the most appropriate barrier-free environment is envisaged. Training of teachers, scholarships, uniforms and free transportation facilities for the disabled is promised. Chapter (IX) says about research programmes in the areas of disabilities, financial incentives to Universities to undertake researchers are also mentioned. Never before in the Indian history of disability rehabilitation has any piece of legislation aroused so much interest amongst people with disability and NGOs working for the cause of disabled persons. Though a piece of legislation may not be enough, still it has some impact upon the rehabilitation programmes for the disabled in India. The Act as an eye opener brings much needed relief to the people with disabilities as well to their parents.

In the field of education, India has implemented the NPE 1986 followed by programme of Action 1992 in which education has secured its rightful place. Along with the establishment of special schools and integrated programmes, special teachers’ training facilities are also expanded. And certainly the quality of teaching will be noticed through improved teaching methods. In addition to this, manpower development of allied professions is a need for future planning to support and strengthen special education in India.

CONCLUSION

Efforts are being made at the Government level to provide good academic and technical education throughout the country as well as to train personnel at different levels like master trainers, teacher educators and rehabilitation professionals to serve the children with disability in India. As a result, India could witness positive social changes in the next few decades.
CHAPTER 22

CRITIQUE OF DEVELOPMENTS IN THE AREA OF REHABILITATION IN THE POST INDEPENDENCE PERIOD

The change in the social and intellectual attitude towards the deaf was very late in reaching India, though India has produced several luminaries in different branches of science and art, as early as 1500 B.C., that is the pre-vedic period.

THE NEW HORIZON

National programmes were started after Independence through successive Five Year Plans from 1951 for various rehabilitation services of the disabled, including the deaf. The convention of the teachers of the Deaf born in 1935, on the line of the Convention of the American Instructors of the Deaf submitted a memorandum in 1947, demanding full-fledged rehabilitation programmes for the deaf. A request was made to the Union Ministry to include welfare measures in the Five Year Plans commencing from 1951. With the launching of the Five Year Plans, schemes of Education, Training and Employment of the Deaf, received great momentum.

The United Nations conference of experts on physically handicapped children for countries of South East Asia, held in December 1950, at Jamshedpur was the first of its kind not only in India but in Asia. This conference did much to focus attention on the needs and problems of all handicapped groups including the deaf. This conference was followed in 1953 by the meeting of the expert committee on Deafness appointed by the Government of India.

A seminar for the education and general welfare of the deaf at Mussoorie was organized from 19th to 25th September 1955 by the Ministry of Education. This seminar was attended by officials of the Ministry of Education, Teachers of the deaf, Social workers and representatives of the Central Social Welfare Board.

The seminar considered several proposals for the education and welfare of the handicapped by the Ministry of Education. This gave impetus to Parent guidance, Home Training, Nursery Education and In-service Teacher Training Programmes. In this year the Government of India set up the National Advisory Council for the education of the handicapped to advise voluntary organizations as well as State Governments on all matters relating to the education and welfare of the handicapped. It recommended to States, to establish teacher training colleges on zonal basis, to set up comprehensive Audiology centers and smaller Audiological units in all hospitals and to provide scholarships and also sign language interpreters to courts.
TEACHER TRAINING COLLEGES

That teachers are the architects of any educational edifice applies more particularly to the education of the deaf in any country. Pioneer teachers of the deaf in the country themselves having received adequate training in the education of the deaf in other countries particularly in the U.S.A. and U.K. resolved to train their counterparts within the country.

The oldest teacher training institution for the deaf in the country is that of the Calcutta Deaf and Dumb school which dates as far back as 1887. The next training college for the teachers of the deaf was established in Lucknow in 1948. In 1953, the syllabus of this training college was recognised by a committee consisting of the Director of Technical Personnel trained in the education of the deaf abroad. By 1981 there were about 20 teacher training institutions which provided certificate courses. These institutions were run by private and semi-government agencies.

As recommended by the Mussoorie conference in 1955, several schools specially in Tamil Nadu started in-service training programmes for their own teachers.

NATIONAL INSTITUTE FOR THE HEARING HANDICAPPED (NIHH)

During the International Year of the Disabled (IYD) 1981, a crying need for an association at the national level to play a leading role in organising, reviewing and solving the various needs in the field of deaf education was felt. Thus, National Institute for the Hearing Handicapped dawned in August 1983 at Mumbai. This is an apex body governed by two councils, the general and the executive. It has established regional centres at Calcutta, Hyderabad, New Delhi and runs technically collaborated teacher training centers in several other states.

OTHER FACILITIES AVAILABLE

The allocation for the disabled has been rising during the Five Year Plan. During the first Five Year Plan, the idea of charity was given up and paved the way to a concrete shape in the plans.

- A Government Training Centre for the Adult Deaf was established in Hyderabad in 1952.
- Government of India set up the National Advisory Council for the education of the handicapped in 1955.
- All India Federation of the Deaf (AIFD), a voluntary organisation was established in 1955, in Delhi.
- Special employment exchanges were started since 1959. Today there are above 55 special cells and 23 special employment exchanges in the country.
- AIFD established a multi purpose training centre in Delhi in 1960.
- During the Fourth Plan there were 14 vocational rehabilitation centers run by Government of India.
- Government started Central Scheme of assistance and awarded scholarships during the second and third plans.
- Training centre for the Adult Deaf was established by Madras Association of the Deaf in Madras, in 1973.
The field of audiology and speech pathology in India made a beginning in 1965. In 1965 the All India Institute for Speech and Hearing (AIISH) was established in Mysore during the Third Plan by the Ministry of Health.

A school for the partially hearing impaired was started in Hyderabad by the Ministry of Welfare.


National Council for Education Research and Training (NCERT) developed a department for special education and started coordinating the activities in the country through workshops and seminars.

There are at present 200 hospitals and medical colleges in the country where special medical facilities are provided for ENT problems. Besides, there are several speech centres providing correction facilities.

In the cause of the growth of speech and hearing in India, the other diverse disciplines of medical and para-medical sciences and the other allied areas including otolaryngology, pediatrics, neurology and neurosurgery, psychology, audiology, speech pathology, speech therapy, education, acoustics and electronic engineering, vocational counselling, linguistics and phonetics, industry concerned with manufacture of audiologic equipments and hearing aids developed.

The leading Institutions in the country which do work in this field are, Indian Standard Institution, New Delhi, Indian Council of Medical Research, New Delhi.

**Integrated Education of the Disabled (IED)**

Many parents often guided by John Tracy Clinic opted for integrated education. The parents provided the additional support needed by the child. This trend was given a boost by AIISH which encouraged integration education for a number of reasons.

Integrated Education on a formal policy footing started with the advent of the IED programmes.

This centrally sponsored scheme was initiated in 1974. Though initiated in 1974, it remained in its infancy upto 1982. During the International Year of the Disabled, the attention was on the rights of persons with disabilities and plans were made to provide equal educational opportunities. But due to paucity of trained man-power and facilities, this scheme could not be implemented during the 6th Five Year Plan.

With a view to provide enough trained staff and instructional material for integrated education, the NCERT, under the direction of the Ministry of Education, prepared a syllabus for the training of key persons and trained 16 key persons from SCERT/DIET, State Universities and from Regional Colleges of Education.
District Primary Education Project (DPEP)

Since 1982, IED is operated by the Department of Education under the Project, District Primary Education Project (DPEP) in 42 districts spread over the Seven States of Assam, Haryana, Madhya Pradesh, Karnataka, Maharashtra, Tamil Nadu and Kerala. Thus Departments of Education help in implementing the National policies in their respective States and Union Territories.

Commissions and Committees

The Kothari commission (1964–1966) pointed out the need for change in the attitude of educating the Disabled. It said "The education of the handicapped had to be organised not merely on humanitarian grounds but also on grounds of utility. It is essential therefore, that the education of the handicapped children should be in inseparable part of the general educational system" (pp/109/110). It is pointed out that there were only 5 to 6 schools for the training of teachers of the deaf which could train hardly 50-60 teachers per year.

- The late Prime Minister Mrs. Indira Gandhi (1971) stated that we need to work on plans for providing better educational facilities to the weaker sections.
- A National Committee during the year 1981, the International Year of the Disabled Children, set up working groups to formulate schemes to provide least restrictive environments to the disabled children for learning. This scheme was organised in the Ministry of Social Welfare and it became part of the Ministry of Education in October 1982.

Today perhaps the most significant fact about the education of the hearing impaired in India is that it is more widely available to the hearing impaired children of school age. The quality of education varies but it is important that no child needs to be denied an opportunity for it. Because of political, administrative and technical will, less and less number of hearing impaired children are prone to denial of admission to schools, either in special schools or in schools for hearing children. There is a variety of philosophies which underline the way a school is run. Today there are about 540 schools for the hearing impaired in India and most of these schools are supported by a grant-in-aid system and hence come under the reference of, the Central and/or State Governments.

MAJOR CHANGES

- The improvement in hearing-aid technology and its availability to the needy.
- The expansion of knowledge and related teaching skills in language acquisition and development.
- The awareness focussed on the rights of hearing impaired and
- The involvement of Government.
Many changes have taken place in the country especially during the period between 1985 and 1995. Therefore, TRENDS in the following areas are seen.

Enrolment

The age range for education has shifted drastically downward to birth upward to 21 years of age from what used to be 6 to 17 years range, 10 years ago. Thus, infant educational services followed by primary, secondary, higher secondary and higher educational services are now the form in most parts of our country. A decade ago, about 1% of hearing impaired high school students enrolled in higher education (College and Universities), while today approximately 10% of hearing impaired children enrolled in schools attend an increasing number of post secondary institutions seeking higher education.

Degree of Hearing Loss

The level of hearing loss defined as deaf by schools for the hearing impaired children has changed radically over the past 25 years. In the early 1970s, the special schools enrolled multitudes of hearing impaired children with average hearing loss of 50 - 60 decibels in the better ear. Today, it is generally agreed that only children with losses greater than 70 decibels are enrolled in special schools.

Type of Schooling

The number of children attending residential schools is decreasing. Full residence has been largely superseded by the weekly boarding system. Advance in information technology and city transport services have obviously had an influence here. Several children are entering regular schools and come out of the system successfully.

Programme Multiplicity

In addition to the well-developed programme at the State and District levels there has been a marked increase in the number of centres initiating local programmes. At present we cannot even begin accurately to estimate the number of those centers, although we are well aware that it is definitely significantly greater than it was in 1990. Growth in the number of programmes initiated as the grossroots by interested and active groups is encouraged.

Early Detection Facilities

The encouraging progress in the assessment of hearing of young children and the increased understanding that early language stimulation is important for all hearing impaired children precipitated a strong movement towards earlier educational intervention. The early detection of children with hearing impairment by trained grassroot level workers such as Anganwadi workers, an awareness is created toward parent-infant programmes.

A system has been designed in India to distribute free hearing aids to the needy who require them.
Parent Training Programmes

In some places efforts are made to guide the parents through regular programmes. These programmes offer guidance, practical suggestions and information concerning the home-care of the child before and during the pre-school years. Some of the well established schools conduct such courses for parents. Parents have found these courses helpful in giving them specific step-by-step procedures. As a result, the 80s and the years that have followed have brought changes that were previously conceived only as unattainable flights of fantasy.

Technology

Until Second World War, there had been a greater demand for diagnostic and rehabilitative services. As audiology has evolved through the years, its two prongs—diagnostic and rehabilitation, have bifurcated and undergone different metamorphoses.

- 30 years ago amplification was just emerging from the period in which it was viewed as an imposition by audiologists and other technocrats upon helpless children. Its educational and communicative role was mainly limited to that zealously advanced by a few inspired teachers. The average teacher and administrator knew very little about exploiting residual hearing. Amplification as it pertains to hearing impaired children is both pre-requisite and integral component of the entire educational and habilitative process.

- From a technical point of view it is realised that hearing aids today have improved tremendously in the past 20 years. Twenty years ago, the only class system in general use was the hard-wire system. Induction loop amplification were not in use.

- Today, Induction loop amplification are used in pre-schools. The FM auditory training system is of choice in special schools.

- New computer technology is available in some parts of the country.

- The development of solar charger for charging cells to use in body level hearing aids developed by RRTC, Madras, is a significant adjunct to alleviate the battery/cell problems faced by the hearing impaired children in special schools in India.

  It is being marketed by M/s. Flexitron, Bangalore, as a Government of India licenced product and is being freely distributed to the needy by the State Governments such as Government of Tamil Nadu.

- In summary, the period from 1965 to 1990 seems to have been a time of ferment for teaching hearing impaired children to speak. We cannot say that such children are better off now than in 1965, but the stage has been set for some real progress.

LEGAL INITIATIVES

Constitutional rights and safeguards have been strengthened.

Rehabilitation Council of India Act (RCI Act), 1992

A Rehabilitation Council was set up by the Ministry of Social Justice and Empowerment Government of India, in January 1986 and the RCI Act 1992 came into force with effect from June 1993. RCI is responsible for training policies and programmes, standardization of training
courses etc. for professionals dealing with the disabled in the country. It conducts several courses for developing manpower.

**Persons With Disabilities Act, 1995**

The legislation called Persons With Disabilities Act (PWD Act) was enacted in 1995 and came into force with effect from 1996. This Act sets the stage to protect the rights of persons with disabilities, to provide equal educational opportunities and full participation. The Act enshrines a multisectoral response to rehabilitation of persons with disabilities.

**Employment**

The worth of people in life is materialistically measured by how they contribute to the functioning of society, what they do for a living and how much money they make or have. With employment comes a pay cheque that obtains purchasing power and a certain life style. Hearing impaired people can hold most jobs except those few that rely exclusively on hearing and speaking in Western countries there are hearing impaired executives, doctors, lawyers, supervisors, writers and actors.

Educational achievement among the hearing impaired in India is very low. But employment rates have consistently favoured those with more education than those with less favoured. In other words, possibility for higher education has significantly raised the employment status of the H.I. in the country. The less educated group is either unemployed or underemployed. Employment percentage rates for those with post secondary education and particularly those who have completed a degree programme are high. In the new millennium, competition for jobs may result in stronger and better educated hearing impaired obtaining a share of the job market.

In general, however, hearing impaired people face inter-related problems of underemployment, lack of opportunity for advancement and job stereotyping. Lack of information on deafness, limited experience with hearing impaired people, misconceptions and communication barriers contribute to the problems in the workplace.

**ADMINISTRATION**

Although according to the Constitution, relief to the disabled is a State subject, in practice the Cental Government also has a major role to play in this field. The Ministry of Social Justice & Empowerment (previously Welfare) has been identified as the Nodal Ministry by the Government for the welfare of the disabled. It is one of the executive organs of the Government of India headed by a Minister of Cabinet rank. All policy initiatives in the area of handicapped welfare are taken by it, keeping in mind the views of various Departments/Ministries of Government. Some of the programmes are implemented through the NGOs and monitored through State Governments.

Close liaison is maintained with associated Ministries such as Ministry of Health and Family Welfare, Ministry of HRD (Education), Department of Women and Child Development, Ministry of labour, Ministry of Railways, Ministry of Finance and Planning Commission and Ministry of Petroleum.
Multisectoral Approach and Inter-service Collaboration

It will be necessary to ensure that services available to disabled people are co-ordinated within and across the different sectors, which is far from being the case at present in India. Hearing impaired's health, education, vocational training and employment, are like those of everyone else. However, whereas for other citizens, these sectoral needs are met by the respective sectoral ministries.

It will be difficult to facilitate the vocational integration of someone, if his or her educational integration has previously been ignored. Similarly educational integration cannot be considered without referring to the early experiences of the child, the support to the family, the training of teachers, the flexibility of the curricula and the provision of hearing aids.

The fact that Ministry of Education often lacks a structure for dealing with the education of hearing impaired children clearly indicates that, despite official approach of the objectives of "Education for All" the right of children with hearing impairment to inclusive education is not always genuinely recognized.

That is why it is important for each Ministry to collaborate and make sure that every aspect of a person's life is taken into account. The implementation of a multisectoral strategy requires clear commitment on the part of the Government.

CAPART

With a view to encourage, promote and assist voluntary action in rural development and with a focus on injecting new technology inputs for the enhancement for the rural areas, the Government of India set up in September, 1986 the Council for Advancement of People's Action and Rural Technology (CAPART), a registered society under the aegis of the Department of Rural Areas and Employment. CAPART provides financial assistance and technical support to voluntary agencies for implementing nationally planned programmes of Jawahar Rozgar Yojana (JRY), Integrated Rural Development Programmes (IRDP), Development of Women and Children in Rural Areas (DWCRA) etc. As a follow up to ESCAP technical advisory services towards fulfillment of the goals of the Asian and Pacific Decade of Disabled persons with respect to the rural poor, CAPART developed with ESCAP assistance, a strategy to promote the participation of people with disabilities in rural development programmes and projects. The strategy emphasizes *inter alia*, the social mobilization of poor rural people with disabilities and innovative approaches to achieving concurrence of multisectoral programmes and schemes to ensure the inclusion of persons with disabilities as beneficiaries. CAPART also constituted the National Standing Committee on Disability. The committee supports CAPART's Disability unit in screening project applications for funding support to implement the strategy, monitoring implementation of projects funded and in guiding as appropriate, other actions to promote the implementation of the strategy.

Vikalang Bandhu

Ministry of Social Justice and Empowerment has recently introduced on pilot basis the scheme of Vikalang Bandhu (friend of the disabled) under which volunteers from rural areas, usually disabled themselves, are trained with the aim of imparting knowledge, skills and self confidence...
necessary for prevention, identification and early detection of disability, community education, basic rehabilitation treatment and referral services. It is envisaged that after their 3 months training, the Vikalang Bandhu volunteers would be empowered to act as catalysts in their own community and facilitate the process of community based rehabilitation.

The Ministry of Rural Areas and Employment have recently taken an initiative under which 3% of the total subsidy budget under the Integrated Rural Development Programme will be earmarked for the purpose of providing revolving fund assistance of Rs. 25,000/- each to groups/sangams of the disabled rural poor for carrying out suitable economic activities of their choice.

This will be in addition to the existing provisions of 3% reservation of benefits for individual beneficiaries. A linkage has thus been established for the implementation of this proposal.

**NATIONAL HANDICAPPED FINANCE AND DEVELOPMENT CORPORATION (NHFDC)**

The National Handicapped Finance and Development Corporation has been incorporated as a non-profit company, fully funded by the Ministry of Social Justice and Empowerment. The paid up share capital is Rs. 200 crores and the authorised capital is Rs. 400 crores. It is envisaged that the State Governments would set up such corporations of their own or identify channelising agencies for the National Corporation in order to ensure that persons with disabilities get full advantage of the new initiative. The main objectives are to promote and support entrepreneurial and self-employment ventures by persons with disabilities.

**ROLE OF INTERNATIONAL AGENCIES IN COLLABORATIVE WORK**

Pioneer teachers of the deaf in the country were trained abroad (USA & UK), who in turn trained their counterparts in India.

- In 1937, the second meeting of the Convention of Educators of the Deaf was attended by eminent personalities from London, Manchester and United States. In December, 1959, United Nation’s conference of experts on physically handicapped was held in Jamshedpur. This conference attended by experts from abroad made valuable contribution to the educational and economic rehabilitation of the deaf in India.
- In the last decade and a half, there has been a growing awareness and several significant landmarks in the sector of disability both at the National and International levels. These had a direct impact on the thinking of policy makers and others in promoting equal participation.
- During the SAARC Year (1994) of the Disabled a workshop was held for SAARC countries at Hyderabad by the Ministry of Social Justice and Empowerment on 28th November to 2nd December 1994. India-China Seminar was held in Delhi on 25th March to April 2nd 1997. These provided exchange of ideas for the welfare of the disabled including the deaf.
- The Commonwealth Society for the Deaf (CWSD) London, apart from assisting professionals in taking up courses in their country under different programmes, sends a four member working party of experts to Chennai, once in every three years since 1978, to
visit schools and offer technical support. They have also conducted workshops, symposiums and seminars during these days.

- Under exchange programmes, several individuals get a chance to visit the United States for learning. Lately, Japan has shown keen interest in assisting schemes in India and promoted exchange programmes.

Had it not been for the unfailing cooperation of these countries, several accountable programmes might not have been witnessed in this country.

- The beneficient role and contribution of the Institute Voor Doven (IVD), Netherlands, in improving the services to the hearing impaired in India from 1982 till date is substantial and enduring. Two schools in Mumbai and two schools in Chennai have been selected by the IVD, Netherlands, to depute their teachers for short course on "Maternal Reflective Method" (MRM) in Netherlands since 1982. IVD has also been responsible for training teachers for the existing Deaf - Blind programmes in the country. These centres have become satellite centres today in the training of teachers.

ASSISTANCE FROM INDIA

- SAARC Conference held in 1994 and India-China seminar held in 1997, have offered much to the SAARC countries, who participated in this conference and seminar.

- Teachers of the deaf from Sri Lanka have been trained in Chennai at regular intervals. Personnel from Vietnam and African countries have come on short visits to observe the schools for learning.

- The solar battery charger a product developed under mission mode project scheme, funded by the Ministry of Social Justice and Empowerment Government of India has been purchased by an African School.

FUTURE PERSPECTIVE

- It will not be possible for the Government alone to take up the responsibility of education of hearing impaired children. At present two multinational companies/agencies (Bharat Heavy Electricals Ltd. in Trichy, Tamil Nadu and another agency in Jamshedpur) are running schools for the handicapped efficiently. Therefore, other multinational companies/agencies should start, sponsor and sustain such socially relevant projects.

- Technology has not done as much as it could have to improve the educational facilities of hearing impaired children in India. The FM auditory training system should become the choice for hearing impaired children studying in regular schools. New computer technology should be a routine inclusion in hearing aids in all parts of the country. The technology of the computer, electronic media, robotics and sensory aids, could promise for improving speech of hearing impaired children. Attention should be focused in developing assistive devices for bettering the life of the hearing impaired adults. Induction loop amplification could be used in all public utility areas for the benefit of the hearing aid users and the users should be suitably informed/trained to utilise these facilities. Apart from these, the formal collaboration of educationists and audiologists is still in the future.
Challenges continue to exist in education. Even today, the hearing impaired are interpreted on the basis of their greatest liabilities and not on their total assets. Today, a hearing impaired child is placed in an educational service, because it is the only form of provision available. The opportunity to choose among educational programmes does not exist today. In most of the schools for hearing impaired in India there are pupils who have disorders which are additional to their hearing disabilities.

We need different types of provisions to cater to the needs of deaf-blind, deaf-mentally retarded, deaf-cerebral palsied, deaf with learning disabilities and so on (Availability Vs. Appropriateness)

There is a need to improve the quality of education that is provided today.

COLLEGES FOR THE DEAF

In 1993, the concept of a special college gave the hearing impaired an opportunity for post secondary education. St. Louis College for the Deaf, offering a three year degree course in B.Com. and in B.Sc. (Visual Communication) was established in Adyar, Chennai. More than 70 candidates have graduated from St. Louis College. Equally significant was the realisation that hearing impaired persons, when given appropriate learning in study centres could in fact succeed at the Open University. The AYJNIHH collaborates with Vallakom in Kerala in running such a study centre and prepares the students for taking the degree course in The Indira Gandhi National Open University.

Thus, for the first time, the special requirement of hearing impaired persons post secondary education was recognised.

There is a need to develop such study centres State–wise/District–wise, as well as establish colleges on Zonal basis.

The final link in the educational chain is adult education or the life link learning concept. At present there is no organised effort to make appropriate adult education programmes available. The know-how to make adult education appealing and accessible for hearing impaired adults is the need of the day.

CONCLUSION

The last 10 years have provided the impetus for a successful paradigm shift for hearing impaired people as a whole, providing causeways for heightened social mobility. As a result of the interaction between internal and external impacts, that is between changes in hearing impaired people themselves and changes in society, perception and expectations for hearing impaired people have grown more appropriate and positive.

Although there have been significant benchmarks since the 1980s, there are still miles to go and promises to keep. Continued efforts in establishing milestones and translating them into affirmatives results for and with hearing impaired people are still necessary.

Promises in the form of enactments and programmes remain hollow without the concrete commitment of financial and community resources, complemented by activist partnerships among hearing impaired people, parents, professional and public servants.

The paradoxes in the education of the hearing impaired; yes so much more of everything; but much more to achieve!
Critique of Developments in the Area of Rehabilitation in the Post Independence Period

The number of schools for the hearing impaired has gone up from 45 to 515; but there are several thousands of children who are yet to have access to school!

Many of the schools have grown; but the quality of education in many old schools is yet to improve.

Better hearing aids are available in the country; and the central and state governments are subsidizing them; but many children need more appropriate hearing aids.

There are National Institutes, many teacher training programmes and the RCI to encourage better professional training; but there are many teachers engaged in teaching the hearing impaired who need to be fully trained.

There is a lot more money from the central and state governments, international agencies, philanthropists and parents themselves; but many schools are yet to be well equipped and the buildings are yet to be adequate. Many good programmes are yet to create their own venue.

Many professionals advocate language and speech teaching; but many teachers are yet to acquire adequate skills to teach language and speech.

Many professionals advocate sign language and total communication; but not many seem serious about providing training in development and the use of signs/finger spellings in all languages nor using the developing ones extensively.

Most schools have been using signs; but attempts seem yet to be made to enhance the scope of sign language.

There is a great thrust for higher education; but the percentage of our children achieving higher education is yet to improve.

There is so much more awareness, so much more goodwill and so much more support from the public, legislatures and bureaucracy; but much more of these is required to meet the expectations.

There is great help and support from all sources; but the teachers, technocrats and the schools are yet to achieve notable success.

Many stalwarts over the years have striven hard to improve the schools for the children with hearing impairment; but the quality of education is yet to improve in most schools.

Why is this so? Surely, the answer is not that the deaf are different; they are not. We have just made the beginning. We have a long way to go.
CHAPTER 23
EMERGING TECHNOLOGIES, EARLY DETECTION, EDUCATION AND TRAINING

INTRODUCTION
Marconi's first transatlantic radio message in 1901 marked the beginning of Electronics. Invention of the transistor in 1948 made the modern computers and other office machines a reality. The expansion of medical technology by the use of new medicines and new equipment resulted in almost doubling of the life span of a person. Emerging field of genetic engineering holds promise in prevention and management of hereditary disorders. Technology keeps advancing at such a rapid rate that it is difficult to predict where it will take us in the next decade. The impact of emerging technologies for the field of hearing impairment and communication disorders is as powerful as it is for any other field.

PREVENTION
An old saying is 'Prevention is better than cure'. Although, it is not always possible to prevent hearing impairments or for that matter most other impairments, knowledge of the factors causing hearing impairment is helpful in reducing the occurrence of hearing impairment. Prevention is something one DOES, not what one hopes or expects someone else to do. Most of the factors, however, are not only related to causing hearing impairments but also other types of impairments and disabilities.

GENETICS
According to an estimate, nearly half of all human diseases could have a genetic basis. About 50% of the cases of profound sensorineural hearing loss in children are due to genetic factors. At least 70% of cases of otosclerosis have a genetic cause. In some cases of genetic disorders, hearing loss is one of the many and often a more serious physical or medical problems the person has.

Consanguineous marriages increase the risk of transmitting hereditary diseases. Such marriages that may have high risk of disability in the offspring may be avoided.

Genetic counselling can help in reducing the occurrence of inherited diseases. It involves making an accurate diagnosis of the cause of hearing loss and sharing of information on the genetic and medical aspects of the condition with the family. Genetic counselling is advisable for all couples but absolutely essential for those at risk.
It may now be possible to make a prenatal diagnosis of genetic disease. Diagnosis of hereditary disorders before birth may facilitate start of treatment in cases where such treatment is possible.

**NOISE INDUCED HEARING IMPAIRMENT**

Excessive exposure to noise is the most common cause of hearing loss. Noise induced hearing loss is perhaps one of the serious negative impacts of the emerging technology. The modern industrialization and the age of automation have made the world a very noisy place. Many tools of entertainment like Walkman, Video games, Stereos, rock concerts, shooting/hunting etc. are also responsible for causing noise induced hearing impairment. However, noise induced hearing impairment is different from other types of hearing impairments in one important way—it can be reduced or prevented altogether.

Prolonged exposure to noise greater than 85 decibels can be harmful. The effects of exposure to noise are directly related to the level of the noise and the duration for which one is exposed to it. While a single exposure to very loud sounds such as from a gunshot can damage hearing, it may be several years before one develops a hearing impairment due to exposure to sounds of lower intensity.

A noise induced hearing loss usually starts at high frequencies and may extend to other frequencies if the exposure is continued. Typically, people with this type of hearing impairment have difficulty understanding speech even when they can hear people talk. Noise induced hearing impairment is usually associated with ringing in ears (tinnitus). Other harmful or undesirable effects of exposure to loud noise are increase in blood pressure, pulse rate, anxiety and irritability. A reduction in work efficiency has also been reported as a result of distraction from loud noise. Technological advancement has been made in the area of manufacturing of instruments to measure (e.g. Sound Level Meter, Sound Spectrum analyzer) and monitor noise exposure (e.g. Noisedose meter).

**HEARING PROTECTION**

People working in excessively noisy environments can now have access to ear/hearing protectors. Ear protectors reduce the intensity of noise reaching the ear. These can be in the form of ear plugs or earmuffs. When needed, earplugs can be custom made for better fitting and comfort. These may provide an attenuation of about 15-30 decibels. Special filtered earplugs have now become available which while protect hearing by attenuating the harmful levels of noise at the same time enable the person to communicate effectively by listening to speech or monitoring other sounds as in case of musicians and singers.

Usually ear plugs provide better attenuation for low frequency sounds and earmuffs for high frequency sounds. Simultaneous use of earplugs and earmuffs provide an additional attenuation of 10-15 dB than either of these alone. Stuffing cotton into ears provides an attenuation of approximately 7 dB only and hence may not be considered an effective noise protection device.

Use of ear protection devices is just as important (if not more) for persons with hearing impairment as it is for those with normal hearing.
HEARING IMPAIRMENTS DUE TO OTHER ILLNESSES/DISEASES

Otitis media is the most common cause of hearing impairment in children in the early years of their life. Treatment of this and other viral and bacterial disease by the development of various serums, vaccines, antitoxins and toxoids in the 20th century has helped in fighting many diseases including those which may result in hearing and other communication disorders.

ROLE OF INFORMATION TECHNOLOGY IN PREVENTION OF HEARING IMPAIRMENTS

Improved communication channels have made it possible to disseminate and access information in all fields including that of hearing impairments. Use of mass media-radio, television, newspaper, feature films, documentaries, pre-recorded audio and video programmes have enabled dissemination of information related to hearing impairments to the masses at a speed which was not possible earlier. Development of the internet and the World Wide Web has literally joined the whole world for the purpose of information gathering. Electronic mail makes it possible to communicate with anyone in any part of the world instantly. These developments have a large impact on preventing and/or minimizing the effects of hearing impairments.

EARLY DETECTION AS SECONDARY PREVENTION

It is estimated that approximately 1 out of every 1000 children is born deaf. Many more are born with a less severe degree of hearing impairment. Many children develop hearing impairment during early childhood. The first three years of life are considered most important for the acquisition of speech and language. A child who is born with a hearing impairment or who develops one in early childhood may have serious effects unless the impairment is identified early and remedial measures undertaken in a timely manner.

Delayed identification and management may lead to retarded development of speech and language skills which may affect the academic performance and may ultimately result in limited vocational opportunities.

NEWBORN HEARING SCREENING

Advances in technology have now made it possible to identify children with hearing impairments soon after birth. This would, however, be possible only if a proper early identification plan is in operation.

In order for effective habilitation to be initiated it is critical that an infant’s hearing be carefully assessed. A comprehensive audiological assessment serves several purposes. First, it provides a baseline to which subsequent evaluation can be compared. Secondly, any medical or surgical management of the young child is facilitated by such an evaluation. Thirdly, complete assessment of the hearing loss provides the basis for the selection of any necessary amplification. Finally, and perhaps most importantly, a timely
comprehensive assessment provides parents with unequivocal information upon which they may base the often difficult process of acceptance of hearing loss.

Ideally, all infants should be screened for hearing impairments at some level within the first three months of life. This should be supplemented with ongoing monitoring of the child for various developmental milestones and providing information and education to the parents about early signs of hearing impairments.

Various infant hearing screening techniques that have been tried in the past 30 years include: respiration audiometry, body movement or startle reflex, measurement of acoustic reflex, auditory brain stem response audiometry etc.

Acoustic Immitance Assessment

An infant's middle ear function be made imperative at every evaluation of hearing sensitivity. There is a high probability that infants will have middle ear involvement at the time of assessment. Hence, the audiologist should be fully aware of an infant's middle ear status at the time of the audiologic assessment. This is critical for accurate interpretation of test results and in formulating follow up recommendations.

This testing technique is especially well suited for children since it is objective, accurate, quick, easy to administer and creates little discomfort for the child.

Acoustic immitance screening procedures have been applied to screen infants. The use of higher probes frequencies (above 226 Hz) for obtaining the tympanograms has been suggested. Recent evidence demonstrates that acoustic reflexes are best elicited in infant with a 660Hz probe frequency.

Evoked Auditory Response Audiometry

This utility of ABR in the paediatric assessment battery cannot be overstated. For screening an infant under 5 months of age, the ABR has emerged as the clear method of choice (ASHA, 1989).

It can be used both as a screening tool to identify the presence of hearing loss and as a diagnostic tool to quantify the degree of hearing loss.

ABR as a Screening Tool

For a number of years, conventional ABR has been used successfully in the screening of newborns. Initial application of this technology was limited mainly to the Neonatal Intensive Care Unit (NICU) where risk factors were greatest. From these early efforts in new born screening in the NICU with ABR it became apparent that the ABR approach was an accurate way to screen hearing in terms of its sensitivity or its ability to identify those with significant hearing sensitivity loss. The conventional ABR approach has several advantages as a screening tool. It is a valid measure of auditory function from the periphery to the auditory brain stem. It is a flexible approach that has excellent sensitivity in identifying significant sensorineural hearing loss.

One important limitation of conventional ABR screening is the high rate of false positive findings. It also has significant cost implication.
Despite these limitations and as a result of advances in technology and approach, conventional ABR techniques can be used successfully in a universal new born hearing screening programme. Several states in the USA have made federal laws regarding new born screening. Rhode island was the first to introduce it.

Automated ABR approaches have been developed for universal application of ABR technology to infant screening. The approach is designed to be easy to administer and results in a ‘pass’ or ‘refer’ decision. The most widely used automated screener is the ALGO system. The most recent version of this device, the ALGO-2 is being widely used. Automated ABR has the advantage of objective measurement and analysis and also has excellent sensitivity and low failure rates.

**ABR as a Diagnostic Tool**

ABR measurements provide information regarding the identification of site of lesion in the Auditory Brain stem pathway. It is used in children and adults for threshold estimation in terms of degree and configuration of hearing impairment. It also helps in differential diagnosis of sensory neural impairment.

**Evoked Otoacoustic Emissions (EOAE)**

More recently, measurement of evoked oto-acoustic emissions has shown considerable promise as an objective, non-invasive and quick (thereby less expensive) method of testing for cochlear functions. The test can be administered by less skilled persons and has a high sensitivity.

Evoked OAE have an obvious role in neonatal screening programmes. Eventhough the full utility of EOAE in frequency specific threshold assessment has not been fully delineated, it is being used as a diagnostic tool to differentiate between cochlear and retrocochlear lesions or between organic and nonorganic hearing loss. With the availability of OAE, the condition of Auditory Neuropathy is identified more often and children with such problems are managed more appropriately. The most promising application to date is the use of OAE to screen for normal or near normal cochlear status in neonates and infants.

**Behavioural Testing**

Behavioral tests of hearing such as Visual Reinforcement Audiometry or Conditioned Orienting Response Audiometry may be used to identify hearing impairments in most children prior to the acquisition of speech and language.

Screening children at the time of their entry to school provides another opportunity for identification of children with significant hearing impairments.

**Use of Mass Media in Hearing Screening**

Mass hearing screening using radio and television broadcasts has been used successfully for school age children and adults. These techniques offer a very wide reach to a population, which would not be possible with any other conventional techniques.
Other Tests

Other screening tests of hearing that have been developed include hearing tests over telephone, use of electronic calibrated gadgets specially developed for hearing screening.

Public and Professional Education

A large percentage of children with hearing impairments get identified primarily because of parental concern about their child’s hearing. Increasing the efforts to educate parents and other professionals can significantly enhance this. Various tools that have proved effective in this direction include: print-brochures, posters, articles and features in newspapers and magazines; broadcast-radio and television; audio and video programs, documentaries and films etc. Eventhough technology is available, it is presently not possible to implement a universal new born hearing screening programme due to the prohibitive cost factors and the lack of other trained manpower to support such a programme.

ADVANCES IN TECHNOLOGY FOR EARLY INTERVENTION

The need for early intervention is based on the presumed critical age theory of cognitive, communicative, social, emotional and physical development which stresses the impact of the quality of early experience on the development of intact systems. Early Intervention has long been recognised as important for profoundly Hearing Impaired children to prevent their missing the critical language learning age. For these children the major components of early intervention include identification of hearing loss, comprehensive auditory evaluation, selection and introduction of hearing aid and habilitation for the child and the family. The major goal for early intervention is to prevent secondary problems in language communication, cognition and social intervention rather than to remediate such problems.

The most important means of early intervention for young hearing impaired children is to provide an appropriate individual amplification system.

Amplification Systems

Amplification systems used by the Hearing Impaired are the Hearing aids and Assisting Listening Devices. The hearing aids are of the following types: (i) Analog, (ii) Programmable, (iii) Digital. Analog Hearing aids allow for the representation of a continuously changing physical variable i.e. electrical current. Almost all contemporary hearing aids are analog in nature. Programmable Aids feature conventional amplifiers and filters controlled by an external digital source. These may be more accurately described as VLSI (very large scale integration) analog circuits controlled by digital means. In Digital Hearing Aids (DHA), a digital signal processing circuity (DSP chip) is used which are designed to make decisions. In essence, the DHA is a wearable computer. DSP allows for the possibility of improved methods to solve background noise and feedback problems for greater flexibility and control of response and performance characteristics, repeatability, stability of performance and improved control of filters.
Technologies for Hearing Aid Analysis

Going hand in hand with the technological advancements made in the area of hearing aids, advancement in instrumentation for evaluation of hearing aids was also seen. Hearing Aid Test systems have come into the market enabling detail assessment of Electro Acoustic characteristic of hearing aids. Measurements, either with 2cc couplers or on manakins with simulated human ear canals are possible. Hearing aid test systems are also useful in verifying the trimmer settings by reanalysing the Electroacoustic characteristics of the aid.

Technologies for Hearing Aid Fitting

Hearing aid evaluation implies the use of some clinical procedures for selecting the best instrument for each patient. The challenge of developing scientifically based methods of selecting, evaluating and fitting hearing aids moved a giant step forward with the advent of computerized probe mic real ear technology.

Ear canal measurement performed with probe tube microphone instrumentation introduced a new dimension to the knowledge, quality and expertize of hearing aid fittings.

Acoustic measurements performed in the ear canal with and without the earmould and hearing aid in place provide valuable information regarding the total combination of influence on the amplification device including the impedance characteristics of the ear anatomy itself, as well as the acoustic plumbing and the natural reasonance of the individual’s ear canal. Sound pressure measurements are taken with and without the fitted hearing aids in place and insertion gain is determined as the difference in decibels between the two response curves. This technique is a considerable advance over previous efforts to make real ear microphone measurements. It requires only modest co-operation from the patient and minimum of testing time with good data reliability.

Computerized real ear probe microphone applications are among the most important advances in the history of hearing aid technology. Every aspect of the hearing aid evaluation procedure, be it instrument selection, fitting, electroacoustic adjustments and acoustic modification can involve computerized real ear probe microphone measurements.

There are several practical advantages such as:

- The risk of providing over amplification can be checked very effectively. This is a big boon in the venture of fitting hearing aids to infants with very small ear canals.
- Information regarding the ‘gain’ of the aid is obtained over a continuous frequency range and not just at discrete frequencies.
- Real ear gain can be determined for patients who are unable to provide any behavioural response.
- The effects of input level on real ear gain can be assessed.
- There is a significantly improved test retest reliability.
Ear Mould Technology

Ear mould is a device which couples the hearing aid to the ear/ear canal. This is a very important component of the hearing aid as this will ensure that all the amplified signal is directed into the external ear canal. This device can also alter the electro acoustic characteristics of hearing aid in terms of its frequency response, gain etc. It is very important that the earmould fits well into the ear. Thus, custom made earmoulds are prepared by taking ‘impression’ of the ear and preparing the mould for each ear.

Earmould making procedures are well standardised. There is considerable advance made in the area of finding suitable material for taking earmould impressions as well as for making earmoulds. ‘Non Shrinkable’ materials used for impression enables the impressions to be taken by the local professionals and get the moulds fabricated even at distant labs by mailing the impressions to them. A variety of earmould material are available which includes heat cure and cold cure acrylic, silicon etc. Technological advancement has also been done in the area of processing of the moulds. Ultraviolet (UV) based moulds are available. Moulds of varying degrees of softness can be made using the latest micropor technology.

It is now possible to manipulate the entire frequency response of hearing aid by attending to several parameters of earmoulds such as length and diameter of sound bore, provision of Vents, dampeners etc.

ASSISTIVE LISTENING DEVICES

These are systems that:

- Improve signal to noise ratio by transmitting amplified sound directly to the hearing impaired listener.
- Transform sound into a visual or tactile signal.

These systems are classified into the following four functional categories.

- Sound enhancement technology, e.g. hearing aids, personal and group hard-wire systems, infra-red and FM systems.
- Television enhancement technology e.g. telecaption decoding.
- Telecommunication technology e.g. text telephones.
- Signal/alerting technology e.g. visual and tactile hard-wire or wireless systems.

TACTILE AIDS

Tactile aids have very effectively served as effective transmitters of acoustic information and have proven to be helpful for deaf adults in day to day use. A number of different kinds of tactile aids have been tested over the years. There may be great room for improvement in device technology. One particular area of anticipated improvement lies in the development of better smaller vibratory stimulators that would allow more densely packed arrays of independent points of stimulation on the skin, better dynamic
range (currently 10-15 dB is typical) and perhaps better frequency resolution. There are different types of tactile aids available in the market (electrotactile device like the Tickle Talker). Tactile aids need to be supplemented with lip reading for better speech perception.

COCHLEAR IMPLANTS

These are a relatively new form of assistive device for the profoundly deaf who receive little benefit from conventional acoustic hearing aids. The development of cochlear implant has enabled the direct electrical stimulation of remaining auditory nerve fibres, thus bypassing non-functional or absent hair cells in the cochlea.

What is a Cochlear Implant?

Typically, a cochlear implant consists of external and internal components. Sound is picked up by a microphone and sent to a speech processor which amplifies and filters the signal, then converts it into a digital code. The encoded information is modulated by a radio-frequency signal and sent across the skin via inductive coupling. The implanted receiver demodulates and decodes the signal and sends the appropriate stimulation patterns to electrodes implanted in the cochlea. The electrodes stimulate auditory nerve fibres thereby providing a sensation of hearing.

Commercial cochlear implant systems differ in the following aspects:

- Location of external microphone
- Method of sound processing
- Number, type and placement of electrodes
- Stimulation mode (current path)
- Availability of back telemetry
- Programming system (hardware and software)
- Legal/regulatory status

Standardized technology is now available to undertake the processes involved in cochlear implantation which are as follows:

a. **Preimplant Evaluation**—The most important activity in the preimplant stage is a detailed audiological assessment. This consists of testing the child’s auditory sensitivity with and without hearing aids. In addition to evaluating a child’s hearing and speech perception capabilities, it also includes assessment of the child’s education placement, his or her academic setting and information to school personnel about cochlear implants etc. Throughout the assessment process, members of the cochlear implant team provide information to parents, teachers of the deaf and other professionals.

b. **Implant Surgery**—This involves the surgery to insert the electrode array and receiver/stimulator by an otolaryngologist.
c. **Post Implant Activities**—3-4 weeks after the implant surgery, the speech processor is programmed/or tuned to determine the characteristics of the electrical signal required. Then begins the day-to-day rehabilitation process. The child has to return periodically to the implant centre for follow up reprogramming assessment and may also participate in speech language therapy and audiologic rehabilitation.

### EDUCATION AND TRAINING

Early identification of hearing impairment paves the way for early intervention. Identification of hearing impairment in a child is followed with detailed diagnostic evaluation. Observation, clinical examination and various objective and subjective test measures are utilized to arrive at a judgement about the nature and the severity of the problem. A teamwork approach is applied to formulate the intervention strategy. This includes decisions about selection and fitting of suitable hearing aids. Whenever needed, other options in the form of cochlear implants, vibro-tactile aids or frequency transposition aids may be considered.

Early intervention may include participation in infant training, parent training, preschool training programmes. The emphasis on these programmes is for ensuring adequate auditory stimulation and conducting activities that are conducive to increased communication and speech and language development.

Schooling of hearing impaired children follows different formats. These range from education in ordinary schools to enrolment in special schools for the deaf. There has been an ongoing conflict as to whether oral (speech and speech reading) or manual (signs and finger spelling) method should be used for educating deaf children. Part of the problem, however, has been due to the fact that delays in identification of hearing impairment in children resulted in a lag in development of the speech and language. This coupled with the lack of adequate amplification and other devices used in education make the task of oralism that much more difficult.

Presently, more and more educational institutions in the western countries are adopting the philosophy of total communication. This encourages the use of whatever communication methods that are appropriate to the deaf child. These include speech, speech reading, cued speech, sign language, finger spelling, art, mime, gesture, reading and writing.

Recent technological developments have made early identification of hearing impairment a reality. Advancements in the hearing aids have enabled better amplification options for more children with hearing impairments. Cochlear implants and vibro-tactile devices have become available to provide sound sensation to the profoundly hearing impaired children (and adults) who could not get any benefit with the use of conventional hearing aids. These changes in recent years have made it possible to mainstream the hearing impaired children with other hearing children in ordinary schools.
Modification in the Classroom

Children with hearing impairments may attend regular schools or special schools. In regular schools, the modification in their education may consist of things like: front row seating to make it easier for them to hear and speech read the teacher. The children may also need additional help in the form of tutoring in some subjects, speech therapy to improve their speech and access to class notes from other fellow students. They may have access to FM (frequency modulated radio aids) or other special hearing aids to improve signal to noise ratio in the classroom.

FM systems provide a wireless means of transmitting the sound source to the listener. The auditory signal is picked up by a microphone and is transmitted in the form of radio frequency modulated carrier waves to a personal receiver that is worn by the hearing impaired listener. Because of the use of the radio waves, FM systems are not subject to the limitations found with other systems. They can be used outdoors as well as in classrooms, auditoria and living rooms.

Infra Red Systems do not use a hard-wire connection. Sound picked up by the microphone is converted into infra-red light waves through the use of diodes which are then dispersed throughout the listening environment. The receiver worn by hearing impaired listener transforms the infra-red light waves back into an auditory signal. These can be used for a large area or for personal amplification.

WORK PROSPECTS

More and more children with hearing impairments are now able to pursue post secondary education programmes. Any improvements in the educational level brings in more career opportunities. This makes it possible for the hearing impaired persons to get trained and find jobs in almost every vocation except those where good hearing is a primary requirement—for example, a music conductor or a telephone operator. Special devices that help the persons with hearing impairment cope better in their work environment include: special telephones (amplified, text), visual alarms, additional ringers and vibrating devices etc.

Vocational training programmes for children in special schools are also conducted as an integral part of education in the later years. There are other centres that offer vocational training in certain trades targeted especially for persons with hearing impairments. These are especially useful programmes for those who did not get mainstreamed in their school years.

Emerging field of computers, Internet—the World Wide Web—offers a lot of promise of employment or self-employment of persons with hearing impairments. While the trained persons with hearing impairments may seek jobs through regular employment exchanges like other people, special agencies have also been set up which deal exclusively with the employment of persons with various disabilities.
AYJNIHH, being an apex body in the area of hearing disability in India has been undertaking research work covering all the aspects of rehabilitation of the hearing impaired since its inception in 1983. Research in the area of hearing impairment is one of the main objectives of the Institute. The various departments and units of the Institute regularly undertake large and small scale research projects/studies. These pieces of research have covered all areas of rehabilitation like prevention and early identification of hearing impairment; hearing assessment techniques, amplification for the hearing impairment, speech and language assessment of the hearing impairment and other disorders, education of the hearing impairment; psychosocial and vocational aspects of the hearing impairment. Many of these studies are published in indexed and non-indexed Journals. Others are available as unpublished reports of the Institute.

i. Prevention and Early Identification of Hearing Impairment
   - Development of material (audio, video and written) for developing awareness (regarding hearing impairment) in public.
   - Consanguinity and hearing impairment.
   - Screening of preschool children for early identification and intervention of hearing impairment and developmental delays.
   - Development of training material for workers in rural areas for early detection and management of communication disabilities in young children.
   - Development of material for creating awareness in parents of the hearing handicapped and in the community.
   - Asha Ki Kiran: A campaign to popularise the symbol of hearing impairment.
   - Preparation of hearing screening kits for use in rural areas.
   - Iodine deficiency and hearing impairment.

ii. Amplification for the Hearing Impaired
   - Prototype of low cost cord and battery tester for hearing aids.
   - Follow up study on performance of Indian hearing aids.
   - Development of soft ear moulds - review.
   - Electro-acoustic evaluation of hearing aids under SADP scheme.
• Earmould acoustics.
• Effect of battery drain on performance of body level Indian hearing aids.
• Objective way of fitting hearing aids.
• Use of loop induction system in ‘Across the counter’ communication for the hearing aid users.
• Comparison of electro-acoustic parameters on mic and T-coil mode.
• Variability in frequency response of body-worn hearing aids.
• The effect of wax coating the ear impression on acoustic seal in the ear.
• Follow up study of beneficiaries of hearing aids distributed under SADP.
• Development of indigenous FM hearing aids.
• Performance of hearing aids with different earmoulds.

iii. Hearing Assessment
• Normative data on ABR for different age groups.
• ABR findings in high risk babies.
• Research on MLR, P300 and 40 Hz.

iv. Education
• Achievement levels of Deaf children in IEDS.
• Study of facilities available in schools for the deaf in India.
• The needs of hearing impaired children not attending school.

v. Pre-school Training
• Development of a module for pre-school training programmes.

vi. Vocational Rehabilitation
• Identification of jobs and trades that are suitable for hearing handicapped.
• Welding trade for the hearing handicapped at par with regular ITI level.
• Research on developing a certificate course in computer operations for the adult hearing handicapped.

vii. Speech and Language of the Hearing Impaired
• Development of ‘general’ sign language.
• Voice of the hearing impaired vs. normals.
• Normative data on Fundamental frequency range.
• Research and study in Sign Language and development of a National Indian Sign Language for the deaf to facilitate interaction at social and academic levels.
• Auditory discrimination in hearing impaired students.
• Normative data on the laryngograph.
• Relevance of PPVT for English speakers in India.
• Nasalence value in normal connected speech in normals.
- Development of standard speech stimuli and proforma for nasoendoscopic examination of larynx and velopharyngeal closure.
- Speech parameters of the geriatrics.

viii. Speech and Language Assessment
- Development of Articulation Test in Marathi, Hindi and Gujarati.
- Development and standardization of language tests in 8 Indian languages.
- A procedure for assessing vibrotactile perception in the hearing impaired.
- Study of language skills in the hearing impaired based on Linguistic Profile Test.
- RAP and related voice parameters in Dysphonias.
- Normative data for visi-pitch, Vowel phonation and connected speech.
- Development of techniques of listening.
- Training for Speech Development in the hearing impaired.

ix. Psycho-social Aspects of the Hearing Impaired
- Non-verbal performance battery—An aptitude test for adult deaf.

x. Therapeutic Material

POST-GRADUATE RESEARCH

The initiation of post-graduate programmes in the field of Audiology and Speech, Language Sciences, Rehabilitation and Education of the Deaf has given a considerable impetus to research at the Institute. This appears to have brought about a transformation. The priority of the Institute with a subtle but definite thrust towards research and development (R&D). Today, the orientation of the Institute remains not service for the sake of service, which is, in fact, a highly commendable approach but rather to service for the enhancement of knowledge. This may not appear, prima facie, to be politically acceptable. However, the philosophy behind this is that it is only with the upgradation and expansion of knowledge that one can hope to provide people with quality care and services. It is research and development activity that leads to technological advancement and innovations and enables any field of endeavour to keep abreast with the rapid changes/scientific fields.

Research undertaken are enumerated under the following heads:

Audiology

1. Assessment of Benefit from Hearing Aid Usage in clients with acquired hearing impairment.
4. A study of the characteristics of click evoked otoacoustic Emissions in Normal Hearing Children Aged 5–10 years.
6. The Status of Amplification Devices in the schools for the Hearing Impaired in Andhra Pradesh.
8. Variation in length and diameter of the sound bore of earmould and performance of the behind the ear hearing aid.
9. Comparison of auditory behavioural responses in infants with and without high risk factors for hearing impairment in the age range of 0 - 6 months.
10. Auditory middle latency responses in male adults and children who stutter.
13. P 300 in the learning disabled.

Speech and Language Pathology

1. Aero dynamic analysis of voice in pubertal and post pubertal age groups.
2. Nasalance measures in Marathi pressure consonants produced by cleft up and palate and normal children.
3. A picture articulation test in Kashmiri.
4. Effect of prelingual severe to profound sensorineural hearing impairment and puberty on electrolaryngograph parameters.
11. The Effect of Severity of Symptoms of vocal fatigue on the vocal parameters of school teachers.
12. The Effect of Narrator's Speech on the Child's Story Retelling Abilities.
15. Development of Speech Perception Test for Hearing Impaired in Marathi.
18. Two methods to Assess Severity of Perceived Nasality in sustained Phonations of Cleft Palate Speakers and their correlation with Nasalance Measures.
17. Measures of Short-Term Fluctuations and Spectral Noise Levels at the extremes of MP7R.
18. Familial Incidence of Stuttering—A Review.
20. Perceptual Analysis of Intonation in Normals.
23. Some aspects of pragmatics in adults with mental retardation.
26. Use of Adjectives by the Hearing Impaired Children.
27. Communication problems in Geriatrics - A descriptive Analysis.
32. Articulatory errors in Telugu in severe and profound hearing impaired children.
33. Adaptation of Western aphasia battery into Telugu.
34. Perception of stop consonants and vowels by hearing impaired (Telugu speakers).
35. Visual perception of Hindi consonants in the initial word position by the hearing impaired.

**Psychology**

3. Personality Profiles of Individuals with Vocal Nodules.
5. A comparative study of short term memory in learning disabled and normal children
10. Symbolic play in children with and without pre-lingual hearing impairment - A Comparative study.
11. A Comparative Study of Interpersonal Stress between Stutterers and Non- stutters.
14. Parental attitudes towards their Hearing Impaired Children.
18. Comparative Study of Intelligence and Academic Performance of Hearing Impaired and Normal Hearing Children.

**Education**

1. A study of Relationship between Reading, Language, Verbal Intelligence and Academic Performance among normal fifth graders.
2. Speech Intelligibility of Hearing Impaired students attending schools with aural-oral approach and total communication.
3. Survey of Aids and Appliances: Their Effective Use by the Teachers for Academic Education in schools for the deaf in Mumbai.
5. A Study of Special Educational facilities for the Hearing Impaired in Orissa.
7. Impact of Pre-Primary Education on Integrated Education of the Hearing Impaired Children at Primary level.
10. A Study of Vocational Education in relation to the socio-economic status of adults with hearing impairment.
CHAPTER 25

FUTURE VISION

THE PRESENT SCENARIO

The future is for those who prepare for it. Knowledge will not stand still. So the reality is that scientific disciplines, if they are to survive, must actively contribute to the "knowledge" of the times and not merely be "users of current knowledge". The sad but historically proven fact is that fields that choose simply to use the knowledge of their day, soon become slaves to yesterday's knowledge and yesterday's technologies. Thus, in our rapidly changing world of science, it is imperative that the field of rehabilitation takes control of its future by developing the knowledge base necessary for the delivery of services in the future (Minifie and Flower, 1994).

Advances in the area of hearing impairment are taking place at a tremendous pace. Great strides in technology are making their impact on the Indian scene. The need to keep instruments, material, procedures and devices updated and current is being felt in major centres dealing with education, diagnosis, management and vocational aspects of the hearing impaired. Professional training programmes include these components in their practical training so as to keep abreast of advancements.

It is a fact that much of the impact of technological advancements is confined to the big cities and metropolis. A large proportion of India continues to be deprived of even rudimentary services. The bulk of the population in the rural reaches are not aware of existing facilities, concessions or aids available under various schemes of the government. The number of schools/centres for the hearing impaired fall far below than what is required and with distances being vast, only a small percentage receives services. Even where the facility of a special school exists, the amenities and teacher-student ratios as well as teachers' qualifications do not serve the purpose for which the school was established. Inadequate funds, poor wages, lack of adequate infrastructure has confined the task of rehabilitation to diagnostic centres, special schools and vocational centres. The concept of early identification and intervention is yet to gain a foothold in rural India where illiteracy is rampant and poses an additional obstacle for rehabilitation workers.

Despite the prevailing scenario, some progress has been achieved in rural areas through the setting up of various centres and schemes by the Government of India. Although progress is slow and tedious, a beginning has been made.

PROMOTING EARLY IDENTIFICATION AND INTERVENTION

Greater thrusts in the area of early identifications of hearing loss must be an integral part of the picture in the coming years. Major projects will need to be taken up on high risk factors, foetal audiometry, neonatal tests, infant screening programmes in hospitals, Primary Health Centres (PHCs) and in nursing homes. Expectant women will need to be closely monitored on health
problems, diet and also undergo tests to determine the status of the foetus. Any newborn with a significant prenatal or natal history would need to be registered at a diagnostic centre and followed up by a designated team. Children with significant post-natal history too would need to be placed under observation in the early years. As a routine, all children who are brought for paediatric evaluations, immunization, etc. at PHCs would need to undergo hearing screening at periodic intervals.

Infants and children thus identified would then need to be placed in early intervention programmes that would be available at PHCs and other centres. Personnel attached to the programmes would need to conduct hearing screening tests at play-schools, balwadis, creches etc. periodically, so as to "catch them young".

FITTING AND USE OF APPROPRIATE AIDS/DEVICES

There is a crying need to keep pace with improved technology available for the hearing impaired. Digital hearing aids, programmable hearing aids, FM systems have made their mark on the international scene. There has been considerable growth in technology for improving signal-to-noise ratio to enhance listening through the hearing aid. Adaptation of these for Indian conditions needs to be explored and implemented. The amplification needs of various age groups and clinical populations must also be considered. Hearing aids with special circuits and attachments must become available for those with specific problems. In keeping with the advances worldwide, Indian hearing aid users need access to ear level instruments through distribution schemes of the government. Behind-the-ear hearing aids and canal type aids need to become more commonly used thus supplanting the body level type. Moreover, it is essential that binaural amplification become a routine fitting for children and adults with aidable hearing loss in both ears.

The earmould, an accessory of the hearing aid, is important too and should be given due consideration. Instant moulds and soft moulds should become available and affordable. Facilities to have them custom made at periodic intervals is essential especially for the paediatric population. Earmould laboratories of the future must be able to offer users a variety of benefits including comfort, economy in cost and time for preparation, acoustic characteristics, aesthetics etc.

It is likely that in the years to come, hearing impaired individuals in India, like their western counterparts, will need to have a wide choice in Assistive Listening Devices. Baby cry alarms, doorbell alarms, clock alarms, telephone amplifiers, TV listening devices amongst others, will be required in many homes. The hearing impaired person may thus be able to enjoy listening to music or to appreciate a TV programme along with his family members and also be able to maintain an independent lifestyle.

Loop Induction System (LIS), Hard-wire Group Hearing Aids, Frequency-Modulation Hearing Aids are useful for classrooms of the hearing impaired and in other public places. These equipment should also be made available through the SADP scheme to improve communication for the hearing impaired in the classroom. LIS and FM Systems have been found useful to enhance listening through hearing aid. The initiative taken by the Railway Ministry to install more and more LIS at railway stations and reservation counters is to be encouraged and these equipment should be installed at banks, cinema halls, temples, churches for providing easy access to communication to the hearing aid users in public places.

Cochlear implants have been used successfully in the the western world. Facilities for cochlear implantation are available in some of the big hospitals in metropolitan cities in India.
now. However, facilities for pre-implant evaluation/assessment and post implant rehabilitation are minimal. Facilities for cochlear implants should be developed indigenously and the health sector may take appropriate steps to subsidise the cost of implant, surgery and post surgical rehabilitation so that it is within the reach of the common man in our country.

STRENGTHENING EDUCATIONAL INPUTS FOR THE HEARING IMPAIRED

Of the hearing impaired who are in the educable age group, only a very small number has been attending school for the hearing handicapped both in rural areas as well as in urban area. As per NSSO 1991 estimates there are 0.272 million hearing impaired in the age group of 5-14 years. The infrastructure available for education in its present form is not able to enrol all children in the educable group nor can it take care of the annual addition for the educable group. (Pandey and Advani, 1993). Most of the schools are run by NGOs with assistance from the Central and/or State Governments. The number of such schools should be increased. The amount of grant usually disbursed should also be increased in terms of salaries of teachers, equipment, furnitures, boarding and lodging of hearing impaired students as well as miscellaneous expenditure. There should be at least one residential school for the hearing impaired in each district of the country.

The success of the education for the hearing impaired lies in the early intervention programme before the pre-school age. Thus, new programmes which involve parents as first teacher on equal partnership should be developed. This makes compulsory that parents of hearing impaired children should be literate and, therefore, the role of adult education should be amalgamated with Parent-Infant Programmes. This is an area of applied research and modules for Parents-Infants Training as well as providing functional literacy to parents of hearing impaired should be taken up on priority basis. The module should be made keeping urban and rural needs in mind.

Parent-Infant programmes should be available to all parents either on direct contact basis or postal correspondence basis or on distance learning basis. Parent-Infant programmes will strengthen the base of the education of the hearing impaired both in special and integrated schools.

Pre-schooling for the hearing impaired is a recent concept in India and is still not as readily available to the hearing impaired as it is to their normal peers. Most of the existing schools do not provide schooling to very young children. Our society is becoming more and more competitive day by day. It is high time we recognize the rights to education of hearing impaired children and enable them to lead a normal and full life in the mainstream of society. To ensure their right to education, we must lay a sound foundation of pre-schools in all corners of the country and reach services to the unreached (Roy, 1993). Suitable research in the areas of development of curricula, suitable teaching aids, materials for parents education and recreational and extra-curricular activities should be taken and models already existing should be field tested and implemented. Providing pre-school facility should be made compulsory for all institutions being run by NGOs or GOs under the Central/State Government funding scheme and additional allotment of funds should be made available.

Perhaps the only way to enroll all hearing impaired children in the school age-group is integration or mainstreaming in the available educational set-ups. The National Policy on Education, 1986, which contain a chapter on education of the handicapped advocates the approach of providing integrated education for the mildly handicapped and special education for severely
handicapped children. Even before the enunciation of the National Policy in 1986, the then
Ministry of Welfare, Government of India, initiated a centrally sponsored scheme of integrated
education of the disabled. The Scheme is now handled by the Ministry of Human Resource
Development and the latest revision has been made in 1992. In 1987, NCERT, New Delhi,
adopted a scheme with assistance from UNICEF which came to be known as Project Inte-
grated Education for the Disabled (PIED). In this approach, a cluster, instead of the individual
school approach is emphasized. This approach was found more suitable than IEDC.

Without getting into controversy of special/integrated education of hearing impaired and
approach to education that is oral, oral/aural or total communication, we must strengthen our
integrated education. Systems should supplement and complement each other instead of com-
peting with each other. A nodal agency should be made responsible for the expansion of special
schools as well as for the integrated education of hearing impaired, if we have to achieve the
goal of universalization of education of the hearing impaired.

National Open School system provides opportunities to students to get secondary educa-
tion. Open universities have also been set up for a similar purpose in respect of higher education.
These systems are useful for the hearing handicapped as well as they are cost effective, user
friendly, have a flexible examination system and a wide range of optional subjects including
vocational subjects like interior decoration, horticulture, beautician course, art and craft, printing,
baking and catering and many more subjects. Study material in the form of audio-visuals, CD
Roms using the latest technology should be made available as these are national level programmes
and will prove effective in the long run. Usage of computers should be popularised in subject
teaching as these are the only options of many hearing impaired persons for updating their
qualification to be able to derive the benefit of the reservation policy of the government.

More and more centres should be accredited to NOS for imparting education to the
hearing handicapped. Language exemption should be made in all states. Elderly literate people
can be utilized as resource teachers after training and can be utilized for the education of the
hearing handicapped in unreached areas. Modern day technology of telecommunication and
mass media should be used for imparting education to the hearing impaired.

District Primary Education Programme (DPEP) was recently introduced and can be ap-
propriately utilized for enhancing the enrolment of the hearing impaired in normal schools.
College education for the hearing impaired has just been started in India. Coordinated efforts
and research should see their expansion to each part of the country and these should include
vocational courses. Existing scholarship schemes should be strengthened and must be made
known to the public for full utilization. It is particularly important that all special schools should
bring down their admission age to cover the 2 1/2 to 6 years of age group to actualize the
critical age concept in the language learning process.

TARGETS IN PERSONNEL TRAINING

It is apparent that any attempt to improve rehabilitation and educational services will naturally
mean that personnel in large numbers will be needed. An apex manpower development body
such as AYJNIHH has produced about 3972 personnel/professionals in the area of Special
Education(HI) and Speech and Hearing (Appendix) till date. The number of training pro-
grammes at various levels will need to be increased in order to meet the requirements of the
country in the years to come. To ensure that the personnel trained will serve in the regions where
services are poor, some measures such as compulsory postings after graduation/certification will be required. Establishing training centres in rural areas could also be attempted in this regard.

Training programme need to be geared to serve the following purposes:

- Research (scientific personnel to carry out research and developmental activities)
- Master trainers/experts to serve academic needs
- Clinical/teaching personnel to serve in service centres/schools.

It may be appreciated that training of personnel is a vital issue for ensuring the quality of rehabilitation services. However, in India, the rehabilitation scenario will for many years require the participation of other workers. These workers who are, in the main, para-professionals or rehabilitation workers, can be utilized at a basic level for referrals and providing guidance to hearing impaired individuals and their families.

The future years will see an increase in the number of universities and institutions conducting courses that meet adequate standards in terms of theoretical and practical aspects. A monitoring agency would be required to enforce standards of training, which in turn would ensure that the quality of rehabilitation services for the hearing impaired will be upheld.

Attempts may be made in future to ensure that professionals working with the hearing impaired compulsorily attend refresher courses at periodic intervals. This would help them to remain cognizant of recent developments and to stay focused on the task of rehabilitation.

Teachers’ training for pre-school education is to be implemented without further delay. Only pre-school education will bring about parity between the deaf and their hearing counterparts.

PRIORITY FOR RESEARCH AND DEVELOPMENT

Appropriate research and programmes should be undertaken for providing disabled peoples' own agendas (Gregory et al, 1996). Oliver (1997) emphasized the social model as the core principle in disability research. Research should be carried out in applied investigations to optimize disabled peoples' right to self-determination and prompt further consideration of how researchers can increase meaningful representation of disabled people in all walks of life.

The hearing impaired in India present specific problems that researchers will need to address. These are mainly in terms of adaptation of tests, techniques and instrumentation for our context/situation. Researchers will need to delve into diagnostic procedures, early identification and intervention issues, improving communication skills, adaptation of assistive listening devices, curriculum planning in special schools, multilingualism issues, Indian sign language etc. The needs of special populations like geriatric individuals and the multiply handicapped merit consideration. Methods of preventing hearing impairment including pre-natal tests, genetic tests, carrier detection, nutritional and hormonal imbalances, alternatives for ototoxic drugs, effective medicosurgical management of reversible hearing loss need to be explored. Research must also probe aspects of communication such as means of improving speech and language skills, developing alternative and augmentative communication skills, sign language, developing sign language interpretation skills. It should also probe aspects of vocational aptitudes, higher education potential, marriage issues etc. of the hearing impaired. It is desirable to be able to further evolve our research practice in ways which will enable disabled people to be instrumental in providing the answers themselves (Moore et al, 1998). With a Multisectoral approach, a wide variety of research/service centres need to be established. A few examples of such centres are as follows:
Status of Disability in India – 2000

- Genetic Counselling Centres
- Noise Survey Centres
- Pre and Post Cochlear Implant Evaluation and Rehabilitation Centres
- Paediatric and Geriatric Rehabilitation Centres
- Marriage and Vocation Counselling Centres
- Sports, Games and Athletic Training Centres
- Recreational Centres (including National Theatre for the Hearing Impaired)
- Library & Information Centre for the Hearing Impaired.

The PWD Act needs to be implemented very effectively through Central and State co-ordination committees. There is a pressing need for legislation in order to control noise in the environment and also to monitor all the activities geared towards the rehabilitation of the hearing impaired. Schemes to promote the educational, fine arts, performing arts, vocational abilities of the hearing impaired need to be started and implemented.

EXPANDING VOCATIONAL OPPORTUNITIES

Attempts need to be continued to expand the scope for employment of the hearing impaired. In keeping with developments on the economic front as well as technological growth, vocational training programmes must be designed and implemented, ensuring that high standards are set. The affiliation of all vocational training programmes for the hearing impaired to established boards/institutions should be made mandatory.

In terms of employment, more stringent compliance with reservation quota for the hearing impaired need to be urged. Special incentives for those employers who take in more disabled employees should be considered.

FOSTERING NGO INVOLVEMENT

The contribution of NGOs to the rehabilitation scenario in India is laudable. In the years to come they will need to be involved to a greater degree, in evolving employment schemes, educational programmes, service centres for the hearing impaired, especially in the rural areas and remote villages. Their skills would also be required in starting training programmes for personnel in smaller towns, for the hearing impaired in trades suited for rural India and for spearheading drives for new legislation. Greater links between GOs and NGOs in the future would strengthen the cause of the hearing disabled and accelerate the pace of developmental activities. Their mutual efforts should help bridge the urban-rural divide and galvanize the rehabilitation scenario in the years to come.

SENSITIZING THE MEDIA

The success of rehabilitation efforts vest in part on how well the hearing impaired are accepted and integrated in society. The media has a powerful role to play in fostering attitudinal changes. In the years ahead, the media will have to shoulder much responsibility—not only for acceptance of the disabled but also in removing misconceptions and superstitions. The media can also
delegate responsibility to the public to learn to interact with hearing impaired persons. For long the onus has been on the hearing disabled to learn to communicate with the hearing world. In tomorrow’s world, hearing impaired persons may well lay claim to their many rights.

Much of the ignorance in the remote villages and towns can be tackled through the vital role of the media. Massive mass awareness programmes on causes of hearing impairment and its prevention should be taken up. Publicity regarding schemes of the government, concessions for the hearing impaired, job reservations, can do much to awaken and mobilize the rural masses. Poster campaigns, use of print media, television, noted celebrities are instrumental for publicity on prevention of hearing loss. Observing the National Day for Prevention of Disability would also contribute to generating public awareness and publicity. Hence, in the time to come, the media will assume a much larger and significant role in rehabilitation of the hearing impaired.

FUTURE VISION

*Family Literacy:* Family literacy should be emphasized specially the mother’s literacy for better home stimulation towards early communication skill development. Once the hearing impaired infant is identified, diagnosed and fitted with suitable hearing aids and custom made ear moulds, stimulation becomes the most urgent need.

*Maintenance of Risk Register:* While popularising parent infant programmes established in all service centres and pre-schools towards prevention and early identification of the disability the Risk Register should be made mandatory.

*Parent Training Module:* Parent Training Modules developed at various places like AYJNIHH should be adapted and translated as per local socio-cultural needs of the different regions on a larger scale to improve awareness and for giving access to information to the parents along with efficient networking with various organisations.

*Prevention of Hearing Loss:* Prevention of hearing loss is an area where greater emphasis should be given. We have and may develop more methods for preventing known diseases which cause hearing loss but the challenge of prevention of hearing loss from unknown causes will continue to haunt researchers. Present knowledge should at least be converted into an action plan for next millennium for the prevention of hearing impairment.

*Opening of More Multi-sectoral Resource Centres:* Disability issue should be merged with health, woman and child, nutrition, well-baby clinics, education, child adoption schemes etc. This will reduce the marginalization of the disabled population.

It will also help mainstreaming as the option for the majority. The mild to moderately hearing impaired, with appropriate fitment services and with the help of a resource teacher or a centre, should follow the mainstream of education. Language exemption should be implemented in all states. However, special pre-schools should be strengthened in skills and upgraded in technology to the secondary and higher secondary level to cater to the needs of the severe to profound categories of deaf children. All special schools should have a service centre. Resource centres and the service centres at IED and special schools should be equipped with proper infrastructure and a trained team of professionals. Open school, correspondence-cum contact courses, distance learning and open universities with accredited study centres are always the best options for the hearing impaired. Provision of equal service facility all through
the country with the incorporation of internship in the professional courses and by strengthening other outreach services are to be made.

Language exemption should be implemented in all states. The momentum is building up with the efforts of some NGOs and GOs, but it may well take a couple of decades, perhaps, for India to achieve "Rehabilitation for All" in the area of hearing disability.
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