

# Frequency of Sensorineural Hearing Loss in Chronic Otitis Media

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## ABSTRACT

**Aim:** To estimate the frequency of sensorineural hearing loss in chronic otitis media.

**Study design:** Descriptive study.

**Place and duration of study:** Department of ENT, Services Hospital Lahore from 1<sup>st</sup> June 2021 to 30<sup>th</sup> November 2021.

**Methodology:** One hundred patients diagnosed with chronic otitis media were enrolled. Their clinical details were documented and audiograms were performed. Frequency of sensorineural hearing loss was determined.

**Results:** Mean age of 27.9±6.1 years with 59% males and 41% females. There were 52% patients who were diagnosed with the sensorineural hearing loss while it was not present in the 48% of the patients whereas significant difference within the positive patients with sensorineural hearing loss and longer duration of infection was observed in comparison to sensorineural hearing loss negative cases.

**Conclusion:** A high frequency of sensorineural hearing loss is presented in chronic otitis media cases.

**Keywords:** Frequency, Sensorineural hearing loss, Chronic otitis media

## INTRODUCTION

Chronic diseases of ear are commonly reported worldwide especially in the developing and under developed countries. These diseases include chronic otitis media (COM), chronic mastoiditis, tympanosclerosis, chronic suppurative otitis media as well as cholesterol granuloma and many others. An infection of ear which persists up to twelve weeks or higher is termed as chronic-otorrhoea. It is accompanied with perforated tympanic membrane (TM)<sup>1</sup>. If left untreated it can lead to hearing loss in affected patients.

The prevalence of otitis media is reported by WHO as 7% in developing countries. The reason of such high prevalence is considered over population and low socioeconomic class of majority of the residents. In most of the cases with chronic otitis media there is a hearing loss as a result of the rupturing of the TM or as a consequent of the alterations in the ossicular chain by fixation or erosion by inflammatory process<sup>2-4</sup>.

The COM is mainly divided into two types such as a atticointral and tubotympanic COM. The atticointral COM comprises of scanty foul-smelling discharge with perforated TM involving its margins. Cholesteatoma in addition to the granulations are major related complications. Where as in the former type of COM a profuse discharge with centrally involved TM perforation is reported<sup>5-7</sup>. The former type is not related with the cholesteatoma as well as other complications. As a result, many of the physicians delay in its treatment which might cause hearing impairment. Reoccurring infections of the ear can also cause ear drum perforation and toxin absorption. Inhabitation of macromolecules inside the cochlea from thin-round window membrane leads to the sensorineural hearing loss (SNHL)<sup>8-10</sup>.

The present study was designed for estimation of the frequency of the sensorineural hearing loss in chronic otitis media. The study provided precise number of patients affected by the COM and its delayed treatment and also highlighted its frequency for better management and understanding of the disease.

## MATERIALS AND METHODS

This descriptive study was conducted at ENT Unit-I Services Hospital Lahore from 1<sup>st</sup> June 2021 to 30<sup>th</sup> November 2021 and

comprised 100 patients. All those patients who were diagnosed with COM were included in the study with tubotympanic type of disease. Patients who were operated earlier, had ototoxic drugs application history or a family history of SNHL were excluded from the study. The sample size of the study was taken as 100 through calculation via WHO sample size calculator keeping power of test as 80% and 95% CI as well as 7% prevalence with 5% margin of error. The demographic details, age, family and clinical history of each patient was documented. The clinical symptoms and complication were also noted. A well-structured questionnaire was designed for this purpose. Audiogram performance was done by audiologist specialized in this field. An average of three frequencies was taken through the audiogram and their mean was determined. A mean less than 25 decibels was confirmed positive for SNHL. The frequency of SNHL was then calculated using analytical software SPSS version 26.0 using chi square with a p value <0.05 as significant.

## RESULTS

The mean age was 27.9±6.1 years. The highest number of patients was in the age group of 23-32 years, with a percentage as 51%. Males were having a majority with 59% while there were only 41% females enrolled (Table 1). There were 52% of those patients who were diagnosed with the SNHL while it was not presented in the 48% of the patients (Fig. 1).

The duration of infection was less than 12 months in majority however there was no significant difference observed in between SNHL positive and negative cases. Whereas a significant difference within the patients positive with SNHL and longer duration of infection was observed in comparison to SNHL negative cases (Table 2). There was an equal involvement of both ears with insignificant difference within the left and right ears SNHL presentation (Fig. 2).

Table 1: Distribution of age and gender (n=100)

Variable	No.	%age
<b>Age (years)</b>		
12-22	21	21.0
23-32	51	51.0
33-42	28	28.0
<b>Gender</b>		
Male	59	59.0
Female	41	41.0

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Table 2: Comparison of duration of infection within SNHL positive and negative cases

Duration of infection	Sensorineural Hearing Loss		P value
	+ve (n=52)	-ve (n=48)	
<12 months	30 (57.7%)	27 (56.2%)	1.3
1-6 years	15 (28.8%)	12 (25.0%)	<0.05
>6 years	7 (13.5%)	9 (18.8%)	<0.05

Fig. 1: Frequency of SNHL positive cases

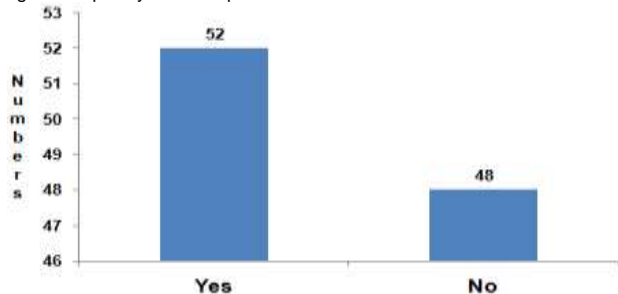
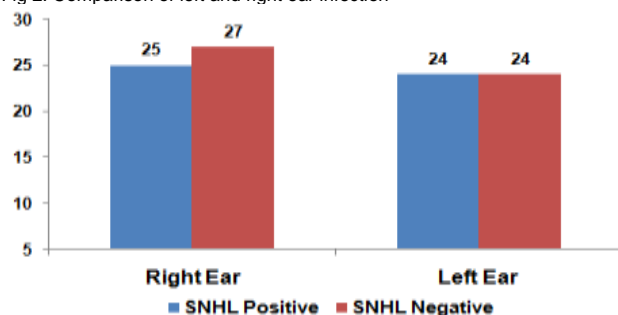


Fig 2: Comparison of left and right ear infection



**DISCUSSION**

There have been various researches on the association of hearing loss and SNHL, case control studies as well as seven cohorts have also reported hearing loss and negative outcomes in exposed groups in comparison to the control groups.<sup>11-18</sup> It has also elaborated that cases with SNHL exposure above three months had a significantly higher incidence of odds ratio than those with an exposure lower than three months.<sup>12,16</sup> The mean or the median value within some study groups limited within 1.19 to 32,2 dB as well as 0 to 10 dB.<sup>18</sup> The results of aforementioned researches were in coordination with the present study results showing a high significance within hearing loss as SNHL through prolonged otitis media infection.

There is still many limitations observed in various researches on otitis media association with SNHL which requires to be addressed for proper data interpretation. Many of these articles main limitation was not addressing the duration effect of the otitis media infection on the SNHL. However, the current study addressed this limitation efficiently and provided analysis of duration of otitis media infection with the formation of SNHL. A significant finding was also interpreted showing that, as the duration of infection is prolonged the risk of development of SNHL is significantly increased. Other studies on extensive research over otitis media and SNHL have reported that increased and prolonged inflammation as well as toxin development in the inner ear can lead to higher risk of SNHL within cases of prolonged infection<sup>19-21</sup>.

Thakur et al<sup>22</sup> done a study in 100 cases within the similar age group as of present study and determined the effects of duration on the presentation of SNHL in otitis media patients. Their research found an increase in incidence of SNHL up to 23% in

ases with prolonged infection duration.<sup>22</sup> The present study results also presented the risk as 41.6% in 1-6 years prolonged infection while 20.8% in those with greater than 6-year duration of infection.

**CONCLUSION**

A high frequency of sensorineural hearing loss is presented in chronic otitis media cases with significant association with duration of infection in SNHL positive cases than negative cases.

**Conflict of interest:** Nil

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