

Original Research Article

Incidence of Meniere disease in a tertiary healthcare center in Mumbai

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ABSTRACT

Background: The disorder of the inner ear related to abnormally increased levels of endolymph in the membranous labyrinth is called Meniere's disease. It is well studied that the prevalence of Meniere's disease varies widely across regions. It was found to be 13% to 42% around the world in various places. It is important to know the incidence in India to know the population suffering and to plan better treatment strategies to cater to rehabilitation strategies. Hence, the current study was planned to estimate a load of Meniere's disease in a tertiary care hospital in Mumbai.

Methods: A retrospective analysis of the case reports was undertaken. As per American academy of otolaryngology-head and neck surgery (AAO-HNS, 2020), the patients were separated as definite and probable Meniere's disease.

Results: The descriptive analysis revealed that 6 in 1000 patients reporting for hearing evaluation in a tertiary care hospital are suffering from Meniere's disease. There was a female preponderance found in the patients with a gender ratio of 1.85:1.

Conclusions: The incidence of Meniere's disease in a tertiary care hospital in Mumbai was found to be 0.61% of all the patients tested for hearing impairment.

Keywords: Meniere disease, Definite Meniere, Probable Meniere, Incidence, Hearing loss

INTRODUCTION

Meniere's disease is a disorder of the inner ear first reported by Prosper Meniere in 1861.¹ He described Meniere's disease to accompany the triad of symptoms like episodic vertigo, hearing loss, and tinnitus.² Merchant et al proposed the pathophysiology of the disease post exploratory surgeries of the preserved temporal bones of confirmed cases with Meniere's disease suggesting the presence of hydrops in either ear.³ This endolymphatic hydrops destructs the anatomy of the membranous labyrinth. They also suggested that this is caused by the disordered homeostasis in the inner ear due to damage to the spiral ligament.

Several pieces of research are proposing the probable pathogenesis of Meniere's disease like genetic predisposition, inappropriately overproduction of

endolymph or reduced absorption and/or reduced absorption, and idiopathic causes.⁴⁻⁷ The anatomical structures namely the endolymphatic duct and sac are mostly reported to cause Meniere's disease. Basura et al have proposed the guidelines for the classification of Meniere's disease in the American academy of otolaryngology-head and neck surgery (AAO-HNS) in 2020.⁸ As per the guideline Meniere's disease can be classified as definite Meniere's disease and probable Meniere's disease based on the symptoms. The presence of more than two episodes of spontaneous vertigo lasting anywhere between 20 minutes to 12 hours with hearing loss (fluctuating in low to mid frequencies) and tinnitus (fluctuating) was reported as definite Meniere's disease. The presence of at least two episodes of vertigo or giddiness (lasting for more than 20 mins to 24 hours) with fluctuating aural symptoms were considered as probable Meniere's disease.

The relatively latest study on the prevalence of Meniere's disease reported by Bruderer et al found the prevalence of 13.1 per 100,000 person-years for the period stretching from 1993 to 2014.⁹ The authors retrospectively identified the patients diagnosed with Meniere's disease and performed the statistical analysis. They also reported that depression, migraine, insomnia, and anxiety were prevalent in cases with Meniere's disease. This extensive study also reported that the incidence of Meniere's disease was between 18 to 79 years of age. A similar study was done by Kotimäki et al who collaborated the data in a retrospective study from various healthcare hospitals in Finland from 1992 to 1996.¹⁰ They found the prevalence of 42.3% per 1,00,000 individuals in Finland. The above studies have used the AAO-HNS criteria to identify individuals with Meniere's disease. Some other studies on the epidemiology of Meniere's disease reported the prevalence of 75/1,00,000 people/year in Cantabria between 1992 and 2002; incidence of 15.3% in 1,00,000 people from 1951 to 1980 in Rochester; the prevalence of 42.3% per 1,00,000 individuals was reported in Finland during 1992 to 1996.¹⁰⁻¹³

There is a dearth of studies on epidemiology of Meniere's disease in India and to the best of the author's knowledge there are no such studies reported in Mumbai. Therefore, the current study aims to ascertain the incidence of Meniere's disease in a tertiary healthcare center in Mumbai from August 2019 to March 2020. The primary objective of the present study is to estimate the incidence of Meniere's disease in a tertiary healthcare center in Mumbai. The secondary objective is to study the gender distribution of Meniere's disease in a tertiary healthcare center in Mumbai. The information on the incidence of the disease would help in appropriate planning for the development of efficient treatment plan.

METHODS

A retrospective analysis was done by reviewing audiological reports of 2,279 patients (females=1069, males=1210) evaluated for hearing loss in AST department from August 2019 to March 2020. The incidence was aimed to be estimated for one year, however, due to COVID-19 lockdown the period was reduced by 4 months. The audiogram proforma booklets were used to review the history, hearing status, and other ear-related complaints presented by the participants, along with demographic details in the study period. The participants who have reported for evaluation of hearing loss for the first time were included to ensure data collection from new cases of Meniere's disease. The follow up patients with previous history of testing for hearing loss were excluded from the study. The protocol for definite and probable Meniere disease as per AAO-HNS (2020) criteria are given in Table 1.

The pure-tone audiometry test was performed using standard protocols. This was done using a calibrated dual channel diagnostic audiometer (GSI Audiostar pro) coupled with TDH-39 headphones housed in MX-41/AR ear cushion was utilized to obtain air conduction thresholds. Bone conduction thresholds for frequencies between 250 Hz to 4000 Hz were obtained using a B-71 radioear bone vibrator. The ear-specific audiogram findings is given in Figure 1. A waiver of consent was obtained and the study was approved by the institute ethics committee (ECARP/2021/122).

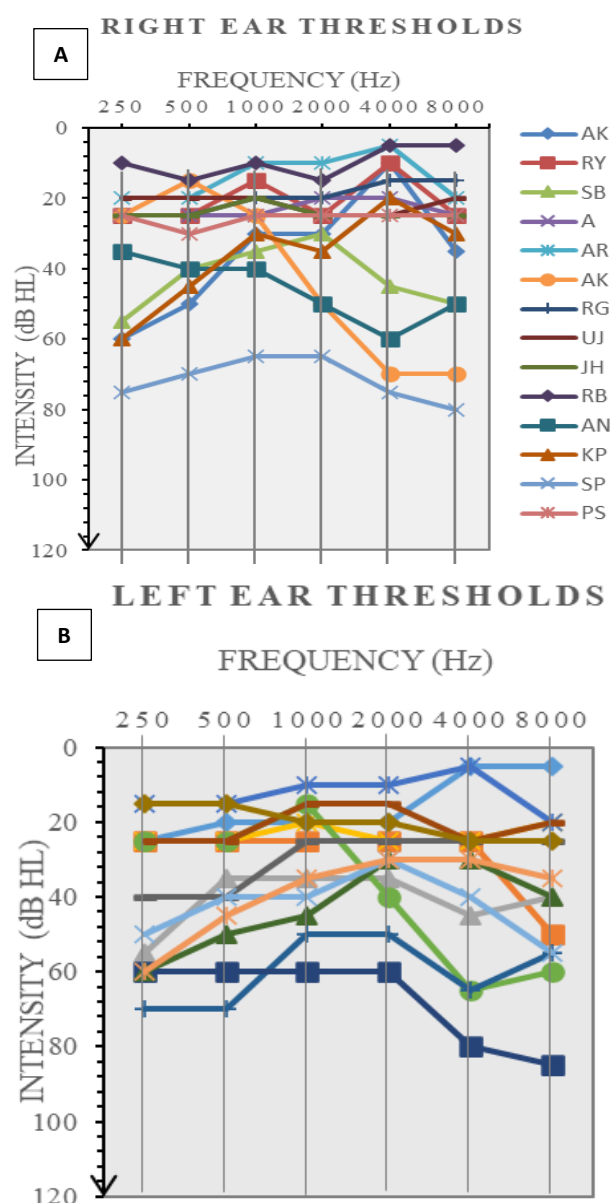


Figure 1 (A and B): Pure-tone audiogram configurations for right and left ear, respectively, of patients with probable and definite Meniere's disease.

Table 1: The guidelines for the classification of Meniere's disease in the AAO-HNS in 2020.

Definite Meniere's disease	Probable Meniere's disease
Two or more spontaneous attacks of vertigo lasting for 20 minutes to 12 hours	At least two episodes of vertigo of dizziness lasting 20 min to 24 hours
Audiometrically document sensorineural hearing loss in low to mid frequency in at least 1 occasion	Fluctuation aural symptoms (hearing loss, tinnitus, or fullness) in the affected ear
Fluctuation aural symptoms (hearing loss, tinnitus, or fullness) in the affected ear	Other cause excluded
Other cause excluded	

RESULTS

The descriptive analyses were done using SPSS version 21 after reviewing 2279 audiograms. The incidence rate was calculated for the collected data. The frequency distribution analysis was administered to obtain the distribution of Meniere's disease as per the age and gender of the participant in definite and probable Meniere's disease category. The mean age of the patients with Meniere's disease was found to be 38.1 years (SD=4.3 years). It was observed that the ratio of female to male was 1.85:1.

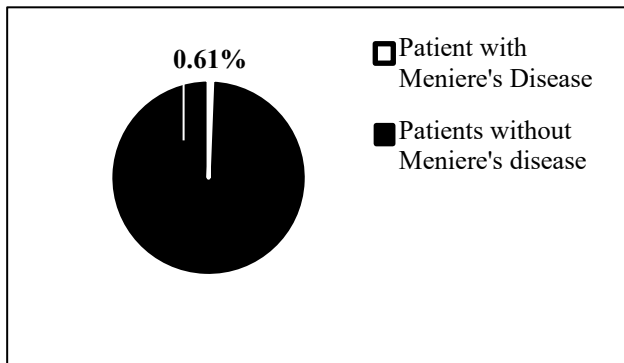


Figure 2: Incidence of Meniere's disease in the population reported to tertiary healthcare hospital.

Out of 2279 patients assessed for audiological impairments, 14 (0.61%) were found to have Meniere's disease (Figure 2). Among these 14 patients, 64.3% were diagnosed to have definite Meniere's disease. The remaining had probable Meniere's disease, refer Figure 3 for gender-specific information. The incidence of definite and probable Meniere's disease was found to be 0.39% and 0.29%, respectively.

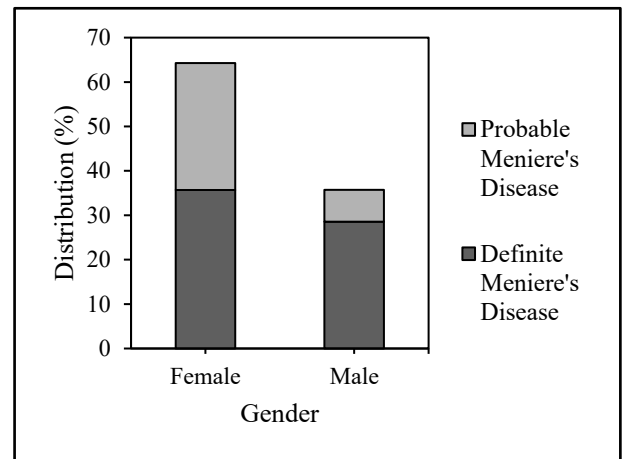


Figure 3: Gender difference in the definite and probable Meniere's disease among people diagnosed with Meniere's disease.

Table 2: Demographic details, audiological findings of individuals with Meniere's disease.

Type of MD	Age (years)	Gender	Configuration of hearing loss (Right ear, left ear)	Time duration of first episode (min)	Other complaint(s)
Definite	18	Female	Rising	-	Tinnitus (tonal high pitch, and intermittent)
	30	Female	Flat, rising	-	Tinnitus (tonal high pitch, and intermittent); nausea/vomiting
	50	Female	Inverted saucer	20	Tinnitus (Tonal low pitch, intermittent); nausea/vomiting; aural fullness; history of fall
	55	Female	Rising	150	Tinnitus
	65	Female	Inverted saucer, flat	-	-
	24	Male	Sloping	20	-
	50	Male	Sloping	30	Tinnitus
	50	Male	Flat, rising	-	Tinnitus (Tonal low pitch, intermittent)

Continued.

Type of MD	Age (years)	Gender	Configuration of hearing loss (Right ear, left ear)	Time duration of first episode (min)	Other complaint(s)
	52	Male	Flat, inverted saucer	20	Tinnitus (tonal low pitch, and continuous); nausea/vomiting
Probable	17	Female	Flat, gradually falling	-	Tinnitus (tonal low pitch, and continuous)
	20	Female	Flat	-	-
	25	Female	Flat	15	-
	30	Female	Flat	30	Tinnitus (tonal high pitch, and intermittent)
	48	Male	Flat	-	Tinnitus (tonal high pitch, and intermittent); nausea/vomiting

DISCUSSION

The incidence of Meniere's disease among the patients reporting to the tertiary health care center was found to be 1 in 167 patients or 6 in 1000 patients. It was also observed that the distribution of gender (Female: Male ratio) was 1.85:1 similar to the findings of Alexander et al.¹¹ The study done by Alexander et al showed the ratio to be 1.89:1 which is in close agreement with the findings of the current study. The dominance in female was reported to be linked with pregnancy-related changes by.¹⁴

Hearing loss is one of the triad symptoms of Meniere's disease. It was observed that the hearing status of the patients varied from no hearing impairment to moderate sensorineural hearing loss. The hearing loss was found to be bilateral in 6 out of 14 patients diagnosed with Meniere's disease. The configuration of the hearing loss varied from reverse falling or rising (21.4%), flat (46.4%), inverted 'V' (7.1%), to sloping (17.8%). A similar dominance of flat and rising configuration was reported by Liu et al.¹⁵ Tinnitus is another bothersome symptom reported by patients with Meniere's disease. In our study we found 71.4% patients with confirmed diagnosis had the complaint of tinnitus. It was observed that the perceived characteristics of tinnitus as described by the participant varied from low continuous to high-pitched intermittent (Figure 2). These varying findings between participants are also found by Selvakumar, Balraj.¹⁶

Vertigo is widely reported to be the third symptom of the triad. The duration of first episode was described by the patient to range between 20 minutes to 150 minutes. The details of the duration of vertigo in the later episodes could not be found. Perez-Garrigues, Lopez-Escamez has also found that the duration between 20 mins to 6 hours are seen more frequent than more than 6 hours of duration.⁷ In the current study as the audiological evaluation reports were retrospectively assessed few details in the case history could not be availed.

CONCLUSION

It can be inferred the findings of the current study that 1 in 167 patients reporting to the tertiary health care center were found to be diagnosed with Meniere's disease. The ratio of female: male was found to be 1.85:1.

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