

**PREVANTION OF HEARING LOSS- MATERIAL FOR PUBLIC EDUCATION  
PAMPHLET**

REG. NO.M9412

AN INDEPENDENT PROJECT SUBMITTED AS PART FULFILMENT OF  
FIRST YEAR M.Sc. (SPEECH AND HEARING) TO THE UNIVERSITY OF  
MYSORE, MYSORE.

ALL INDIA INSTITUTE OF SPEECH AND HEARING: MYSORE 570 006

MAY 1995

DEDICATION TO


Dedicated to all my family members and above all to my  
special Guru

'DR. VIJAYALAKSHMI BASAVARJ'

## CERTIFICATE

This is to certify that this Independent Project entitled: PREVENTION OF HEARING LOSS - MATERIAL FOR PUBLIC **EDUCATION PAMPHLET** is the bonafide work in part fulfilment for the First year MSc, (Speech and Hearing) of the student with Reg.No.M9412.

Mysore  
May 1995

  
**Dr. (Miss) S. Nikam**  
Director  
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**C E R T I F I C A T E**

This is to certify that this Independent Project entitled : **PREVENTION OF HEARING LOSS - MATERIAL FOR PUBLIC EDUCATION PAMPHLET** has been prepared under my supervision and guidance.

Mysore

May 1995



**GUIDE**

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## DECLARATION

I hereby declare that this Independent Project entitled: **PREVENTION OF HEARING LOSS - MATERIAL FOR PUBLIC EDUCATION PAMPHLET** is the result of my own study under the guidance of **Dr.(Miss) S.Nikam**, Prof, and Head of the Department of Audiology, All India Institute of Speech and Hearing, Mysore and has not been submitted earlier at any University for any other Diploma or Degree.

Mysore  
May 1995

**Reg.No.M9412**

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## INTRODUCTION

Hearing loss is one of the commonest conditions in our country. Yet it goes unnoticed, if we don't see the person wearing the hearing aid. All of us at some time or the other are affected by some disease or another in our lives, the faster these diseases are identified and earlier the proper treatment is initiated the better are the results, but if they are neglected or ignored, they could turn out to be fatal to the person or can cause such serious handicap that he would have to live with it for the rest of his life. As the saying goes "Prevention is better than cure" one must try to prevent hearing loss.

Hearing loss affects man both physiologically and psychologically like withdrawal from the society, nervousness, irritability, instability etc. Sometimes even irreversible damage to hearing mechanism is also a consequence. Apart from this, hearing loss also affects language acquisition, especially when the hearing loss occurs within the critical period. This is a period from five months to two years which is the best period for learning and most important for acquisition of speech. Since we know that speech and language is the key stone of modern society, so lack of adequate speech and language



causes devastating effects. Hence, serious attempts must be made to prevent hearing loss and appropriate habilitative/rehabilitative steps must be taken in respect of those individuals who already have a hearing loss.

Now, the cases whom I have discussed had either come in their school age. When they were identified by their inattentiveness or else when it was so late that nothing else could be done for them interms of language development but dust fitting a hearing aid.

Based upon this we can see that awareness of hearing loss is not yet fully established in our country. If the awareness is created amongst the common man then definitely the impact of hearing loss will not remain so devastating.

Keeping all these facts in mind, I got interested in this independent project. Now, this project highlights different causes leading to hearing loss as well as their symptomatology in a simplified language for better understanding.

## CASE HISTORIES

### CONGENITAL HEARING LOSS:

Age of onset of hearing loss varies. Now, hearing loss may not only be acquired later in life also, but I have also come across cases where hearing loss is caused as part of birth injuries that is either obvious at birth or may become manifest later in life.

I came across a five year old Nithun. The moment I looked at the child, I was sure that the child was having hearing loss. This is because the child had depressed cheek bone, large fish like mouth. The two pinnae were malformed and there was also narrowing of the right canal. These are all classic features of Treacher-Collins syndrome as reported in the literature. In such cases, the hearing loss is associated with other problems such as mentioned above.

Now, normally, there are two types of inheritance ie dominant and recessive. The type is determined by whether the genes which are meant for heredity transmission, are present in heterozygous or homozygous condition. So in this case, it was found that there was dominant heredity.

Hearing evaluation done showed conductive loss in the right ear. Left ear could not be tested by air conduction due to complete absence of ear canal. Even his language was considerably retarded and also he had defective articulation.

Nithun's parents were given genetic counselling for them to become wiser to decide on having another child. This was all based upon the findings of the pedigree tree. Now this tree is drawn on the basis of heredity transmission from one generation to the other. Other remedial procedures included an air conduction hearing aid fitted to her right ear by a special earmold. In addition Nithun was placed in a special school where he could receive an intensive program of academic instruction and remedial assistance in speech, language and auditory training. Later, corrective surgery would be performed in an attempt to alleviate his hearing loss. This was associated with the facial abnormalities and fissure in the lip and palate.

There was another case Chavi aged seventeen and a half years. She came with problem of hearing loss. Detailed case history was taken. Parents also reported that Chavi spoke so softly that other students found it difficult to

hear and understand her in class. She had hearing loss from the last two years. Also reported was roaring sound in the ear and dizziness. I did the audiological evaluation as usual from simple pure-tone audiometry. It showed conductive loss and the characteristic dip at mid frequency. When hearing aid evaluation was attempted, it was seen that Chavi was unable to use amplification in her right ear to any advantage because of low scores in understanding speech. However, it was found that hearing aid on her left ear brought her hearing closer to normal limits.

From these two cases, it can be noted that hereditary type of hearing loss may or may not be associated with other problems and also that the hearing loss may be noticed just after birth or may manifest itself later in life.

Another case, a school boy, Nikku, aged 6 years was seen by me. He had hearing loss. This was associated with facial abnormalities and fissure in the lip and palate. He had what is referred to as cleft lip and cleft palate.

Detailed case history was taken and showed that he suffered frequently from middle ear infection. His health was no more good because of problem of regurgitation of food. Therefore he feared taking any liquid fluids. Now, normally

for such young children, they cannot respond to the puretone audiometry, so we use behavioral audiometry where the behavioral responses of the case is noted on presenting sound. But since Nikku could respond to the sound so, I planned out therapy for Nikku. It mainly included antibiotics and later was to be followed by surgery.

There was another child David age seven, he had been enrolled in speech therapy for correction of articulation problem. After about two months of therapy, I thought of reevaluating his hearing. It was readily apparent that David was a mouth breather and when asked to close his mouth and breathe through his nose, he was unable to do so because of congestion. Oral examination revealed such extremely large tonsils that we wondered how the child was able to swallow his food.

Audiological evaluation showed a mild bilateral conductive type of hearing loss. The child however, did not complain of pain in his ears. These all are classic signs of otitis media. Surgical treatment called myringotomy for the drainage of fluid was recommended.

Apart from this there was another case fifteen year old Ms. G.O. who suffered from chronic otitis media for years. The infection was not properly controlled because of discontinuation of medicines. Eventually the infection travelled to the brain and resulted in some tissue damage. G.O. is now subject to seizures and is under constant medication for control of the same. In addition, she has severe conductive hearing loss due to the erosion of her middle ear structures.

Above two cases show that otitis media may lead to severe problem unless it is controlled properly.

Apart from these above congenital hearing loss can also occur as a result of illnesses, drugs and accidents sustained by mother during pregnancy. In the past, it was thought that the placental barrier shielded the fetus to a great extent from infections of the mother, but it is now realised that a great many diseases are transmitted directly from the mother. This does not mean that mother should be treated as a culprit but instead it underline the fact that proper care of mother should be taken during pregnancy.

Dong, a child born to European parents was brought to me at the age of four. He was the youngest of four children.

His two older brother and a sister were normal in all respects. Now Dong's mother's pregnancy was uneventful except that she contracted rubella during the early months. Dong appeared normal at birth but as he developed, an eye problem was discovered. His hearing loss was noticed when he was two and a half years old. Later audiological evaluation showed a moderate to severe sensori-neural hearing loss in both the ears.

Rehabilitation procedures consisted of fitting him with a body type hearing aid and enrollment in a preschool nursery program for children with hearing-impairment. Dong was fortunate that such a program was available in the area since usually there is considerable lack of help for many preschool youngsters like him. He adjusted well to the program and he has been able to make good use of his residual hearing and also supplement this through speechreading. His articulation skills are fairly good and the speech he does use is intelligible.

### ACQUIRED HEARING LOSS:

Let me take you to the world of damaging sounds. I met two men of Mr.Gopal and Mr.Krishna approximately of 40-45 years. Both of them were working a welding workshop since past 2 years. They came with the problem of hearing loss, feeling of fullness in the ear. Problem of sensation of muffled hearing as well as high pitched ringing sound in their ears. This complaint was more when they worked for whole day.

Case history was taken. On questioning each one separately, it turned out that they were working in a very noisy place. There was so much noise that they could not hear each other even when they spoke loudly, so they resorted to gestures while working. Their speech discrimination was poor in noisy environment, but they had little difficulty in a quiet environment. When they spent one week in quiet place they found some improvement in their hearing.

People who are continuously exposed to noise without protecting barriers are at risk. Such people who are working in noisy place, day after day, for more than eight



hours a day working without protection begin to get hearing loss in high frequency sounds and later it spreads to the other frequencies.

I wanted to find out how much hearing loss they both had. For this, I began with the first step of hearing evaluation that is with puretone audiometry. Because of continuous ringing sound in the ear. So instead of puretone of continuous tone I used pulse tone as the test stimulants proposed by (ANSI). Puretone audiometry showed typical test results, that is more loss in the high frequency. He showed sensori-neural loss indicating that the problem lay in the inner ear. The test result was supportive of my suspicion that they had been exposed to noise. Another test called impedance confirmed that there was no middle ear pathology and that the defect occurred in the inner ear.

Since they were already employed, it was not possible for them to find employment in different quieter place. So in order to prevent further damage, wearing of ear protective device was recommended. Now, these hearing protective devices are devices worn on the person that gives protection to the auditory system against the external exposure to loud noise. So I thought recommending ear protectors and calling for regular follow-up was in order.

Now, there are different types of ear protective devices like helmets, ear muffs and ear inserts. Out of these, helmet usually covers a substantial part of the head. Ear plug is worn within the external ear canal. Lastly, ear muff is a protector usually comprising of a headband and ear cups with a soft outer ring intended to fit snugly against the pinna. These devices provided maximum attenuation properties than ear inserts and ear plugs. Now, I gave separate appointment to the two gentlemen Mr.Gopal and Mr.Krishna to find out best suitable ear protecting devices.

It is very important that the ear protector should be chosen according to the ear size and job suitability of a person. It should not be chosen just on the basis that the person is feeling comfortable.

One more gentleman who was working in the same welding workshop came to me worried suspecting hearing loss. This was because this individual was less susceptible for noise induced hearing loss even while working in the noisy area. So we saw that out of the three gentlemen working in the same noisy place, two showed susceptibility and one showed little susceptibility. This shows that when some get hearing loss other may not, even though they were exposed to noise in the same work place.

One more individual from same workshop, fifty-nine years old came with the problem of hearing loss. In his case it was difficult to say, whether the hearing loss was because of exposure to noise or because of ageing. In both cases, hearing loss is in the higher frequencies. Even though noise-induced hearing loss manifests itself as a notch in one frequency, gradually adjacent frequencies get affected, if steps are not taken to protect one's ears against the impact of loud noise. Hearing loss due to advancing age has its onset in the higher frequencies and gradually the adjacent, lower frequencies also get affected. Hence, it is difficult to separate the two in people who show high frequency hearing loss and who have also advanced in age.

Now, one child came to me. He started complaining to his parents that he is not hearing properly and kept asking for repetitions. This was just after the Deepawali celebration.

## CAN OLDER PEOPLE GO DEAF?

Take a close look at your grandmother's face; she certainly does not look the same as she did twenty years back. So just as ageing brings about changes in physical status of people, ageing also casts a shadow on the acuity of hearing. In other words, with age some amount of the hearing loss does creep in gradually. A healthy seventy years old Mrs. Krishna Murthy came to me with a problem of hearing loss.

She showed gradually processing hearing loss. There was problem in discrimination of sounds ie. she could hear some sound but could not understand what all is being said. She was unaware of her problem and blamed others for mumbling. In fact, it is only after much cajoling and prompting from the family members and friends, she thought of getting her hearing checked.

I wanted to find out how much hearing loss she had. For this I began with pure tone audiometry. It showed hearing loss in which high frequencies were more involved supporting my suspicion that hearing loss is caused due to ageing.

Since nothing else could be done to reverse the hearing loss which was due to aging, I thought of prescribing her a hearing aid.

So just like our sight may become impaired due to aging, our hearing can also become impaired. In some cases, the changes may occur in the inner ear. It is important that not only people whose hearing becomes worse but people who persevere for many years, should also ask for help.

Another gentleman came to me. He was 80 years old who was working in the factory since past ten years came to me suspecting hearing loss due to aging.

He complained of high pitched ringing sound, feeling of fullness and irritability.

Case history was taken and it turned out that he is working in a very noisy place. Pure tone audiometry showed no great hearing loss in high frequencies and the cause being suspected noise exposure. So not every old person can have hearing loss due to ageing.

Yet, another gentleman came to me with a complaint of hearing loss. His main problem was in understanding

speech. Pure tone audiometry showed that hearing was slightly affected, but the ability to understand speech was severely impaired.

So, we see that the effect of age on not all old people will be equal in terms of hearing acuity.

### CAN DRUGS DAMAGE HEARING?

A number of drugs may cause irreversible damage to organ of hearing. Now, before the days of antimicrobial therapy, the best known drug in this category was quinine. This drug was not only given for the treatment of malaria, but was also used for other purposes such as treatment of leg ache in women. When taken over considerable periods of time, this drug may cause tinnitus and sensori-neural hearing loss beginning in the high frequency range. Due to these reasons, it becomes necessary to make a special mention about these drugs.

Rajasha at the age of 44 years came to me with a problem of tuberculosis. In addition to his problem with tuberculosis, he was now in the need of rehabilitation for his hearing loss because of injudicious use of streptomycin. This is an ototoxic drug which is used for the treatment of tuberculosis. It is life saving. Apart from the problem of hearing loss, he also reported of tinnitus and problem in understanding speech. Pure tone audiometry done showed a bilateral speech. Pure tone audiometry done showed a bilateral, sensori-neural hearing loss. Understanding of speech was markedly reduced even when it was presented at

intensity levels well above the levels of normal conversation.

Radasha had to depend upon his kinesthetic and visual senses in order to remain ambulatory but he had to be sure that his environment is well lighted.

Now, in case like this it becomes very difficulty to discontinue the drugs like Neomycin, Kanamycin etc. because such drugs are used as life savers. In which no other drug promises a cure. However, the dose necessary to produce cochlear damage is unpredictable and sudden deafness can occur even some time after the discontinuation of the intake of the drug. However hearing loss can be avoided or held to a much milder degree, if monitoring audiometry been performed while patient is on the drug, and more important, in taking such drugs under proper medical supervision.

Rajasha was therefore fitted with a body type hearing aid and was enrolled for the rehabilitation program where plans were made to make good use of his residual hearing and where he can be taught to utilize speechreading to supplement what he hears.



Mr.T.V.Shaha, a 40 year old lady who is sister of Mr.Rajasha who was convinced about the treatment that we gave Mr.Rajasha came to me with her 3 year old daughter, Naina.

Mrs.Shaha was very much worried about her daughter's hearing because she was given Kanamycin in her childhood, two years back for an infection she had contacted.

Naina's pure tone audiogram showed no hearing loss. So Mrs.Shaha was very happy and was told to bring her daughter for a follow up after 3 months.

So, it not that every one who takes drugs like Kanamycin, Aspirin, Neomycin etc. always suffers from hearing loss. So it all depends on the susceptability of person.

### CAW ACCIDENTS CAUSE HEARING LOSS?

Physical trauma to the head may produce varying degrees of damage to the hearing organ.

A 30 year old lady Mrs.Kanta Nayar came with a problem of hearing loss after she had suffered a sharp blow on the auricle one and a half years ago. Apart from this she also had problem of tinnitus and vertigo.

Audiometry showed high frequency sensori-neural hearing loss revealing that the problem was in the inner ear.

In cases like this the damage may be temporary or permanent, depending upon the degree of disruption of neural epithelial elements. I thought of referring Mrs. Kanta to ENT Department for drug therapy. Normally treatment of such cases is rarely surgical but may include medical techniques and also Mrs.Kanta was prescribed body level hearing aid. It would have been more sensible if Mrs.Kanta would have been brought to us immediately after the blow because that would have prevented some hearing loss.

Another gentleman named Mr.Suresh, aged twentynine came to me with a similar problem but here the cause was different. Hearing loss was caused following rupture of eardrum because of swimming. All the symptoms accompanied pain also.

Now from the above case, it should be noted that not only the eardrum can rupture due to accidents like blast but due to sudden change in pressure such as diving.

## WAX IN THE EAR

Hearing loss can even be caused by a simple cause like wax accumulation causing external ear blockage. I came across a small boy Sonu, aged six years. He came mainly with a problem of pain in the ear since past three months.

Detailed case history was taken by questioning both the parents and the child. It showed that since past four months Sonu was asked for repetitions and could not clearly understand speech when spoken too softly.

Evaluation done using pure tone audiometry showed mild hearing loss. Otological examination showed that the ear canal was blocked by wax, thus causing obstruction for the passage of sound waves into the ear and striking the eardrum.

I demonstrated Sonu's father the putting of eardrops which would soften the wax. This is because the wax had become hard. After the removal of wax, hearing was found to be normal as shown by pure tone audiometry.

Now, wax production is a normal phenomenon of the glands in the external ear. The wax produced, which is better, is intended to keep insects etc. out of the ear canal. So ears should be properly and carefully cleaned from time to time through buds.

Another man named Mr.J.Vandan, age forty years seen. Although, he complained of some loss of hearing, his chief complaints was itching in the left ear canal. He like other average people attributed the itching to an accumulation of wax. It should be noted that mostly when people cannot find any reason they blame excessive amounts of wax for all hearing problem. Now in attempts to rid his left ear canal of what he thought was an accumulation of wax, Mr.J.Vandan poured hydrogen peroxide into it since this can be used to soften wax. This procedure resulted in a pain deep in the left ear and left him dizzy and nauseous.

Audiological evaluation showed conductive hearing loss in the low frequency. In addition, a mild high frequency sensori-neural hearing loss was also present bilaterally. Physical examination of the left ear revealed a fungoid external ear and also presence of inflammation as well as perforated tympanic membrane. Thus, the pain experienced upon application of hydrogen peroxide was due to the fact

that peroxide was getting into the middle ear through perforated tympanic membrane. By carrying the bacteria from ear canal with it, a middle ear infection could have resulted.

With all these problems, I thought more sensible to send Mr. J.V. for otologic treatment. Medication was prescribed to eliminate the fungus and to relieve the itching in his ear canal. Since J.V's hearing loss was in high frequency and so was prescribed hearing loss.

Thus, the foregoing case points up the danger of self treatment combined with ignorance. Thus people should not by their own begin treating their ears without consulting the professionals even though they feel that the cause is wax accumulation because simple and most common causes like wax accumulation foreign body in the ear can also lead to complications.

## EPILOGUE

Friends,

Hope, it was nice experience going through these case histories.

If your interest in prevention of hearing loss has been kindled after going through this, the workers will be gratified.

Your criticisms and suggestions are most welcome to the Department of Audiology, All India Institute of Speech and Hearing, Mysore 570 006.

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