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Hearing impairment in rural area of Himalaya: prevalence and etiology

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ABSTRACT

Background: Hearing impairment is most frequent sensory deficit in human population. The disease burden estimations based on sound epidemiological research provide the foundation for appropriate public policy focus and measures for effective management of disease conditions. Data regarding the magnitude of hearing impairment in our country is limited and the literature search revealed that no such studies have been conducted in this region.
Methods: A community based cross sectional observational study was carried out among the 306 individuals in rural area of Shimla district, Himachal Pradesh. Information was obtained by a structured questionnaire, clinical ENT examination and audiological tests after obtaining informed consent.
Results: The study group had 52.6% males and 47.4% females. Maximum 26.5% of individuals were in the age group of 31-45 years. Mean age was 36.56±18.83. The prevalence of hearing impairment was 16.7%. Among individuals with hearing loss, maximum 52.9% were in the age group of ≥60 years. Sensorineural hearing loss was found in 68.6%, maximum 56.9% had mild hearing loss. Among majority of individuals with hearing loss cause was presbyacusis 52.9% followed by infectious ear disease 33.3%.
Conclusions: In the present study, prevalence of hearing loss was found to be 16.7% and predominantly mild sensorineural or conductive type of hearing loss. An early intervention and quality patient education is necessary for prevention of hearing impairment in majority of cases.

Keywords: Hearing loss, Prevalence, Rural, Presbyacusis, Sensorineural

INTRODUCTION

Hearing impairment is most frequent sensory deficit in human population. Consequences of hearing impairment leads to inability to understand speech sound, decreased capability to communicate, delay in language development, economic and educational backwardness, social isolation and stigmatization.[1] The disease burden estimations based on sound epidemiological research provide the foundation for appropriate public policy focus and measures for effective management of disease conditions. Which diseases and what interventions does public policy need to focus upon are normally derived from such evidences.[2] Hearing loss is hearing impairment of various degrees. Early screening for hearing loss and early rehabilitation is recommended to reduce the disability caused by hearing impairment.[3] The ability to communicate is a crucial aspect of human life as auditory sense is very important for communication of any kind. It is indispensable for normal mental development of a child. Hearing impairment and deafness acquire a special significance as a large percentage of population affected are children.[4] In India, 63 million people (6.3%) suffer from significant auditory loss. A lack of skilled manpower and human resources make this problem a huge challenge. The Government of India has

launched the National Programme for Prevention and Control of Deafness (NPPCD).[5] Data regarding the magnitude of hearing impairment in our country is limited and the literature search revealed that no such studies have been conducted in Himachal Pradesh. Thus, our study is an attempt to determine the prevalence and determinants of hearing impairment among rural population of Shimla district.

METHODS

This community based observational cross sectional study was carried out by the department of Otorhinolaryngology - Head and Neck Surgery, IGMC Shimla, over a period of 1 year from July 2015 to June 2016 in rural area of Shimla district, Himachal Pradesh.

Based on earlier studies and available literature, the prevalence of hearing impairment was found to vary from 5% to 17% in different parts of India. Assuming an average prevalence of 10%, absolute precision of 5% and 95% confidence interval with design effect of 2, sample size was calculated to be 278. Considering 10% non-response, the total sample size required was 306.

Multistage cluster sampling technique was used at the following levels in rural area. One Block area of Shimla district, Himachal Pradesh was selected. All villages in the Block listed and 10 villages were selected by simple random sampling. The households in the 10 selected villages were covered based on the size of village in proportionate manner.

All persons who were willing to participate were enrolled into study after taking informed written consent. Information was obtained by a structured questionnaire, clinical ENT examination and audiological tests.

All the data was entered into Microsoft excel format and SPSS software.

RESULTS

Total of 306 individuals were studied in different age groups, with minimum age 6 months and maximum age 90 years (mean age 36.56±18.83). Individuals were distributed into different age groups. Maximum number of individuals were in the age group of 31-45 years 81 (26.5%), 67 (21.9%) individuals were in the age group of 16-30 years, 66 (21.6%) in the age group of 46-59 years, 50 (16.3%) in the age group of 0-15 years and 42 (13.7%) in the age group of ≥60 years (Table 1).

Out of total 306 individuals, 161 (52.6%) were male and 145 (47.4%) were female (Table 2).

Maximum individuals 220 (71.9%) had medium standard of living, 74 (24.2%) individuals had high standard of living and low standard of living in 12 (3.9%) individuals (Table 3).

Table 1: Age group wise distribution (N =306).

Age (in years)	N (%)
0 – 15	50 (16.3)
16 – 30	67 (21.9)
31 – 45	81 (26.5)
46- 59	66 (21.6)
≥60	42 (13.7)

Table 2: Sex distribution (N =306).

Sex	N (%)
Male	161 (52.6)
Female	145 (47.4)

Table 3: Socioeconomic status (N =306).

Socioeconomic status	N (%)
High standard of living	74 (24.2)
Medium standard of living	220 (71.9)
Low standard of living	12 (3.9)

Table 4: Hearing loss (N =306).

Status of hearing	N (%)
No hearing loss	255 (83.3)
Right ear	10 (3.3)
Left ear	6 (2)
Both ears	35 (11.4)

Table 5: Type of hearing loss (n =51).

Type	n (%)
Conductive hearing loss	16 (31.4)
Sensorineural hearing loss	35 (68.6)

Table 6: Degree of Hearing loss (n =51)

Degree	n (%)
Mild hearing loss	**29 (56.9)**
Moderate hearing loss	**14 (27.5)**
Severe hearing loss	**6 (11.8)**
Profound hearing loss	**2 (3.9)**

Among 255 (83.3%) individuals there was no hearing loss, hearing loss in right ear in 10 individuals (3.3%), hearing loss in left ear in 6 individuals (2%) and hearing loss in both ears in 35 individuals (11.4%). So the prevalence of hearing loss in the rural area was found to be 16.7% (Table 4).

Out of 51 (n) individuals with hearing loss maximum were in the age group of ≥60 years 27 (52.9%) followed by 9 (17.6%) in 16 -30 years, 6 (11.8%) in 46-59 years, 5 (9.8%) in 0-15 years and 4 (7.8%) in 31-45 years age group. Out of 51 individuals with hearing loss, 29 (56.9%) were male and 22 (43.1%) were female. In 51 individuals with hearing loss, maximum had medium

standard of living 40 (78.4%) followed by 9 (17.6%) high standard of living and 2 (3.9%) low standard of living.

In 51 individuals with hearing loss, sensorineural was found in 35 (68.6%) and conductive in 16 (31.4%) (Table 5).

Out of 51 individuals with hearing loss, mild hearing loss was present in 29 individuals (56.9%), moderate hearing loss in 14 (27.5%), severe hearing loss in 6 (11.8%) and profound hearing loss in 2 (3.9%). Maximum individuals had mild degree of hearing loss (Table 6).

Table 7: Etiology of hearing loss (n =51).

Etilogy	n (%)
Infectious ear disease (ASOM/CSOM/Cholesteatoma)	17 (33.3)
Trauma	1 (2)
Ototoxicity	1 (2)
Noise exposure	1 (2)
Presbyacusis	27 (52.9)
Congenital	1 (2)
Systemic diseases	1 (2)
Cause cannot be determined	2 (3.9)

Table 8: Further action (n =51).

Action	n (%)
No action	17 (33.3)
Medication	3 (5.9)
Corrective middle ear / mastoid surgery – urgent	1 (2)
Corrective middle ear / mastoid surgery – non urgent	14 (27.5)
Hearing aid	12 (23.5)
Probable cochlear implant	1 (2)
Special need education	1 (2)
Others	2 (2)

Out of 51 individuals with hearing loss, among majority of individuals cause was presbyacusis 27 (52.9%) followed by infectious ear disease in 17 (33.3%), cause of hearing loss cannot be determined in 2 (3.9%), systemic disease in 1 (2%), Trauma in 1 (2%), ototoxicity 1 (2%), noise exposure 1 (2%) and 1 (2.5%) with congenital type of hearing loss (Table 7).

Among 51 individuals with hearing loss, no further action needed in 17 (33.3%) individuals. Among 17 individuals with infectious ear disease, 13 (26%) needed corrective middle ear surgery in the form of myringoplasty / tympanoplasty for CSOM safe, 3 (5.9%) with ASOM needed medications and 1 (2%) needed mastoid surgery for CSOM unsafe. 1 (2%) needed corrective middle ear surgery in the form of myringoplasty / tympanoplasty for traumatic hearing loss. Among individuals with sensorineural hearing loss, 12 (23.5%) needed hearing aids, 2 (3.9%) needed further investigations for the cause of hearing loss, one with noise induced hearing loss needed special education to prevent further damage and 1 (0.3%) with congenital hearing loss needed cochlear implant (Table 8).

DISCUSSION

A significant proportion of cases of hearing loss are due to common ear diseases, which if diagnosed early and managed properly can significantly reduce the burden of decreased hearing.[1-3]

In our study, prevalence of hearing loss was 16.7% in rural area. Prevalence of sensorineural hearing loss necessitating hearing aids was 23.5%. The need of mastoid surgery was 2%. Mishra et al multi-cluster survey in rural and urban population, showed similar results with overall hearing impairment of 15.14% in rural population.[10] The prevalence of sensorineural deafness necessitating hearing aids was 20% in rural. The need of surgery was much more amongst rural subjects indicating more advanced / dangerous ear disease.[10] In the present study prevalence of hearing loss in rural and necessitating hearing aids were consistent with this study.

In the present study, otitis media was commonest cause of conductive hearing loss. Bansal et al study in rural area, showed similar results with conductive hearing loss as the commonest type of hearing loss in otitis media.[6]

In our study, we found individuals with earlier onset of sensorineural hearing loss in age group of 46-59 years due to the presence of systemic diseases. Agrawal et al survey showed similar results that increase in hearing loss prevalence occurred earlier among participants with smoking, noise exposure and systemic diseases.[8]

In our study, we found prevalence of hearing loss ≥60 years age group was 52.9%. Lin et al analyzed data from hearing assessment in adults aged 70 years and older. Prevalence of hearing loss was 63.1%.[11]

In our study 52.6% were males and 47.4% were females. Out of this in individuals with hearing loss, sensorineural hearing loss was present in 68.6% and conductive hearing loss in 31.4%. In individuals with hearing loss, mild degree of hearing loss was present in 56.9%, moderate hearing loss in 27.5%%, severe hearing loss in 11.8% and profound hearing loss in 3.9% cases. Balasubramanian et al study comprises males 64% and females 36%. Out of this, about 15% had conductive deafness and 42% had sensorineural hearing loss. About 29% suffered from mild hearing loss, 26% moderate and 11% severe hearing loss.[12]

In present study mild degree of hearing was most common and presbyacusis was the most common cause of hearing loss. Bisht et al study on OPD basis, showed

similar results with presbyacusis was the most common cause of hearing loss.[13]

In our study we found 1(2%) individual with noise induced hearing loss, 1 (2%) with traumatic hearing loss and 1 (2%) with ototoxicity which is not consistent with other studies.

Hearing assessment in the age group of <4 years was done with behavior observation audiometry and OAE. BERA was used as gold standard diagnostic tool. John et al performed neonatal hearing screening of high risk babies by which recommended use of otoacoustic emissions followed by BERA for screening of hearing.[7] Jose et al assessed high risk babies by 2 staged DPOAE screening and those who failed the second stage DPOAE screening were subjected to diagnostic BERA. 0.9% of the high risk babies had hearing loss.[14] In our study we found 2.2% cases of congenital type of hearing loss among the individuals with hearing loss and probably needed cochlear implant. Mehra et al showed similar results with average incidence of neonatal hearing loss is 1.1 per 1000 infants, with variation among states.[9]

CONCLUSION

In the present study overall prevalence of hearing loss was found to be 16.7%. Prevalence of bilateral hearing loss was more common and majority of individuals with hearing loss were in the age group of ≥60 years. Hearing loss was common in males. Most of individuals with hearing loss were from socioeconomic status of upper and lower middle class Most of the individuals with hearing loss had sensorineural type of hearing loss. Predominantly mild degree of hearing loss was present. Presbyacusis was leading cause of hearing loss followed by the infectious middle ear diseases. Since hearing loss has been found to have predominantly mild sensorineural or conductive hearing loss, an early intervention and quality patient education is necessary for prevention of hearing impairment in majority of cases.

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