Prevalence of hearing loss with intact tympanic membrane: A tertiary care hospital experience

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ABSTRACT

BACKGROUND: Hearing loss due to suppurative otitis media is a common clinical condition experienced by Otorhinolaryngologist. However hearing loss without suppurative otitis media is also not uncommon in our population.

OBJECTIVE: To determine the prevalence of hearing loss with intact tympanic membrane in patients presenting to a tertiary care hospital.

MATERIAL AND METHOD: This cross-sectional prospective study was carried out in the department of E.N.T, Head and Neck Surgery, MTI/LRH, Peshawar from June 2016 to December 2016, including 56 patients in age range of 10 to 50 years, fulfilling inclusion criteria. After complete evaluation pure tone audiometry was carried out by same skillful audiometrician using clinical audiometer Amplaid 455 (Italy) following ISO standard. PTA was carried out at frequencies 0.25, 0.5,1, 2, 3, 6 and 8 KHz. Severity of hearing loss was classified according to WHO classification. Data collected on the proforma were analyzed using SPSS version 16.

RESULTS: Out of total 56 patients, males were 36 and females were 20. The patients were in age range from 10 50, with mean age of 28.26± 1.16 years. Majority of patients (21, 37.5%) were in 2nd decade. Among these patients 37 cases (66.1%) were jobless, 35 cases (62.5%) were illiterate. Twenty three patients (41.1%) were suffering from sensorineural hearing loss bilaterally. Bilateral moderate sensorineural haring loss was the most common (22, 39.3%) degree of hearing loss, followed by bilateral mild sensorineural hearing loss (10, 17.9%).

CONCLUSION: Hearing impairment with intact tympanic membrane was commonest finding in people in 2nd decade of life. The commonest PTAfinding was sensorineural type hearing loss in both ears with moderate degree of severity bilaterally.

Key words: *Hearing loss, intact tympanic membrane, sensorineural, conductive*

This article may be cited as: Zada B. Wahid F, Nagra RS.
Prevalence of hearing loss with intact tympanic membrane: A tertiary care hospital experience JSMC 2018.8;1: 17-19

INTRODUCTION:

Hearing loss is a common problem across the globe. About 360 million people are suffering from hearing loss; amongst them 328 million are adults while 32 million are children. Approximately one third of people above the age of 65 years are suffering from disabling hearing impairment.[1] Epidemiological prevalence of hearing loss is estimated 20.6% in adults of age 48-59 years and 90% in adults above 80 years age. Hearing impairment is not only a health problem, but it is also a social, psychological and economical problem. Severity of this condition has been studied to be associated with poor quality of life, difficulty in communication, impaired activities of daily living; dementia and cognitive dysfunction.[2]Hearing loss can be categorized as sensorineural, conductive and mixed type. According to severity of hearing loss it can be classified as mild, moderate, severe and profound hearing loss. Conductive hearing loss results from disruption in the sound conducting pathway from pinna to the labyrinth. On the other hand sensorineural hearing loss occurs due to impairment in the hearing pathway from the cochlea to the cortex of brain. There are many factors responsible for hearing loss i.e. ageing, trauma, tumours, infections, genetic, epigenetic, drugs, toxins, environmental and co-morbidities.[3]Whatever the cause of hearing loss may be, it needs proper evaluation and rehabilitation to have a near normal life. So besides medical and surgical treatment rehabilitation with hearing aids, cochlear implants, assistive listening devices are in common use worldwide.[4]Suppurative otitis media results from defect in the tympanic membrane and is associated with hearing impairment due to defect in the ear drum as well as underlying disease. However people may have hearing loss with intact ear drum. Usually people having hearing impairment with intact ear drum are diagnosed incidentally as they have no enforcing otorrhea.[5]

A large number of patients are presenting to our unit who are suffering from hearing loss with intact tympanic membrane, not diagnosed previously. Thus this study was aimed to determine the frequency of hearing loss in people with intact tympanic membrane.

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Received: August 3rd 2017, Accepted: November 11th 2017

World Health Organization Grades of hearing impairment (WHO, 2008)

Grade of impairment	Corresponding audiometric ISO value
0 - No impairment	25 dB or better (better ear)
1 - Slight impairment	26-40 dB (better ear)
2 - Moderate impairment	41-60 dB (better ear)
3 - Severe impairment	61-80 dB (better ear)
4-Profound impairment including deafness	81 dB or greater (better ear)

MATERIAL & METHOD:

This cross-sectional prospective study was carried out in the department of E.N.T, Head and Neck Surgery, MTI/LRH, Peshawar, after approval from hospital ethical board from, June 2016 to December 2016 (06 months). Newly diagnosed patients of both gender in age range of 10 to 50 years with hearing loss and intact tympanic membrane were included. While patients with hearing loss and defect in ear drum, previously diagnosed cases and with age $\leq$ 10 and $\geq$ 50 years were excluded, because otitis media with effusion is more common in children under 10 years of age, while presbyacusis is also common in elderly people above 50 years of age. In these two conditions tympanic membrane remains intact. Each patient was subjected to detail history and thorough examination focusing on the hearing impairment. Pure tone audiometry (PTA) was carried out by same skillful audiometrician using clinical audiometer Amplaid 455 (Italy) following ISO standard for hearing level assessment in a sound proof audiometry room.[1] PTA was carried out at frequencies 0.25, 0.5,1, 2, 3, 6 and 8 KHz. Severity of hearing loss was classified according to WHO classification (WHO, 2008) as given below in table. Each patient was asked to indicate hearing of tones at each of the above frequencies and various intensities. The intensity was reduced in 10 dB steps after each tone indication response and it was raised by 5 dB after each lack of response. Patient was instructed to raise the finger on hearing of tone having proper masking. The PTA findings were entered to a predesigned proforma. Data collected on the proforma were analyzed using SPSS version 16.

RESULTS:

Total of 56 patients fulfilling inclusion criteria were enrolled in the study. Males were 36 and females were 20 with male to female ratio of 1.8:1. The patients were in age range of 10-50 years, with mean age of 28.26 $\pm$ 1.16years. Majority of patients (21, 37.5%) were in 2nd decade followed by 3rd decade (15, 26.8%) and 5th decade (12, 21.4%). Most of the patients (22, 39.3%) belonged to Peshawar, followed by northern districts (15, 26.8). Regarding profession 37 cases (66.1%) were jobless, 14 cases (25%) had private job and only 5 cases (8.9%) had Govt. job. Among these patients 35 cases (62.5%) were illiterate, 15 cases (26.8%) had education level less than matric, intermediate and graduate were 3 cases (5.4%) each. Among these patients 23 cases (41.1%) had sensorineural hearing loss bilaterally, followed by conductive type of hearing loss bilaterally in 12 cases (21.4%). Bilateral mixed type hearing loss and sensorineural hearing loss on right side was found in 5 patients (8.9%) each (Table 1). Bilateral moderate hearing loss was the most common (22, 39.3%) degree of hearing loss, followed by bilateral mild hearing loss (10, 17.9%) (Table 2). In 29 cases (51.8%) Flat type curve was found on pure tone audiometry, while in 19 cases (33.9%) descending type curve was obtained (Table 3).

DISCUSSION:

Impaired hearing is common medical problem prevailed in our population. A number of causes are responsible for hearing impairment; however suppurative otitis media is the most common cause of hearing loss. Hearing impairment may occur with intact tympanic membrane, so to know the magnitude of the disease this study was carried out. Males were a little bit more than female with male: female ratio of 1.8:1, which is in accordance with study of Bisht RS from India.[6] The reason for male predominance cannot be explained on the basis of this study; however it may be due to more outdoor activity of males in subcontinent, hence they are more exposed to the hearing impairing agents. In this study people in age less than 10 years and more than 50 years were excluded, as otitis media with effusion is common in the early one and presbyacusis is the common cause in later one. We noted that hearing impairment was common in patients (21, 37.5%)

in 2nd decade followed by 3rd decade (15, 26.8%) and 5th decade (12, 21.4%). This is comparable to the study of Agrawal Y from US, who found that most of the patients (25.4%) were in 20-29 years of age, followed by 21.2% in age range of 30-39 years.[7] Most of the patients (22, 39.3%) belonged to Peshawar, due to easy accessibility of the patients to this tertiary care hospital. We observed that hearing loss with intact ear drum was common in patients who were jobless (37, 66.1%), while 14 cases (25%) had private job and only 5 cases (8.9%) had Govt. job. Similarly Musani MA also reported that hearing impairment and deafness was common in lower socio-economic group (52%).[8] We also noted that hearing impairment was predominant in those who were illiterate (62.5%). Relation of hearing loss with profession could not be explained in the literature, however probably the people with no job may not be that much careful regarding hearing care. Among these patients 23 cases (41.1%) had sensorineural hearing loss bilaterally, followed by conductive type of hearing loss bilaterally in 12 cases (21.4%). Bilateral mixed type hearing loss and sensorineural hearing loss on right side was found in 5 patients (8.9%) each, which is supported by the study of Bisht RS, who found that in majority of cases (27.5%) moderate-severe sensorineural hearing losss was present, and least being moderate-severe conductive hearing loss(1.3%).[6] Similarly Musani MA experienced that sensorineural hearing loss was 20%, of which 87% were bilateral and 13% unilateral. While conductive hearing loss was 50%, out of which 65% was unilateral and 35% was bilateral and mixed type hearing loss was 30% only.[8] Our result is further strengthened by finding of Pannu KK, where bilateral hearing loss was 20%, while unilateral hearing loss was 80%, of which 30% was on right side and 20% on left side.[9] In Maharjan study, moderate conductive hearing loss was 30.5%, moderate-severe hearing loss was 4.1%, while severe hearing loss was only 2.7%.[10] In Alabbasi study right ear was more affected than left ear with 52.5% and 10.8% respectively.[11] In this study in 29 cases (51.8%) flat type curve was found on pure tone audiometry, while in 19 cases (33.9%) slow descending type curve was obtained, which is in keeping with study of Jivai and colleagues, who found that in 179 cases (29.83%) flat, in 135 cases (22.5%) slow descending, in 134 cases (22. 5%) step descending, while in 152 cases (25.33%) mix pattern audiogram curve was obtained.[1,12]

CONCLUSION:

Hearing loss with intact tympanic membrane is not uncommon in population, which may be diagnosed incidentally, because in these patients there is no enforcing otorrhea. Hearing impairment with intact tympanic membrane was commonest finding in people in 2nd decade of life. The commonest PTA finding was sensorineural type hearing loss in both ears with moderate degree of severity bilaterally

Table 1: Type of Hearing Loss (N=56).

Type of Hearing loss	Frequency of cases	Percent
Conductive HL Bilateral	12	21.4
Sensorineural HL Bilateral	23	41.1
Mixed HL Bilateral	5	8.9
Conductive HL R Ear	3	5.4
Conductive HL Ear	1	1.8
Sensorineural HL R Ear	5	8.9
Sensori Neural HL L Ear	2	3.6
Mixed HL R Ear	3	5.4
Mixed HL Ear	2	3.6
Total	56	100.0

Note: HL-Hearing loss, R- Right, L- Left.

Table 2: Degree of Hearing Loss (N=56).

Grades	Frequency of cases	Percent
Mild HL Bil	10	17.9
Mod HL Bil	22	39.3
Sever HL Bil	4	7.1
Prof HL Bil	1	1.8
Mild HL L Ear	2	3.6
Mod HL R Ear	4	7.1
Mod HL L ear	1	1.8
Sever HL R Ear	5	8.9
Sever HL L Ear	1	1.8
Prof HL R Ear	3	5.4
Prof HL L ear	2	3.6
No response	1	1.8
Total	56	100.0

Note: HL-Hearing loss, R- Right, L- Left, Bil- Bilateral.

Table 3: Pattern of PTA Curve (N=56).

Pattern of PTA Curve	Frequency	Percent
Flat	29	51.8
Slow Descending	19	33.9
Steep Descending	3	5.4
Ascending	2	3.6
Mixed Type	3	5.4
Total	56	100.0

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