

# Ear diseases pattern and hearing impairment in the Eastern Nepal- A study in a combined eye and ear set up

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## ABSTRACT

**Background:** This is a prevalence study of ear diseases and hearing impairment done in a combined eye and ear set up of Biratnagar Eye Hospital. This study was conducted in the Sunsari and Morang districts of Nepal. Its aim is to find out the ear disease and hearing impairment prevalent in the community. **Materials and Methods:** A total of 2259 people who visited eye camps were screened for ear diseases. Patients were examined by the eye and ear assistants under supervision of otolaryngologist. A head mirror, an otoscope, an aural syringe, kidney trays and light source and a set of tuning forks (512 and 256 Hz) were used to assess the ear diseases and hearing loss. **Results:** A total of 1094 patients presented with ear diseases. Males were more than females [608(55.42%) vs. 486(44.57%)]. Children up to and below 15 years were 386 (35.28%). The frequency of ear diseases were as follows: Impacted wax- 319 (29.15%), chronic suppurative otitis media mucosal type - 307(28.06%), otomycosis - 66 (6.03%), furunculosis/otitis externa - 46 (4.29%), Acute suppurative otitis media - 46 (4.2%), tubal catarrhal - 34(3.1%), otitis media with effusion - 24 (2.19%), perichondritis - 21(1.91%), Unsafe otitis media - 14(1.27%), Foreign body in the ear - 4 (0.36%) cases, Posttraumatic perforation of tympanic membrane - 2 (0.18%), deaf and mute - 12 (1.09%). presbycusis and other sensorineural hearing loss- 199(18.19%). The point prevalence of otitis media was 17.3% (391) people. Hearing impairment was 64.99 % (635 out of 977 patients above 5 years). **Conclusion:** Ear diseases and hearing impairment are very common in Sunsari and Morang districts of Nepal demanding immediate treatment.

**Key words:** Hearing impairment, Ear diseases, Combined eye and ear setup, Eastern Nepal

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## INTRODUCTION

360 million people worldwide have disabling hearing loss and 50% of them are preventable. This is approximately 5.3% of the world population. 32 million of these are children of less than 15 years.<sup>1</sup> The World Health Organization has indicated that a prevalence rate of chronic suppurative otitis media greater than 4% in a defined population of children is indicative of a massive public health problem requiring urgent attention.<sup>2</sup>

Chronic suppurative otitis media (CSOM) is one of the most common ear diseases in South East Asia having

a prevalence of approximately, 5.2% in the general population.<sup>3</sup> Nepal is a landlocked developing country and has been listed as one of the least developed nations by United Nations.<sup>4</sup> It is ridden with illiteracy, poverty and sociopolitical problem. It has very poor medical system with lack of manpower, medicine, instruments and facilities.<sup>5</sup> 2011 (2068) census shows the hearing disability to be 15.45% out of 1.94% total disability in the Nepalese population. 1.48% suffers with a combined hearing loss and vision impairment. Speech problem was seen in 11.5%.<sup>6</sup>

In 1991, BRINOS/TUTH reported 16.6% hearing loss in general Nepalese population. Thirty-two percent of

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hearing impairment was associated with otitis media, which was more common in children.<sup>7</sup> A study carried out by BP Koirala institute of health sciences in Sunsari district of Eastern part of Nepal showed a prevalence of otitis media in 10.3% among those surveyed in health examination camp.<sup>8</sup> A community oriented study was conducted in Eastern Nepal to find out the awareness in population about the ear disease, its impact on personal and socioeconomic life. The result showed the management of ear diseases to be very poor.<sup>9</sup>

The associated hearing loss due to otitis media has a life-long impact as it occurs during speech and language development and the early school years.<sup>10</sup> A recent study in Nigeria has concluded that hearing loss due to chronic suppurative otitis media had an adverse effect on the academic performance of the children.<sup>11</sup>

Most of the ENT surgeons (nearly 75%) are in capital. In the Eastern part of Nepal, the availability of ENT surgeon with surgical facility in government institution is very less. Private set up is not easy to afford for most of the people. In addition most of the people live in rural areas and are not aware of the consequences of ear disease. So the available facility is also not utilized to its maximum. Hence there is a need for community oriented ear care programme that would go up to the door of these sufferers and manage their ailments. In 2001, in rural areas of western Nepal, community ear assistants and volunteers were found to be very effective for ear care delivery.<sup>12</sup> Also in New Delhi, India in 2010, Dr. Shroff's charity eye hospital evaluated integration of eye and ear care at primary level and found it to be very effective.<sup>13</sup>

In view of above background, in January 2012, as a pilot project, Biratnagar Eye Hospital (combined eye and ear programme) took an initiative for setting up of community oriented primary ear and hearing care services in conjunction with existing eye setup to address the ear care needs of underprivileged and marginalized section of the Eastern Nepalese society to achieve the mission as outlined in SOUND HEARING 2030.<sup>14</sup>

### Aims and objectives

To assess the ear diseases and hearing impairment prevalent in the Sunsari and Morang districts of Eastern Nepal with the help of eye and ear assistants of Biratnagar Eye Hospital in a combined eye and ear setup.

## MATERIALS AND METHODS

This pilot project was a cross-sectional study conducted on a total of 2259 people in the year 2012. Eye Camps in the

district of Sunsari and Morang were organized at various remote areas all throughout the year. Together with the eye camp, 45 ear camps were also organized. The set up for eye camp was utilized. Those patients who complained of hearing loss and ear problems were examined by the eye and ear assistants under supervision of consultant otolaryngologist. Three eye care workers were trained for 3 months at Tribhuvan university teaching hospital, Kathmandu and oriented for detection of ear diseases and use of tuning fork to screen hearing loss. They were equipped with a head mirror, an Otoscope, a set of tuning forks, an aural syringe, kidney trays and light source. After detailed history and Physical examination, hearing loss was assessed by tuning fork. The Weber and the Rinne's test were performed with the 512 and 256 Hz tuning fork. These tests were done before syringing and other procedures as WHO criteria. Appropriate primary management was advised at community level. Syringing was done for cases of ear wax. Health education regarding awareness of ear diseases, aural hygiene and ear care precautions was given. Appropriate referrals for further assessment, surgical and rehabilitative management to the needy was done. The importance of improved and hygienic living conditions, nutrition, immunization, ear cleaning and avoidance of water entry in the ear was emphasized.

The results were tabulated and statistical analysis was done in frequency and percentage.

## RESULTS

1094 people (including 386 children up to 15 years), with definite ear ailments and hearing loss were identified (Table 1).

Males 608(55.42%) were more common than females 486(44.57%). Point prevalence of otitis media was found

**Table 1: Ooscopic findings of patients with ear problems**

Diagnosis	Male	Female	Total	Percentage
Tubal catarrhal	13	21	34	3.10
Ome	15	9	24	2.19
Asom	26	20	46	4.20
Csomtt	173	134	307	28.06
Csoma	8	6	14	1.27
Furunculosis/otitis externa	30	16	46	4.20
Perichondritis	7	14	21	1.91
Impacted wax	179	140	319	29.15
Otomycosis	28	38	66	6.03
Foreign body ear	3	1	4	0.36
Traumatic perforation	1	1	2	0.18
Presbycusis, ?Snhl	117	82	199	18.19
Deaf/mutism	8	4	12	1.09
Total	608	486	1094	100
Percentage	55.57	44.42	100	

in 17.3 % (391). One hundred seventy-three (44.24%) of these were children with otitis media. The commonest pathology found was impacted wax in 319 (29.15%) followed by chronic suppurative otitis media mucosal type in 307 (28.06%) patients. Unsafe otitis media was found in 14 (1.27%) only. Acute suppurative otitis media in 46 (4.2%), otitis media with effusion in 24 (2.19%) and tubal catarrhal in 34 (3.1%) were other pathologies found. Various infections like otomycosis in 66 (6.03%), furunculosis/otitis externa in 46 (4.29%) and perichondritis in 21 (1.91%) patients were seen in the community. Foreign body in the ear was found in 4 (0.36%) cases. Posttraumatic perforation of tympanic membrane was found in 2 (0.18%) patients. Twelve (1.09%) children and adults were found to be deaf and mute. Age related hearing loss-presbycusis and other sensorineural hearing loss- suspected was found in 199 (18.19%) of those attending the camps and most were elderly who needed hearing aids.

Three hundred eight-six (35.28%) of those affected were children up to and below 15 years (Table 2). On analyzing them separately, the commonest pathology was impacted wax in 156 (40.41%). Chronic suppurative otitis media, mucosal was found in 117 (30.31%). The frequency of acute suppurative otitis media was in 35 (9.06%) and otitis media with effusion was found to be in 16 (4.14%). Unsafe otitis media was found in 5 (1.29%) children complaining of continuous and foul smelling discharge from the ear. Otomycosis was seen in 11 (2.84%) children. Various other infections like furunculosis/otitis externa in 23 (5.95%) and perichondritis in 9 (2.33%) was seen. Suspected congenital hearing loss was found in 7 (1.81%) children. Post traumatic perforation was seen in 1 (0.25%).

The hearing analysis was done using tuning fork 512 Hz and hearing loss was recorded in 64.99% (635 out of 977 patients

above 5 years who could understand the instructions). However use of audiometer would have helped in quantifying the degree and classifying the type of hearing loss.

A total of 211 cases (19.28 %) of suspected Sensorineural hearing loss (age related and other causes) were identified.

## DISCUSSION

Utilization of eye set up for ear care was a new experience. WHO promotes combining eye and ear services for tackling the problem of hearing loss.<sup>2</sup> WHO together with CBM and other NGO's have launched the program of Sound Hearing 2030 for South East Asia with aim of reducing the prevalence of hearing loss with the philosophy of combining eye and ear services.<sup>14</sup> Similar program was done by Shroff's Eye hospital in Daryaganj, New Delhi and they found that combining eye and ear services were very effective.<sup>13</sup>

The commonest disease found was impacted wax, as a whole both in all age groups included and in those below and equal to 15 years. The high incidence is similar to the findings as in the studies done in Nepal and Nigeria.<sup>15-19</sup>

Chronic suppurative otitis media was the next commonest disease in both the groups. Acute suppurative otitis media and otitis media with effusion were also common, more in the children of 15 years and below. The other studies conducted in Nepal also showed the similar results.<sup>7-9,15,18,19</sup> Most of the studies done in Nepal has shown chronic otitis media to be very common in the population screened.<sup>9,12,15</sup>

Overall, in this survey, point prevalence of otitis media was found in 17.3% (391). 173 (44.24%) of these were children of 15 years and below. Zakzouk and al-Muhaimed also showed similar high incidence of otitis media in their study (19.6%).<sup>20</sup> A cross-sectional, clinical and epidemiological study in Kolkata and Hooghly revealed middle ear pathology to be more common in rural area (20%) compared to (12.6%) in urban areas.<sup>21</sup> Amin et al found chronic otitis media to be 18.46% to 35.58% in four rural ENT camps done in Bangladesh.<sup>22</sup> Other studies in Eastern Nepal have documented a prevalence of otitis media ranging from 10.3% to 13.2%.<sup>8,15,23</sup> Contrary to these studies, a relatively low incidence was observed by Kalpana and Chamyal (4.75%).<sup>24</sup> A relatively high incidence of otitis media in our study could be because we had targeted those interior most rural areas where proper treatment was not available, similar to the study in rural areas by Bandyopadhyay et al and Amin et al.<sup>21,22</sup>

The problem of hearing impairment and ear pathologies was more common in lower socioeconomic group, in the

**Table 2: Ooscopic findings of patients of age 15 years and below**

Diagnosis of upto 15 years	0-5 years		>5-15 years		Total	Percentage
	M	F	M	F		
Tubal catarrh			2	3	5	1.29
Ome	4	3	6	3	16	4.14
Asom	10	9	9	7	35	9.06
Csomt	7	9	54	47	117	30.31
Csoma			3	2	5	1.29
Furunculosis/ otitis externa	3	4	11	5	23	5.95
Perichondritis		1	2	6	9	2.33
Impacted wax	34	28	60	34	156	40.41
Foreign body	1				1	0.25
Posttraumatic perforation				1	1	0.25
Deaf/mutism	2		3	2	7	1.81
Otomycosis	1	1	3	6	11	2.84
Total	62	55	153	116	386	100

study done by Upadhyay and Maharjan.<sup>8,15</sup> Poor nutrition, incomplete immunization and unhygienic living conditions could be responsible for this susceptibility to otitis media and various ear infections of these children.<sup>8,9,15</sup> The habit of bathing in ponds and not following the precautions to avoid water entry like use of cotton and cream or ear plugs in cases of infection of ears could be the cause for recurring and persisting ear discharge. Warm and humid weather, scratching of ears with sticks, twigs, metal or pencils might lead to these different infections in the ears like otomycosis, otitis externa, furunculosis and perichondritis.<sup>8,9,15</sup>

In 1991, BRINOS/TUTH reported 16.6% hearing loss in general Nepalese population. Thirty-two percent of hearing impairment was associated with otitis media, which was more common in children.<sup>5</sup>

Our study revealed hearing loss in 64.99% of the study population. Upadhyay also showed hearing loss in 65.33% of their study population.<sup>9</sup> However even mild hearing loss was taken in to consideration in our study as well as in study by Upadhyay. However we had not used audiometer and only tuning fork was used to screen the hearing loss.

Our study has shown prevalence of presbycusis and suspected sensorineural hearing loss to be 18.19%. The prevalence of hearing impairment in adult population in southern Taiwan in a study was 21.4%.<sup>25</sup> However, in a Korean study where subjects aged 65 years and above was screened, the incidence of presbycusis was 37.8% and 8.3% for  $\geq 27$  dB HL criterion and  $\geq 41$  dB HL criterion, respectively.<sup>26</sup>

Lack of manpower and resources can adversely affect the treatment and prevention of hearing impairment. It would take years to train the manpower and build a separate infrastructure. However, by the use of existing infrastructure and resources, as in this study, we can train the existing eye care workers who are already involved in managing the patients. They can be trained to detect hearing loss and ear diseases. They can also provide primary treatment. Appropriate referrals can be made for the needy. As the awareness regarding existence and impact of hearing loss and ear diseases is poor in the community, health education about early detection and prevention of hearing impairment can be given.<sup>8,9,15</sup> This model could be helpful in reducing prevalence of hearing impairment early and in a cost effective manner as outlined by the goals of Sound Hearing 2030.<sup>14</sup>

## CONCLUSION

Ear diseases and hearing impairment are very common in Sunsari and Morang districts of Nepal demanding immediate treatment.

## Limitation and further scope of the study

This is a pilot study. Random sampling technique was not performed. With this data, further large population of Sunsari and Morang districts can be taken to find out the exact prevalence of ear diseases and hearing impairment. Only tuning fork was used to assess the hearing impairment. Further detailed objective assessment of hearing impairment and ear diseases in the community should be done. Further detailed studies should be done to find out the feasibility of an integrated eye and ear care program.

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**Authors Contribution:**

**Thakur SK** – designed and conducted the study, tabulated and analysed the data, drafted and reviewed the manuscript; **Singh SK** – Contributed to the study design and reviewed the manuscript; **Mahato B** – Contributed to the study design and reviewed the manuscript; **Singh A** – Contributed to the conduction and tabulation of the study.

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