

# Knowledge and Beliefs about Ear and Hearing Health Among Mothers of Young Children in a Rural Community in South India

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## ABSTRACT

**Purpose:** *To study the knowledge and beliefs about ear and hearing healthcare among mothers from a rural community.*

**Method:** *In 1 week, 6 focus group discussions were conducted across 6 villages of a district in Tamil Nadu in southern India. The participants were 60 mothers who had children below 5 years of age.*

**Results:** *Mothers in this rural community had information about some aspects of ear and hearing healthcare. They were aware that use of hairpins and safety-pins to clean ears was harmful; they were knowledgeable about ways to identify hearing ability (child responds to name call, verbal instructions, and startles at loud sounds); and, conditions like consanguinity and malnutrition of expectant mothers were recognised as risk factors for hearing loss. However, misconceptions also existed. The practice of pouring herbal juices to remove insects in the ear continued; there was the perception that all children with a hearing problem were “deaf”, and a lack of awareness about the possibility of partial/unilateral hearing loss. Regarding the age of identification, mothers believed that a child’s ability to speak and the ability to hear was pertinent to assess hearing. None of the mothers related normal speech development to normal hearing.*

**Conclusion:** *For the success of a community-based hearing screening programme, it is important to utilise the existing knowledge of the mothers, and simultaneously attempt to fill in gaps in knowledge and clarify misconceptions. These measures will facilitate greater compliance from the community in*

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*achieving the goals of early identification and early intervention for problems of hearing loss.*

*Key words: rural community, knowledge and belief, ear and hearing*

## INTRODUCTION

Poverty, ignorance, poor hygiene, inadequate medical guidance, and customs and beliefs based on tradition and culture are reported to be reasons for poor health awareness (Kumar, 1997). Having appropriate health-related information ensures that people are better equipped to access services (WHO, 2010). Hence, lack of health awareness results in poor primary and secondary prevention of diseases or health conditions. This lack of awareness also extends to the area of ear and hearing healthcare. Attempts have been made to create awareness about hearing loss and ear care through information, education and communication strategies using health personnel and grassroot workers using local, culture-specific innovative strategies (Garg et al, 2009).

With the aim of preventing avoidable hearing loss (primary prevention), early identification and treatment of ear problems, and rehabilitation of persons with hearing impairment, the Government of India initiated the National Programme for Prevention and Control of Deafness (NPPCD) and integrated it with National Rural Health Mission (NRHM) at the state and district levels. In line with such efforts, the Department of Speech, Language and Hearing Sciences at Sri Ramachandra University proposed a rural community-based hearing screening programme for infants and young children, with the focus on newborns, in Thirukazhukunram and Madhurantagam blocks of Kancheepuram district in Tamil Nadu in southern India. During this programme, trained Village Health Workers (VHWs) conducted hearing screening using Oto Acoustic Emission equipment on a door- to-door basis in the villages. For those children advised to be 'referred' after screening, telehealth technology with Auditory Brainstem Responses was used to conduct diagnostic testing.

The key to the success of a community-based programme lies in the developmental spirit of 'fact-finding' and 'learning lessons for improvement' from the grass root (Garg & Laskar, 2010). Although measures have been initiated to improve ear and hearing care at the community level, the goals will be achieved only when programmes implemented at the grassroot level relate to the region, community, or even the family. For example, Scheppers et al (2006) who reviewed studies on

ethnic minorities conducted in different countries, reported low use of screening health services among them due to lack of awareness. Strong local beliefs and traditional health practices in the community, such as “health problems are caused by natural and supernatural causes” or “a result of the act of God”, deter people from availing healthcare services (Scheppers et al, 2006). Studies in South Africa by various researchers such as Olusanya (2000), de Andrade and Ross (2005) and Swanepoel and Almec (2008), note that poor public awareness regarding childhood disabilities is often aggravated by superstitious customs and beliefs. Lack of knowledge among programme planners about these local customs and beliefs can impact the use of healthcare services in the community.

The purpose of the present study was to gain insight into the knowledge and beliefs of the community regarding ear and hearing. Specifically, the researchers wanted to find out whether the community was aware that hearing could be tested/screened as early as at birth; when they first suspected hearing loss and whether they knew the consequences of unidentified and untreated hearing loss; also, whether there were any culture-based beliefs that deterred the community from availing screening services.

It was considered necessary to obtain this information prior to the initiation of the rural community-based hearing screening programme in order to incorporate appropriate messages for the VHWs to convey: a) during sensitisation programmes carried out before screening, and b) after screening, as a part of the counselling for parents /caregivers. Such measures are expected to improve compliance for availing of the hearing screening service in the village. The mothers were the target group to obtain this information, as they represent the specific population for whom the screening programme is designed. Compliance for hearing screening has been reported to increase when the mothers were educated on infant hearing loss and its consequences (Francozo et al, 2007).

This study was approved by the Institutional Ethics Committee. Participants were included after obtaining their informed consent.

## **METHOD**

### **Location**

The study was conducted in 6 randomly sampled villages from Thirukazhukunram and Madurantagam, 2 blocks of Kancheepuram district in Tamil

Nadu, India. Kancheepuram district is located on the northern East Coast of Tamil Nadu. The population of Thirukazhukunram and Madurantagam is approximately 39,000 and 41,000 respectively.

## **Participants**

The 60 women participants included mothers of children between 0-5 years of age who were residents of the rural area under study. None of them had family members with congenital hearing loss. The average age of the mothers was 28.73 years (SD= 5.12) and 73% had children under 2 years of age. All the mothers were fluent in Tamil, the local language. All of them had some level of education, but only 4% had completed an undergraduate Degree. The annual income of 93% of these mothers was less than Rs. 20,000.

## **Developing Focus Group Guides**

To facilitate the focus group sessions and lead the discussions, the investigator developed guides in Tamil. Literature reviews were conducted, using databases such as Medline, Pubmed, and EBSCO, employing the key words 'parent and caregiver', 'knowledge and belief', and 'ear and hearing healthcare'. Literature search was conducted in the areas of: i) ear care, ii) assessment of hearing ability, iii) risk factors for hearing loss, iv) consequences of hearing loss, and v) professionals and services for persons with hearing loss. Expert opinions of people working in the area of hearing healthcare and the inputs of VHWs working in the area of community health were also included while developing the guides. Two pilot studies were conducted to assess appropriateness of the guides in promoting participation and discussion.

Based on the pilot studies, minor changes were incorporated and a final set of guides to lead the FGDs was developed. Guides used under each heading are provided in Appendix I. They have been translated from Tamil to English for the purpose of this publication.

## **Execution of Focus Group Sessions**

FGDs were conducted with the assistance of the VHWs, who identified the venue for the sessions and communicated information about the time and place to the participants. FGDs were conducted at a residence accessible to all the participants. Each FGD included: 1) participants, 2) principal moderator (audiologist) to

initiate and guide the discussion, 3) facilitator (VHW) to assist the moderator in the discussion, and 4) observer (VHW) to take notes. Each session was audio-recorded using 2 digital voice recorders (Sony IC recorder ICD-UX70 and Cenix VR-P2340 voice recorder). The duration of each session ranged from 45 minutes to one hour.

## Data Analysis

The recorded data was analysed and written transcriptions were developed. The observer's notes were referred to for clarifications. The transcriptions were verified by another audiologist (co-investigator). The transcribed data was reviewed to identify 3 themes: correct knowledge, gaps in knowledge and misconceptions. Themes were analysed under the broad areas of: 1) ear care, 2) identification of hearing status in children, 3) age at which hearing can be assessed, 4) risk factors for hearing loss, 5) consequences of hearing loss, and 6) professionals and services available for children with hearing impairment. Both word coding and thematic analysis were done. Thematic analysis carried out by the principal investigator was verified by both co-investigators. The responses are reported using the descriptive summary method. To understand the responses better, verbatim transcripts of a few participants are quoted as examples.

## RESULTS

Results are reported according to the broad areas under which FGDs were conducted. Quantifiers used to describe the results are: 'All' for 100%, 'Majority' for more than 50%, 'Many' for more than 20% but less than or equal to 50%, 'Some' for more than 10% but less than or equal to 20%, and 'Few' for less than or equal to 10%.

### 1. Ear Care

All the mothers believed that ears should be kept clean. Many used either ear buds or cloth to clean ears. They were aware that foreign objects (insects, sticks, grains) could enter the child's ear and had approached medical professionals for help in such cases. Some reported that insects were removed using traditional home remedies such as pouring warm water, saline water, and herbal juice into the ear.

*“If there is any dirt inside the ears, we don't put anything else because it might damage the ears. So we take it out using ear buds” (FGD 5 - participant 8).*

*“Sometimes we pour salt water inside the ear. If there is any insect gone inside, that is how we take it. Otherwise we take the child to the doctor” (FGD 4 - participant 6).*

## **2. Identification of Hearing Status of Children**

The majority reported that they were certain that the child could hear when he/she responds to name call. A few mothers stated that if a child demonstrates comprehension when spoken to, or if the child is startled or responds to loud sounds, then it is certain that the child can hear. One mother reported that the child's ability to localise sound is an indication that the child hears. On further probing regarding levels of hearing loss and its manifestation, the general consensus of the groups was that all children with hearing problems are “deaf” or have “no hearing”. The possibility of children having partial and / or unilateral hearing loss was not recognised.

*“If the child turns towards us when we call, then we understand that the child can hear” (FGD1- participant 2).*

*“If any vessel is dropped, when we switch on the television or radio, or if there is a loud noise, then the child cries. With that we can understand that the child hears well” (FGD1- participant 7).*

*“The child comes to you on hearing your call. Likewise, if somebody else calls they will move towards them” (FGD 6- participant 3).*

## **3. Age at which Hearing can be Assessed**

Mothers had varying opinions regarding the age at which hearing could be assessed. The majority believed that since babies sleep a lot in the first 3 months of life, it is not possible to ascertain whether they can hear. Some believed that only at 1 year of age would it be possible to ascertain that the child could hear, since there would be response to commands and soft sounds. A few mothers reported that hearing ability could be identified at birth using informal methods, and they offered their observations with their own children as evidence.

*“As soon as the child is born, the child is not able to see around. It takes about 1 to 1.5 months for the child to look at you and smile and to turn for even soft sounds. I*

*just wanted to say that we do not know anything about its hearing ability as soon as the child is born. In fact, the child is able to hear even when it is in the womb of the mother before birth. It cannot open its eyes to see whether we talk or not. It is difficult to even lift the child as soon as it is born. We do not know whether the child is hearing at that time or not. It takes a month or two, for the child to turn or cry on hearing even soft sounds” (FGD 4 - participant 3).*

*“We can perceive the child’s (hearing) ability only after he /she starts growing At birth, the child has the ability (to hear) but we do not get to know it” (FGD4 - participant 6).*

*“I got to know (about child’s hearing) at birth itself. The child will stop crying on listening to voice. When the nurses come and go inside the room, the child starts crying on hearing the sound of the doors when shut. With that I could confirm the hearing ability” (FGD 5- participant 8).*

#### **4. Prenatal, Perinatal and Postnatal risk factors for Hearing Loss**

To gain insight into the mothers’ knowledge about risk factors for hearing loss, “word coding” of the transcribed conversation was carried out. Most common risk factors reported were consanguinity (which was mentioned 7 times) followed by malnutrition of expectant mothers (which was mentioned 6 times).

*“If we marry within blood relations, such things (hearing loss) occur” (FGD 2- participant 5).*

A few mothers reported that they were not aware of the risk factors leading to hearing loss. Figure 1 shows the risk factors for hearing loss as reported. Knowledge about consanguinity and maternal malnutrition during pregnancy was high and it was thought that these could cause even other types of disability.

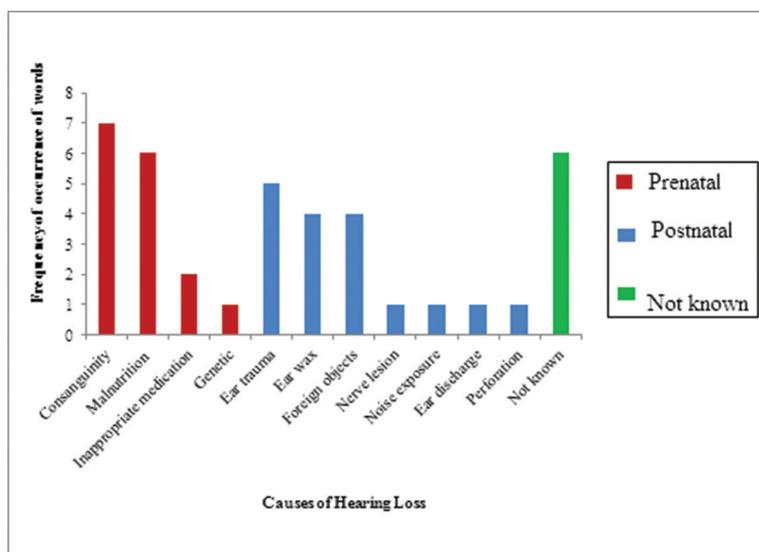
Beliefs such as expectant mothers doing work during the solar eclipse, leading to congenital malformation of the ear, lip or face, were reported. In order to prevent disability such as hearing loss in unborn children, participants reported that pregnant women were not allowed to strain boiled rice or go out of the house during the solar eclipse.

*“If a child is born on an eclipse day, it might be born with its head and ear tilted. Even lips will be raised (referring to cleft lip and palate)” (FGD 6 - participant 1).*

*“When you filter the boiled water when cooking rice, (pregnant women) should not cover it with lid. If you do that, you will get children born with closed ears or mouth”*(FGD 4- participant10).

Other prenatal risk factors for hearing loss such as maternal infections and iodine deficiency were not reported. Perinatal risk factors such as low birthweight, hypoxia, jaundice, infections, and ototoxicity of hearing loss, and postnatal factors such as otitis media, measles and mumps, were not mentioned. A few mothers believed that ear discharge when treated with ear drops resolved the condition and therefore was not a risk factor for hearing loss.

**Figure 1: Reported Causes of Hearing Loss by Mothers**



## 5. Consequences of Hearing Loss

Majority of the mothers were aware of the consequences of hearing loss for a child. They reported that the child with hearing loss would have difficulty in learning, understanding verbal instructions, and leading an independent life. A few mothers reported problems with verbal expression, and psychological problems such as being aloof, low confidence levels and frustration.

*“Even if you try to teach the child, the child is not going to hear”* (FGD1- participant 8).

*“It is a matter of great difficulty when you take the child out. The child is not going to hear when the bus conductor is asking for something while issuing the ticket. One must touch the child”* (FGD 3- participant 8).

*“The child’s mental health will be very much impaired. The child will find it very difficult to play with other children”* (FGD 4 - participant 6).

*“The child will feel inferior when compared with other children”* (FGD 5 - participant 2).

## **6. Professionals and Services for Children with Hearing Impairment**

The general opinion among mothers was that a paediatrician should be approached for any medical problem concerning children, including ailments related to hearing. However, few were aware that Ear, Nose and Throat (ENT) specialists were medical professionals for ear treatment. None were aware of audiologists and their role in ear and hearing healthcare.

It was evident that the majority of mothers were aware that hearing aids could be fitted for children with hearing impairment. Consensus of the group was that hearing aids were fitted only after 1 year of age. They believed that once a child was equipped with a hearing aid, he/she could hear normally and therefore could go to regular school. No mother reported the need for rehabilitation or intervention after fitting the hearing aid.

Only a few of the mothers were aware of the availability of special schools. One mother reported surgery or cochlear implantation as a treatment option for hearing impairment. However, another mother contradicted her and said that surgeries were meant for adults and not for children. A few mothers reported the availability of government allowances for children with hearing impairment. One mother reported that there are facilities and allowances for people with disabilities but none were available for individuals with hearing impairment.

*“There are allowances for people with disability but none of them are bothered about people with hearing impairment”* (FGD 3 - participant 8).

Table 1 summarises the participants’ correct knowledge, inferred gaps in knowledge and misconceptions about ear and hearing healthcare.

**Table 1: Summary of Mothers' Knowledge and Beliefs regarding Ear and Hearing Healthcare**

Area	Correct knowledge	Inferred gaps in knowledge	Misconceptions
Ear care	Use of instruments (such as hairpin, safety pin, key, stick, etc) will harm the child's ear.	Ear buds should be avoided for cleaning ears.	Practices like pouring herbal juices for removal of insects in ear.
Methods to identify normal hearing in children	Response to name call, understanding verbal instructions, startles at loud sounds.	Normal speech development in children is an indicator for normal hearing.	–
Age of identification of hearing ability	–	Hearing ability can be ascertained at birth.	–
Causes of hearing loss	Following conditions lead to hearing loss: Consanguinity, malnutrition of expectant mothers, ear wax, and ear trauma.	Causes of hearing loss such as <b>Prenatal causes:</b> Infections to expectant mothers. <b>Perinatal causes:</b> Low birthweight, hypoxia, jaundice, infections, ototoxicity. <b>Postnatal causes:</b> Otitis externa, chronic otitis media, measles, mumps, ototoxicity, noise exposure	Ear discharge is a condition to be treated but not a cause of hearing loss.  Pregnant women doing work at home or outside during pregnancy can cause malformations of the ear.
Consequences of hearing loss	Children with hearing loss have difficulty in understanding verbal instructions, in pursuing education and leading an independent life.	Hearing loss could affect speech development.	–

Area	Correct knowledge	Inferred gaps in knowledge	Misconceptions
Procedures for hearing testing	–	Hearing can be tested at birth.  Test procedures are available for hearing testing.	Hearing can be tested only when the child starts speaking.
Ear and hearing healthcare professionals	E.N.T specialists as professionals for ear and hearing healthcare.	There are professionals (Audiologists) who are involved in hearing evaluation and rehabilitation.	–
Services for persons with hearing loss	Appliances such as hearing aids can be used for hearing loss.  Special schools are education options for children with hearing impairment.	Allowances/ concessions are available for children with hearing impairment.  Child with hearing loss needs training in hearing.  Hearing aids can be fitted at less than one year of age.	–

## DISCUSSION

From the discussion on ear care, it is inferred that mothers were aware that cleaning a child's ear with instruments (such as a safety pin, key or stick) would cause damage. However, the use of herbal juice and oil to remove insects from the ear seems to be a common practice. Practices like pouring mother's milk, neem or garlic oil into the ear, and going to tantric and faith healers for ear diseases have been reported even in an urban community in North India (Gupta et al,

2010). In a rural South Indian community, high prevalence of otitis media was attributed to earache being disregarded (26.4%) or treated with home remedies (67.2%) by most caregivers, while a doctor's opinion was often sought for ear discharge (50%) (Srikanth et al, 2009). Such misconceptions seem to exist in both rural and urban areas, emphasising the need for health education regarding ear care in general.

Regarding identification of hearing status, majority of the mothers mentioned "response to name call" as an indication of normal hearing; however, none directly reported the achievement of normal speech milestones as being related to normal hearing. Similar findings were reported in a questionnaire-based study conducted in rural West Bengal. The authors reported that suspicion of hearing loss was aroused mostly by "no response to name call" (65.6%), followed by "no response to clap" (13.4%), and only 10% reported "lack of speech development" (Rout & Singh, 2010). This would suggest that since delay in a child's speech development may not arouse suspicion, it could lead to delayed identification of hearing loss. Hearing loss in children was associated with "deafness" and it is possible that mothers therefore missed the subtle symptoms of partial or unilateral hearing loss in speech. This may have also influenced their beliefs regarding the consequences of hearing loss, as difficulty in leading independent lives, psychological problems and educational difficulties were reported. Studies have shown that parental concern was low regarding detection of minimal or mild hearing loss in their child (Cone et al, 2010). It is imperative that hearing screening programmes for infants and young children focus on identification of mild to moderate hearing loss. Information, education and communication to parents and caregivers should reinforce the possibility of partial and / or unilateral hearing loss in children, and highlight milestones of hearing and speech development.

In this study, the responses of mothers regarding age of hearing testing suggests that there is a misconception that normal hearing ability can be ascertained only when the child can voluntarily respond (e.g. localisation, saying "I can hear", or by comprehending verbal instructions). The belief that hearing ability can be ascertained only when the child is older, could be detrimental to early identification and intervention. It is important to educate the community about objective hearing testing methods that can be carried out even at birth, so that there is a change in attitude. In a study done in rural West Bengal in India, Rout et al (2010) reported that though children's caregivers first suspected hearing loss

at the mean age of 1.5 years, the first visit to the doctor was at a mean age of 2.4 years and consultation with an audiologist was at a mean age of 9.3 years. Hence, information about early diagnosis and early intervention should be provided to the community.

Majority of the mothers acknowledged consanguinity as a prenatal risk factor for hearing loss; however, awareness about peri- and postnatal factors was limited. A study in a tertiary care hospital in an urban city of South India, shows a similar high rate of awareness regarding consanguinity (64.1%) as a risk factor for hearing loss, followed by noise exposure (61.2%), ear discharge (57.3%), and family history (53.4%) (Revathy et al, 2014). Among Nigerian and South African mothers, poor awareness regarding medications, asphyxia, jaundice, measles and preterm/ low birthweight as a risk factor for hearing loss has been reported (Olusanya et al, 2006). The findings of this study and review of literature suggests that this lack of knowledge exists in developing countries, and therefore should be addressed in all public awareness programmes on ear and hearing health.

In a study among residents of an urban locality in New Delhi, awareness about preventable causes of deafness such as ear infections, trauma and any infection during pregnancy has been reported (Gupta et al, 2010). However, they were unaware that being hit on the ears, excessive use of headphones to listen to loud music and indiscriminate use of ear buds could be harmful. In contrast, among mothers in this rural community there was a lack of awareness regarding preventable causes. The difference could be attributed to better health-related awareness in cities. Also, superstitious beliefs did exist about risk factors for hearing loss and other disabilities, such as the ill effect of solar eclipses and pregnant women carrying out certain household chores. Similar superstitious beliefs were also reported in South Africa (Swanepoel et al, 2008). Misconceptions regarding risk factors should be corrected through culture-specific strategies and the community should be sensitised to prenatal, perinatal and postnatal factors responsible for hearing loss.

While it is encouraging to note that some mothers were aware of ENT specialists, in general there was limited awareness about professionals and services available for individuals with hearing impairment. It is not surprising that mothers from rural areas were unaware of the ear and hearing healthcare professionals, as specialists are almost non-existent in rural areas. The majority believed that fitting a hearing aid solved the hearing loss. The need for intervention after identification should be emphasised in the community. As the paediatrician is

the first medical professional that a mother may interact with, it is important that this group of professionals be sensitised to early identification and intervention for hearing loss.

## CONCLUSION

This study was carried out to gain insights into the knowledge and beliefs about ear and hearing health in a rural community where it was proposed to have a hearing screening programme for infants and young children. The objective was to use the information obtained to incorporate appropriate messages into the sensitisation and counselling of the community by village health workers.

The results of the study suggest that while mothers in this rural community were knowledgeable regarding some aspects of ear and hearing healthcare, lack of information and misconceptions were also prevalent. For greater compliance with the community-based programme aimed at identification of hearing loss in children, it is important to use the existing knowledge of these mothers. Simultaneously, attempts should be made to fill in the gaps in knowledge and work towards dispelling prevalent myths.

In the proposed hearing screening programme, screening in the villages will be conducted by VHWs who will be in close and constant contact with the community. They will be trained to provide the following information on ear and hearing healthcare:

1. Prior to hearing screening, meetings will be conducted in every village at the Balwadi (pre-school) to sensitise parents about:
  - a. Risk factors for hearing loss, such as low birthweight, hypoxia, jaundice, maternal infections, and hearing loss due to untreated ear infections.
  - b. Speech and language development as an indicator of hearing ability.
  - c. Possibility of partial and unilateral hearing loss other than 'Total' deafness.
2. In order to dispel the misconception that hearing can be tested only when the child is old enough to respond verbally, the VHWs will inform the community about the availability of hearing testing methods that are objective and suitable for newborns. This is expected to improve participation in the screening.

3. Before the screening, in order to capitalise on the mothers' knowledge about informal assessment of hearing, questions on behavioural response to sounds will be incorporated in the case history.

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## REFERENCES

- Cone BK, Wake M, Tobin S, Poulakis Z, Rickards FW (2010). Slight-mild sensorineural hearing loss in children: audiometric, clinical and risk factor profiles. *Ear Hear J*; 31(2): 202-12. <http://dx.doi.org/10.1097/AUD.0b013e3181c62263>. PMID:20054279
- de Andrade V, Ross E (2005). Beliefs and practices of Black South African traditional healers regarding hearing impairment. *International Journal of Audiology*; 44(9): 489-99. <http://dx.doi.org/10.1080/14992020500188999>. PMID:16238179
- Francozo F, Fernandes JC, Lima MC, Rossi TR (2007). Improvement of return rates in a neonatal hearing screening programme: the contribution of social work. *Social Work in Health care*; 44(3): 179-190. [http://dx.doi.org/10.1300/J010v44n03\\_04](http://dx.doi.org/10.1300/J010v44n03_04). PMID:17548274
- Garg S, Chadha S, Malhotra S, Agarwal AK (2009). Deafness: burden, prevention and control in India. *The National Medical Journal of India*; 22(2): 79-81. PMID:19852345
- Garg S, Laskar AR (2010). Community-based monitoring: key to success of national health programs. *Indian J Community Med*, 35(2): 214-216. <http://dx.doi.org/10.4103/0970-0218.66857>. PMID:20922094. PMCid:PMC2940173
- Gupta N, Sharma A, Singh PP (2010). Generating an evidence base for information, education and communication needs of the community regarding deafness: a qualitative study. *Indian Journal of Community Medicine*; 35(3): 420-423. <http://dx.doi.org/10.4103/0970-0218.69275>. PMID:21031110. PMCid:PMC2963883
- Kumar S (1997). Deafness and its prevention - Indian scenario. *Indian J Paediatr*; 64: 801-9. <http://dx.doi.org/10.1007/BF02725502>. PMID:10771923
- Olusanya BO (2000). Hearing impairment prevention in developing countries: making things happen. *International Journal of Paediatric Otorhinolaryngology*; 55: 167-171. [http://dx.doi.org/10.1016/S0165-5876\(00\)00392-X](http://dx.doi.org/10.1016/S0165-5876(00)00392-X)
- Olusanya BO, Luxon LM, Wirz SL (2006). Maternal views on infant hearing loss in a developing country. *Journal of Paediatrics Otorhinolaryngology*; 70(4): 619-623. <http://dx.doi.org/10.1016/j.jjporl.2005.08.004>. PMID:16154646

- Revathy R, Selvarajan HG, Rajendran A, Ninan B (2014). Grandmothers' perspectives on hearing loss in children and newborn hearing screening. *Indian Journal of Otology*; 20(1): 20-23. <http://dx.doi.org/10.4103/0971-7749.129803>
- Rout N, Singh U (2010). Age of suspicion, identification and intervention for rural Indian children with hearing loss. *Eastern Journal of Medicine*; 15: 97-102.
- Scheppers E, Dongen EV, Dekker J, Geertzen J, Dekkere J (2006). Potential barriers to the use of health services among ethnic minorities: a review. *Family Practice*; 23: 325-348. <http://dx.doi.org/10.1093/fampra/cmi113>. PMID:16476700
- Srikanth S, Rita I, Rebekah G, Rupa V (2009). Knowledge, attitude and practices with respect to risk factors for otitis media in a rural South Indian community. *International Journal of Paediatric Otorhinolaryngology*; 73: 1394-1398. <http://dx.doi.org/10.1016/j.ijporl.2009.06.024>. PMID:19640593
- Swanepoel D, Almec N (2008). Maternal views on infant hearing loss and early intervention in a South African community. *Audiology*; 47(1): 44-48. <http://dx.doi.org/10.1080/14992020802252279>. PMID:18781513
- World Health Organisation (2010). *Community-based rehabilitation: CBR guidelines*. World Health Organisation.

## APPENDIX I

### Focus Group questions (Translated from Tamil)

#### A. Ear care

1. How do you keep your child's ears clean?
2. What do you all do when any object or insect goes inside the ear?

#### B. Causes & prevention of hearing loss, specific to early childhood hearing loss

3. What according to you are the reasons for a child to have hearing loss?
4. How do you think hearing loss can be prevented?

#### C. Hearing assessment

5. How will you ascertain that the child is able to hear?
6. At what age can hearing ability of a child be assessed?
7. People may have complete loss of sight or some can see partially; are you aware of any such thing for hearing loss? How will you come to know about it?
8. What will you do if your child has any problem in hearing?
  - 1) Do you know anything about hearing testing?
  - 2) At what age can a child's hearing be tested?
  - 3) Are you aware of any specialist or professionals for ear and hearing?

#### D. Consequences/ Signs of hearing loss

9. What do you feel are the consequences of hearing loss?

#### E. Hearing rehabilitation (Hearing aid/ surgery/ education)

10. What can be done for children with hearing loss?
11. Are you aware of any schemes for persons with hearing loss?