



**WHO SEARO
INTERCOUNTRY CONSULTATIVE MEETING
FOR
DEVELOPING GUIDELINES REGARDING INFANT HEARING SCREENING
IN THE REGION**

Kathmandu, 8th December 2009

In cooperation with the Society for Sound Hearing

MEETING PROFILE

An Intercountry consultative meeting was held at Kathmandu, Nepal on the 8th of December 2009, for developing guidelines regarding Infant Hearing Screening in the South East Asia Region. This meeting was organized through a collaborative effort between WHO SEARO and the Society for Sound Hearing.

The Objectives of the meeting were:

1. To discuss the existing programme for neonatal & infant hearing screening in the South East Asia region & rest of the world
2. To establish the most effective strategy for detection of deafness in infants at the community level and the hospital level.
3. To prepare a prototype plan for implementation of Infant hearing screening in the member countries.

The experts who attended the meeting include:

1. DR. CHAMAIPARN SANTIKARN, WHO SEARO
2. DR. ANDREW SMITH, WWHEARING
3. DR. J.J.GROTE, IFOS
4. DR. M. ALAUDDIN, BANGLADESH
5. PROF. KAMRUL HASSAN TARAFDER, BANGLADESH
6. MD. ABUL HASNAT JOARDER, BANGLADESH
7. PROF. XINGKUAN BU, CHINA
8. DR. MCPHERSON BRADLEY, HONG KONG
9. DR. A.K. AGARWAL, INDIA
10. DR. SUNEELA GARG, INDIA
11. DR. SHELLY KHANNA CHADHA, INDIA
12. DR. T.S. SIDHU, INDIA
13. DR. V. BASAVARAJ, INDIA
14. DR. RONNY SUWENTO, INDONESIA
15. DR. DAMAYANTI SOETJIPTO, INDONESIA
16. DR. NYILO PURNAMI, INDONESIA
17. DR. RATNA ANGGRAENI, INDONESIA
18. DR. BULANTRISNA DJELANTIK, INDONESIA
19. DR. HENDARTO HENDARMIN, INDONESIA
20. DR. UPIK RUKMINI, INDONESIA
21. DR. AISHATH ALI, MALDIVES
22. DR. RAKESH PRASAD SHRIVASTAV, NEPAL
23. DR. MADHAV PRASAD DAHAL, NEPAL

24. PROF. HARI BHATTARAI, NEPAL
25. PROF. R.P. SHARMA GURAGAIN, NEPAL
26. DR. CHOP LAL BHUSAL, NEPAL
27. MR. SURESHWAR LAL KARNA, NEPAL
28. MR. BIRENDRA JHA, NEPAL
29. DR. PAWAN KUMAR SHAH, NEPAL
30. PROF. BIMAL KR. SINHA, NEPAL
31. DR. D.S.C. PERERA, SRI LANKA
32. DR. SUCHITRA PRASANSUK, THAILAND

The main criteria for the guidelines to be developed are:

1. The guidelines must be community based
2. They must be practically implementable
3. They should seek to identify all infants with moderate to profound hearing loss by the age of six months.
4. The modalities must be built on evidence based and sound technological principles.
5. Services must be integrated with the existing health care delivery system.
6. It should be cost-effective
7. It should include formal as well as non-formal modes of testing.
8. Diagnosis must be accompanied / followed by suitable treatment and re/habilitation.

INTRODUCTION

PREVALENCE AND AETIOLOGY OF HEARING LOSS AND DEAFNESS:

Prevalence:

As per estimates, there are 278 million persons suffering with 'Disabling Hearing impairment' in the world. Of these, two thirds live in developing countries. 50% of this hearing loss is preventable. South East Asia has the largest number of hearing impaired in the world and houses one third of the world's hearing impaired population. WHO estimates that every year about 38,000 deaf children are born in the region. The detailed break up presented is as given below:

NUMBER OF HEARING IMPAIRED & DEAF IN THE COUNTRIES OF THE SOUTH EAST ASIA REGION

COUNTRY	POPULATION	BABIES BORN DEAF ANNUALLY*
Bangladesh	130,000,000	2,600
Bhutan	600,000	18
DPR Korea	22,260,000	668
India	1,009,000,000	30,270
Indonesia	210,000,000	6,300
Maldives	300,000	9
Myanmar	52,000,000	1,560
Nepal	23,000,000	690
Sri Lanka	19,000,000	570
Thailand	65,000,000	1,950
TOTAL	1,531,160,000	44,635

(*: Estimated babies born deaf annually in South East Asia countries, based on an estimated incidence of 0.2% of all babies born, with an estimation of a birth rate of 1.5%)

PERCENTAGE OF POPULATION SUFFERING WITH PROFOUND HEARING LOSS IN COUNTRIES OF THE REGION

Four countries had been included in a pilot study to assess the prevalence of Disabling hearing loss, deafness and ear diseases in the region. The study report which was submitted to WHO SEARO (Annexure 1), estimated the percentage of persons suffering with Disabling hearing loss in the countries.

COUNTRY	INDONESIA	INDIA	MYANMAR	SRILANKA
Disabling Hearing Loss*	5%	6%	8%	9%
Hearing loss greater than 81dB** in better hearing ear	0.27%	0.3%	0.18%	0.70%

*: (defined as average threshold for 1, 2, 4 kHz of 41 dB or greater in adults, 31 dB or greater in children aged under 15 years).

** : (based on better ear average threshold for 1, 2, 4 kHz)

Aetiology of Hearing loss and Deafness:

The various causes that can lead to Hearing loss and deafness were listed. The important causes in terms of Prevalence within this region were considered.

Country	Indonesia	India	Myanmar	Sri Lanka
Causes (%):				
Ear wax	15.9	13.2	9.0	2.9
Chronic supp. otitis media	5.2	3.6	6.0	2.0
Serous otitis media	3.0	0.3	2.1	2.1
Dry perforation of tympanic m.	0.5	2.6	1.8	0.5
Bilateral genetic (cong. deafness)	0.2	0.1	0.5	0.2
Non-infectious (mostly aging)	10.3	4.1	5.0	9.2
Other causes + unknown	26.6	3.2	24.0	7.6

Though Congenital deafness forms only a small part of the entire aetiological spectrum of Hearing loss, the fact is that this form of hearing loss has the most

severe and debilitating effects on the life and development of the child who is affected as well her family. Undetected and untreated, this child will fail to develop suitable language and communication skills. It is therefore essential that this hearing loss must be identified at the earliest possible stage in life and rehabilitated in order to ensure suitable personal, educational, social and economic growth of the child. This child is the focus of this Infant Hearing screening programme.

Causes of Congenital hearing loss include:

- **Prenatal factors:**
 - Genetic causes
 - Prenatal Maternal Infections including the TORCH (Toxoplasmosis, Rubella, Cytomegalovirus, Herpes simplex) infections
 - Use of Ototoxic drugs in pregnancy
- **Peri-Natal causes:**
 - Birth Asphyxia
 - Low birth weight
- **Postnatal causes:**
 - Hyperbilirubinemia
 - Meningitis

The Joint Committee on Infant Hearing screening:

The United States Joint Committee on Infant Hearing (JCIH) endorses early detection of and intervention for infants with hearing loss, as do many other national and regional paediatric associations. The goal of early hearing detection and intervention (EHDI) is to maximize linguistic competence and literacy development for children who are deaf or hard of hearing. Without appropriate opportunities to learn language, these children will fall behind their hearing peers in communication, cognition, reading, and social-emotional development. Such delays may result in lower educational and employment levels in adulthood. In order to maximize the outcome for infants who are deaf or hard of hearing, the hearing of all infants should be screened at no later than 1 month of age. Those who do not pass screening should have a comprehensive audiological evaluation at no later than 3 months of age. Infants with confirmed

hearing loss should receive appropriate intervention at no later than 6 months of age from health care and education professionals with expertise in hearing loss and deafness in infants and young children. EHDI systems should guarantee seamless transitions for infants and their families through this process. The highlights of the 2000 JCIH statement are appended as Annexure 2.

Screening for Hearing loss:

Various modalities available today for effective identification of Hearing loss include:

Screening tests:

▪ Subjective screening tests:

- Questionnaire based screening with a proforma that takes into account the high risk factors, developmental milestones in relation to hearing and speech as well as caregiver concern.
- Behavioural observation

▪ Objective screening tests:

- Oto-acoustic emissions
- Automated ABR screening

Diagnostic tests:

- Auditory Brainstem response testing
- Auditory steady State response testing

SCREENING PROTOCOLS:

The accepted protocol for Neonatal Hearing screening includes:

1. Well Baby Nursing

Child is subjected to hearing evaluation through oto-acoustic emissions, as soon as possible after birth, usually prior to discharge from the hospital

Those failing the OAE test are called back after a gap of 2-4 weeks for a repeat testing. Those who also fail the 2nd test are then to be subjected to an ABR examination. Ideally, the entire protocol must be completed by the age of 3 months and the child referred for hearing aid fitting and suitable rehabilitation.

2. NICU

NICU infants admitted for more than 5 days ought to have auditory brainstem response (ABR) included as part of their screening so that neural hearing loss will not be missed.

Infant hearing screening in the SEA region: Current status

Majority of the data pertaining to hearing screening in children emanates from the developed countries. As the population profile, economic, social and cultural trends in these countries are very different from those within the region, there is a strong need for us to develop our own database. Sporadic data is available with respect to Neonatal Hearing screening from various parts of our region. On the basis of the available data, it appears that there has been no serious organised effort at Neonatal/infant hearing screening in most of the countries of the region.

- Bangladesh: There is no national policy regarding Hearing screening. However, many institutions do carry on hearing screening activities, at their own level. There are many organisations providing hearing aid fitting and also cochlear implants.
- Bhutan: Has no screening programme and faces a complete lack of audiological resources, both human as well as equipment. It does however, have a free hearing aid distribution programme.
- India: Following the launch of a National programme for Prevention & Control of Deafness, India has developed its own protocol of Infant hearing screening combining both institutional and community based modalities. It has launched the programme in 60-65 districts now. Government of India provides support for hearing aid fitting and therapy. Many private centres provide cochlear implant option.
- Indonesia: There is no national programme for Hearing screening. However, many institutions do carry on hearing screening activities, at their own level. There is no government support for hearing aid fitting. Cochlear implant is available in a few centres.
- Maldives: Has no screening programme and faces a complete lack of audiological resources, both human as well as equipment.
- Myanmar: Has no screening programme and faces a lack of audiological resources, both human as well as equipment.

- Nepal: Has no national policy regarding Hearing screening. There are 3 centres that offer suitable diagnostic services. There is no Hearing aid distribution programme, but one centre offers cochlear implantation.
- Sri Lanka: Has no national policy regarding Hearing screening. Most teaching hospitals offer suitable diagnostic services. There is no Hearing aid distribution programme, but many centres offer cochlear implantation.
- Thailand: Has no national policy regarding Hearing screening. Number of large hospitals offer suitable diagnostic services. There is a Hearing aid distribution programme and many centres offer cochlear implantation.
- Timor Leste & DPR Korea: No information available

The problems pertaining to the region can be summed up as:

- Other pressing health priorities
- Poor audiological resources in the countries, especially human resources
- Poor accessibility of infrastructure to the general population
- Poor availability of rehabilitative services in some countries.

PROCEEDINGS

On

8th December 2009, Kathmandu, Nepal

The "Intercountry Consultative Meeting for Developing Guideline on Infant Hearing Screening" was held on 8th December 2009 in Hotel Himalaya, Kathmandu, Nepal. The meeting was divided into three sessions.

Session I: Background Information

Session II: Sharing Experiences.

Session III: Group Work

Session I

1. Background & Objectives: Dr. Chamaiprn Santikarn (Annexure 3)

Dr. Chamaiprn spoke on the Background Objectives of the Meeting. She quoted WHO figures of hearing loss in relation to the global burden of diseases, the number of people suffering from deafness globally and its incidence particularly in children. She defined screening programmes and successful screening tests. She stressed that models of neonatal hearing screening were available in developed countries and that this meeting has been organized to develop guiding principles for SEA region. She then mentioned about the specific objectives of the screening programme for neonatal and infant hearing in SEAR and that it should have a most effective strategy for detection of deafness in infants at hospital as well as community level. She also emphasized that this meeting should outline modalities for implementing infant hearing screening in SEAR countries and finally adopt guiding principles for Infant Hearing Screening suitable for SEA Region in line with global ones (developed last month). She concluded by saying that the output will be used by WHO SEARO as the next step to review/support further studies to obtain necessary data for policy/programme formulation, fill the gaps in service and capacity, e.g.: social and family support, speech therapy, appropriate education, hearing aids, cochlear implants, etc. and support for appropriate policies/programmes concerned.

2. Epidemiology and Challenges: Dr. Andrew Smith(Annexure 4)

Dr. Smith talked about:

- a. The size of problem
- b. Methods of measurement
- c. Available data on all hearing impairment
- d. Available data on neonatal hearing impairment
- e. Problems/challenges with data collection
- f. Screening principles
- g. Problems/challenges with screening programmes

Dr. Smith presented the grades of hearing impairment and WHO Global Estimate of deafness and hearing impairment 2005 and mentioned that 642 million people have some degree of hearing impairment globally and also gave figures of the estimated global prevalence of hearing impairment by sex and severity level, 2008. Of these 642 million, 278 million are those who suffer with disabling hearing impairment. Dr. Smith reviewed all the available data/studies and explained the criteria for selection of different studies. He then presented results of the data review in developed as well as developing countries. He described the problem of collecting data. He described the screening principles and the problems/challenges with screening programmes. He then discussed in detail the different problems and challenges with screening programmes in developed as well as developing countries. Dr. Smith described how the WHO Ear and Hearing Disorder Survey was designed and tested in different countries and presented the results of these surveys.

3. Modalities for Universal/Targeted Screening: Dr. Vijayalakshmi Basavaraj (Annexure 5)

Dr. Basavaraj discussed the need for Universal Hearing Screening (UNHS) and stressed the fact that HI babies identified at birth by screening can be habilitated successfully. She then discussed which age (when) the babies should be screened, where they should be screened, who should screen, who will pay for the screening and lastly which protocol should be followed

for screening. She then discussed the status of the UNHS programme in developing countries. This was followed by preparations to be made before starting screening programmes. Lastly she discussed her experience in screening of 1000 newborns in KEM Hospital, Mumbai, India and gave her recommendations. Her talk concluded with the suggestion of a multi-national/multi-centric project to evaluate a "Battery of Screening Modules".

4. Role of Different Levels of Health Services in Infant Hearing Screening: Dr. Bulantrisna Djelantik (Annexure 6)

Dr. Bulantrisna talked briefly on the prevalence of congenital hearing loss and its causes. She described in brief the goal and initiatives of SH 2030. She then questioned whether Universal NHS/Targeted NHS protocol used in developed countries was feasible in developing countries, whether there were sufficient human resources and other support for screening programmes in developing countries. She also raised the issue of availability of sufficient and appropriate means of intervention after a baby is diagnosed to be deaf. Lastly, she detailed the different stakeholders in different levels of health services.

She then revisited "WHO SEA Intercountry Consultation on Prevention of Deafness and HI" in Colombo, 17-20 December 2002. She discussed Primary, Secondary and Tertiary Level Ear and Hearing Care Health Services and the rehabilitation of the deaf and hard of hearing. She then outlined the "Recommendations for Action Pointers" for stakeholders, WHO, National Governments, NGOs, Professional Societies and Professionals and DPOs. She also stressed the need for National Committee for Prevention of Deafness and Hearing Impairment in each of the SEAR countries and provided general guidelines for formation of National Committees.

5. Infant Hearing Screening - Cost Effectiveness: Dr. Bradley McPherson (Annexure 7)

Dr. McPherson discussed why we need to screen, what we should be screening for and the benefits of screening. He also described the effects of mild hearing loss on education of the child. He then went on to discuss the costs of screening and the cost effectiveness of infant screening hearing screening. He discussed the benefits of screening in terms of education expenses (reducing the need for special schools), reducing unemployment (HI persons have high unemployment rates and limited choice for vocational training) and the benefit also included benefit to the family as well as peers. He concluded by stating that the cost effectiveness statements are required to convince policy makers of the need for infant hearing screening, that cost effectiveness is best calculated using local data if possible because this has greater face validity and that quantitative and qualitative cost effectiveness data is an optimal combination.

Session II Sharing Experiences

Experts from 4 different countries namely China, India, Indonesia and Thailand shared their experience of Hearing Screening Programmes in their respective countries.

1. Experience in China: Prof. XingKuan Bu (Annexure 8)

Dr. Bu started by stating that the NHS in China has the challenges of dealing with 60,000 hearing impaired newborns every year. He mentioned 2 pilot studies conducted in Beijing ENT Institute from 1989-1996 and by Jiangsu Province Hospital Nanjing Women and Children Health Centre in 1998. In order to take up this challenge he talked about Regulatory issues, National and local training courses and conferences, public awareness and scientific publications.

He described the present status which included strategies, definition of target groups, development of universal screening flow chart, distribution of existing structures, incidence of hearing loss in newborns and problems faced by the Government. He discussed the future development such as to update the National Plan of NHS and issue guidelines and technical criteria to include maximal screening of newborns with deafness and for their habilitation. He concluded by saying that the National Hearing Screening Programme provided the earliest opportunity to identify and deal with HI and this has precious value because of the huge population and poor economic condition, few trained personnel and inadequate technical resources in China. He also mentioned that "tri-basic sustentation" strategies (Universal Screening, Targeted Screening and Community Screening) of NHS are used at the present and that multidisciplinary cooperation is the key-point for success. Finally he reminded everybody that the Chinese Government played a significant role in the whole programme and that "China is still a developing country; there is a long way for us to go."

2. 2. Infant Hearing Screening: The Indian Experience by Dr. Shelly Khanna Chadha (Annexure 9)

Dr. Shelly discussed the Institutional Based and Community Based Screening Protocol developed in India with the objectives of covering the majority of infants. She stressed that according to this Protocol all hearing impaired children must be identified by the age of 6 months and that the focus should be on bilateral severe-profound hearing loss. She then discussed the different levels within Health Care Infrastructure of India. She went on to say that the community based screening programmes of babies should take place at the time of immunization by trained health care workers using history based proforma and by behavioural testing. Babies suspected to have hearing impairment would then be referred to District Hospital (2nd level screening) to be tested by an Audiologist/Audiology Assistant using various tests including OAE and finally suspected hearing impaired babies would be referred to a Medical College (Tertiary Level hospital – 3rd level screening) to be tested by BERA, etc.

She then discussed about the factors addressed such as infrastructure development, awareness creation and patient compliance and also about the problems/lacunae. She then ended her presentation with the current status and informed that the programme has been started in 60 districts in India where manpower has been trained, awareness material developed and distributed, OAE made available and human resource development and deployment are underway.

3. 3. Newborn Hearing Screening In Indonesia: Dr. Ronny Suwento (Annexure 10)

Dr. Suwento started his presentation with components of high quality Early Hearing Detection and Intervention (EHDI). He emphasised that screening should take place before 1 month of age, assessment by 3 months and intervention by 6 months. He also talked about that the National Survey of Ear and Hearing Health (1994-1996) in Indonesia and stated that 16.8% of the population was found to have hearing loss and deafness was found in

0.4% of the population. He then enumerated 16 cities in Indonesia having NHS facilities and discussed in detail the data from the NHS in Jakarta and the Jakarta WHO collaborating Centre of PDHI. He described the NHS programmes in Bandung - West Java, Surabaya - East Java and in Bali and about the new NHS programmes in Jakarta (Private Hospital) and in Central Java. He talked about the different research conducted and also the minimal Ear and Hearing Services available in Indonesia. Finally he touched on the challenges faced in Indonesia and offered solutions as well.

5. Thailand Experience by Dr. Suchitra Prasansuk (Annexure 11)

Dr. Suchitra raised the question whether Hearing Screening should be for infants, newborns and whether it should be targeted at those at high risk or whether it should be universal. She also discussed the merits and demerits of existing technologies such as OAEs, ABR, ASSR and brainstem ERA test for screening and stressed of the need to adopt correct technology. She then discussed at length the screening activities around the world. She concluded by stating that early intervention for hearing impaired babies should include hearing aids, hearing rehabilitation, cochlear implant, mainstream schooling, schools for the deaf, integrated schools and continuation of support until the age of 21 years.

Session III (Group work was held in the afternoon)

- 4.** All participants were divided into 2 groups. Hearing Screening Institutional Model was facilitated by Prof. M. Alauddin with Dr. Bradley McPherson as rapporteur and Hearing Screening Community Model was facilitated Dr. T.S. Siddhu with Dr. V. Basavraj as rapporteur. After 2 hour long group discussion, each of the group presented their recommendations. The recommendations made by the two groups have been attached (Annexures 12 & 13)

GUIDING PRINCIPLES FOR INFANT HEARING SCREENING IN THE SOUTH EAST ASIA REGION

The Guiding principles are based on the following principles: They are-

- Community based
- Practically implementable
- Built on evidence based and sound technological principles.
- Such that they can be integrated with the existing health care delivery system.
- Cost-effective

In consideration of the indigenous problems of this region, it is felt that the Infant hearing screening protocol should be divided into two phases.

- a. **FIRST PHASE:** It is recommended that in the first phase, the focus of the screening programme would be on children with bilateral, severe to profound hearing loss. Target of the screening would be to identify all children with bilateral, severe to profound hearing losses.
- b. **SECOND PHASE:** The second phase would be recommended after the initial phase has been well established. It would focus on identification of all children with hearing loss including unilateral and mild-moderate losses.

The **Objective** of the first phase of the screening programme is, as follows:

*'The first phase shall seek to screen **all** infants and identify those with **Bilateral, severe to profound hearing loss** by the age of **six months** and to ensure the prompt initiation of **re/habilitation measures** soon thereafter.'*

Strategy:

In order to fulfil the stated objective, a **Bi-pronged approach** would be followed. This would include:

- Institution based screening
- Community based screening

INSTITUTION BASED SCREENING:

The principles for Institutional protocol are as follows:

- All **tertiary and secondary level centres or hospitals**, where facilities for electrophysiological testing as well as re/habilitation modalities are available, must implement the screening protocol.
- Screening should be **universal** within institution
- All babies born within these institutions or reporting to the institution (for any reason) in the first six months of life must be screened for hearing loss.
- The babies born within the institution must be screened prior to discharge from the neonatal ward/nursery, preferably within days 1 to 3 to avoid high non-compliance rate.
- 'Late group' (includes all those infants that could not be tested in the neonatal period, due to any reason, whatsoever) schedule may be linked to immunization.
- This includes babies that come to the hospital for immunization or to attend the well-baby clinic. They must be screened at the time of immunization or reporting.
- The hearing test must be administered by a trained technician/trained nurse.
- A responsible professional within that section should be in charge
- In view of the high noise levels in these areas and the need for a reasonably quiet area to conduct these tests, it is recommended that these tests be conducted in a quiet room near the immunization clinic or within the audiology department. The infants would need to be sent to this room prior to discharge or prior to immunization, for their hearing assessment.
- The initial screening would be undertaken by Oto-Acoustic Emission (OAE)/Automated Auditory Brainstem Response (AABR) testing.
- If the baby fails to pass this test, he/she will then be called back for repeat testing at the time of next immunization.
- The child who had failed the first screening, but passes the second test will need to be observed for development of hearing milestones in the future visits as well as by the parents.

- The child who fails the second test will then be sent for Brainstem Evoked Response Audiometry (BERA) at the age of 3 months.
- The child who is diagnosed to have hearing impairment by the BERA test, will be dealt with as follows:
 - The parents will be counselled regarding the diagnosis and the treatment options available.
 - Available modalities for Auditory re/habilitation will be explained to the patient and initiated as soon as the diagnosis is made.
 - Timely therapy and Speech training will be provided to the child.
 - Continuous support and guidance will be provided to the parents, as and when required.

COMMUNITY BASED SCREENING:

All those children who do not come under the purview of those institutions that are offering a Neonatal hearing screening programme, should be screened by alternate modalities.

- Screening should be carried out at the centre for immunization, at the time of immunization of the baby.
- First screening should occur at the time of first immunization, at 4-8 weeks of age, based on country's immunization programme. However, in case a child reports at a later date for immunization, he/she must be included in the screening programme and the procedure undertaken at the time of immunization.
- Screening to be done at the centre prior to administration of the immunization.
- It should be done in any 'quiet area' (less than 40dB A noise level, where whisper can be heard), in or near the immunization centre.
- To be administered by Trained health care workers. Due to the fact that most existing health care workers are overburdened with many aspects of health care, this screening should preferably be as an incentive based programme.
- Screening at the centre would be based on formal testing methods, if possible. If there is a provision for OAE/Automated ABR and suitable trained manpower at the centre, that would be the preferred modality of testing. In the absence or non-availability of these electrophysiological methods of testing, screening must be carried out through non-formal methods. These should include:
 - Questionnaire based on High Risk Register to be administered to the mother/primary care provider at the time of immunization.
 - Reflexive Behavioral testing performed by the trained health care worker, prior to immunization of the child.
- All children suspected to have Hearing loss, at the time of screening, must be referred for further testing to a higher centre where all diagnostic (OAE/AABR, BERA) and habilitation facilities are available.
- This linkage between the referring centre and higher centre must be developed and formalised. A suitable referral slip must be provided to them in order to facilitate this referral process.

- The children identified through this screening programme and their parents must:
 - Be provided with suitable counselling regarding prognosis, importance of re/habilitation and modalities thereof.
 - Receive suitable treatment including sound stimulation, therapy and educational intervention.
 - Be provided support and guidance on a long term basis.

The bi-pronged screening programme must be accompanied by the following measures:

- Status of hearing screening should be included in the Well baby/immunization card. This will ensure that no child is missed from the screening protocol.
- Awareness creation amongst the parents of the child to be tested, as well as the community as a whole is a very important aspect, which must be addressed through suitable means.
- It is important to raise awareness of paediatricians, neonatologists and obstetricians regarding the importance of Neonatal/Infant Hearing Screening.
- Data collection and reporting in predetermined formats must accompany the screening programme.
- Training of the involved manpower has to be undertaken.
- Development and deployment of suitable audiological manpower must be considered, in order to effectively carry out the diagnostic tests and therapeutic interventions.
- The result of screening must only be noted as Refer in the baby card. No report mentioning Hearing loss must be given till a confirmed electro-physiological diagnosis is made.
- Diagnostic reports should be supervised and signed by a certified expert, as per the country's regulations.
- The screening programme must be accompanied by suitable modalities for rehabilitation including sound stimulation, therapy and educational intervention.

In order to ensure that no child is missed out, any child who is left out of this screening process, must be tested at the 9 month immunization contact

Role of Non-Governmental Organisations:

It is foreseen that Non-governmental organisations would play a very important role in this screening process. They have the potential to contribute to the

Hearing Screening Programme with regard to:

- Facilitation of the screening process
- referral process
- Rehabilitation & tracking of the diagnosed babies.

RECOMMENDATIONS

1. The Inter-country Consultative Meeting for Developing Guidelines Regarding Infant Hearing Screening (IHS) in the Region, held in Kathmandu, 8th December 2009, by The Society For Sound Hearing in cooperation With WHO-SEARO, is only the start of the work, and only renders the "IHS guiding principles"
2. A regional SE Asia Joint Committee on IHS should be established, criteria for members of such a committee to be defined
3. More meetings of the SEA Joint Committee to be conducted, facilitated by the Society for Sound Hearing and WHO-SEARO, to refine and develop the "guiding principles" for the region
4. Pilots to be started in countries, and good practices shared between the countries
5. In the future, WHO SEA to formulate these "guiding principles" to be the "WHO Guidelines for Infant Hearing Screening" in the region