

Correlation of the Degrees of Hearing Loss between Male and Female Patients with Otitis Media

Dr. Md. Mashiur Rahman^{1*}, Prof. Md. Ashraful Islam², Dr. Md. Asaduzzaman³, Dr. Md. Mahmudul Amin Sakik⁴, Dr. Md. Mahmudul Hasan Khan⁵, Dr. Mohammad Wakilur Rahman⁶

¹Associate Professor, Department of Otolaryngology & Head Neck Surgery, Basundhara Ad-Din Medical College and Hospital, Dhaka, Bangladesh

²Professor & Head, Department of Otolaryngology & Head Neck Surgery, Bangladesh Medical College and Hospital, Dhaka, Bangladesh

³Associate Professor & Head, Department of ENT & Head Neck Surgery, Shaheed Monsur Ali Medical College and Hospital, Dhaka, Bangladesh

⁴Registrar, National Institute of ENT, Tejgaon, Dhaka, Bangladesh

⁵Associate Professor, Department of Otolaryngology & Head Neck Surgery, Ad-Din Women's Medical College and Hospital, Dhaka, Bangladesh

⁶Junior Consultant, Specialized ENT Hospital of SAHIC, Mohakhali, Dhaka, Bangladesh

*Corresponding Author

Dr. Md. Mashiur Rahman

Associate Professor, Department of Otolaryngology & Head Neck Surgery, Basundhara Ad-Din Medical College and Hospital, Dhaka, Bangladesh

Article History

Received: 15.05.2023

Accepted: 19.06.2023

Published: 07.07.2023

Abstract: Background: Otitis media (OM) is an infection of the middle ear and mastoid cavity. In many studies, hearing loss is described as a consequence of otitis media (OM); the degree of hearing loss can be analyzed by biologically calibrated AA 222 diagnostic audiometer. But in Bangladesh, we have not enough research-based information regarding this issue. **Aim of the Study:** The aim of the study was to evaluate the correlation of the degrees of hearing loss between male and female patients with otitis media. **Methods:** This was a prospective observational study and was conducted in the Department of Otolaryngology & Head Neck Surgery, Bashundara Ad-Din Medical College and Hospital, Dhaka, Bangladesh during the period from January 2022 to December 2022. A total of 64 patients with chronic otitis media (COM) suffered for the past three months or more attended the mentioned hospital were enrolled in this study as the study population. Among them 32(50%) were male and other 32(50%) were female patients. Ear drums of patients were inspected on both sides suction under microscope wherever necessary. The patient's hearing levels in decibel were tested by a biologically calibrated AA 222 diagnostic audiometer. All data were collected, processed and analyzed by using MS Office and SPSS version 23.0 programs as per need. In comparison student's T-tests were also performed. **Results:** In this study, in analyzing the hearing loss status of the patients regarding ear involvement we observed that, 6(18.8), 14(43.7) and 12(37.5) male participants on the other hand 10(31.2), 11(34.4) and 11(34.4) female patients right, left and both ears were found involved respectively. In comparing the ear involvement in hearing loss between the male-female groups, we did not find any significant correlation ($P=0.427$). In comparing the right dB grading, left dB grading, right ear comments and left ear comments of the patients in both groups we did not find any significant

Citation: Md. Mashiur Rahman, Md. Ashraful Islam, Md. Asaduzzaman, Md. Mahmudul Amin Sakik, Mahmudul Hasan Khan, Mohammad Wakilur Rahman (2023). Correlation of the Degrees of Hearing Loss between Male and Female Patients with Otitis Media. *Glob Acad J Med Sci*; Vol-5, Iss-4 pp- 184-190.

correlation; the P- value were 0.932, 0.983, 0.228 and 0.618 respectively.
Conclusion: As per the findings of this study we can conclude that, there was no significant correlation of degrees of hearing loss between male and female patients with otitis media.

Keywords: Otitis media, Hearing loss, Correlation, Male, Female, Audiometer.

Copyright © 2023 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

In developing countries, hearing loss among people has been recognized as a major source of disability; many of its causes are preventable and others are curable [1]. In some studies [2, 3], it was reported that, among the factors responsible for hearing loss are otitis media, mumps, measles, meningitis, rubella, ototoxic drugs, noise exposure, cytomegalovirus, tetanus, hypothyroidism, hypoxemia at birth, genetic factors, foreign bodies and the indiscriminate use of ototoxic drugs to treat ear infections. Otitis media (OM) is the chronic inflammation of the middle ear fossa with discharge through perforated tympanic membrane [4]. It leads to hearing loss and hearing loss leads to impaired development of language and speech skills in case of children that may also cause poor quality of life in adults [5]. Chronic otitis media causes permanent perforation of drum membrane [6]. Chronic (OM) is of two types: Suppurative otitis media and Cholesteatoma [7]. It has been observed that toxins in OM can cause damage to cochlea which may also cause sensorineural hearing loss [8]. The duration of OM was found to have a significant correlation with the increasing incidence of hearing loss and incidence increase especially after 5 years of the disease and the value was noted to be 0.018 [9]. Usually, hearing loss occurred only in 13% of patients of chronic OM, and correlated with older age, but not with the presence of cholesteatoma or duration of ear disease [9]. Chronic OM should be detected early and should be managed effectively so as to prevent the chances of developing hearing loss [10].

METHODOLOGY

This was a prospective observational study that was conducted in the Department of Otolaryngology & Head Neck Surgery, Bashundara Ad-Din Medical College and Hospital, Dhaka, Bangladesh during the period from January 2022 to December 2022. A total of 64 patients with chronic otitis media (OM) suffered for the past three months or more attended the mentioned hospital were enrolled in this study as the study population. The study was approved by the ethical committee of the mentioned hospital. Properly written consent was taken from all the participants before data collection. The whole intervention was conducted

following the principles of human research specified in the Helsinki Declaration [11] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [12]. Ear drums of patients were inspected on both sides suction under microscope wherever necessary. Predetermined inclusion and exclusion criteria were applied while recruiting patients in this study. Prior informed consents from all the patients were obtained. According to the exclusion criteria of this study, patients with a history of previous otologic surgery or a history of familial hearing loss, cases with previous exposure to ototoxic drugs, frank labyrinthitis and positive fistula tests and cases with a history of habitual exposure to noise, meningitis and head trauma were excluded. Tuning fork tests were done using 256, 512 and, 1024 Hz frequencies in each patient. Audiological evaluation included Pure Tone Audiometry, Speech Audiometry and Impedance Audiometry was done of each patient. The patient's hearing levels in decibel were tested by a biologically calibrated AA 222 diagnostic audiometer. The BC threshold at the affected side were measured at a frequency of 500, 1000, 2000, and 4000 Hz respectively in an acoustically treated sound proof boot and compared with those in the unaffected ear. Air and bone conduction thresholds were also determined. The mean hearing loss was calculated through the pure tone average taken at 500 Hz, 1000 Hz and 2000 Hz for each site of perforations (1 to 5). The t-test was applied. The level of significance was determined and the p value of <0.05 was taken as statistically significant.

RESULT

In this study, 50% study participants were male and the rest 50% were female. The mean ages of the male and female participants were 38.63±14.81 and 39.50±17.32 years respectively. We did not find any significant correlation of OM between the ages of both the groups. In this study, in analyzing the hearing loss status of the patients regarding ear involvement we observed that, in 6(18.8), 14(43.7) and 12(37.5) male participants, right ear, left ear and both ears were found involved respectively which were found in 10(31.2), 11(34.4) and other 11(34.4) female respondents respectively. In comparing the ear involvement in hearing loss between the male-female groups, we did not find

any significant correlation ($P=0.427$). The mean right dB grading of hearing loss was 48.87 ± 24.29 in male group and 49.35 ± 20.94 in female group ($P=0.932$). On the other hand, the mean left dB grading of hearing loss was 51.57 ± 23.93 in male

group and 51.68 ± 19.83 in female group ($P=0.983$). In comparing the right and left ear comments of the patients in both groups we did not find any significant correlation; the P-value was 0.228 and 0.618 respectively.

Table 1: Distribution of patients as per age (N=64)

Age (In year)	Male	Female	P-value
	(n=32)	(n=32)	
	n(%)	n(%)	
13-20 yrs.	0(0.0)	6(18.8)	0.198
21-30 yrs.	6(18.8)	7(21.8)	
31-40 yrs.	14(43.7)	6(18.7)	
41-50 yrs.	4(12.5)	7(21.9)	
51-60 yrs.	4(12.5)	3(9.4)	
>60 yrs.	4(12.5)	3(9.4)	
Mean \pm SD Age	38.63 \pm 14.81	39.50 \pm 17.32	0.829

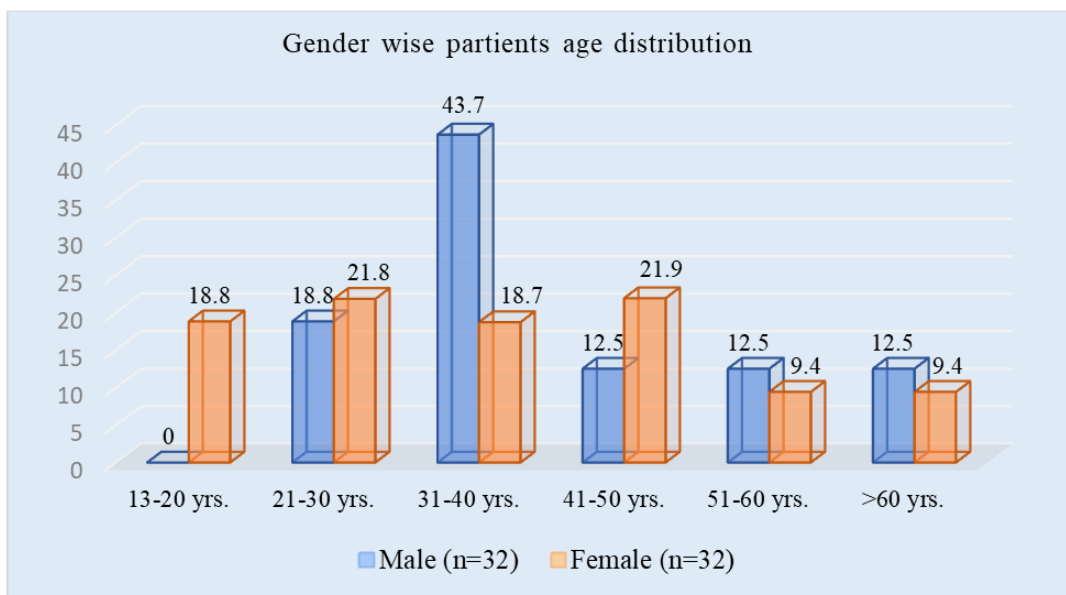


Figure I: Column chart showed gender wise patients age distribution (N=64)

Table 2: Hearing loss distribution of the patients (N=64)

Laterality	Male n(%)	Female n(%)	P-value
Right ear	6(18.8)	10(31.2)	0.427
Left ear	14(43.7)	11(34.4)	
Both ears	12(37.5)	11(34.4)	

Table 3: Right dB grading of hearing loss of the patients (N=64)

Right dB (PTA)	Male n(%)	Female n(%)	P-value
10 to 25 dB=Normal hearing	5(15.6)	3(9.4)	0.862
26 to 40 dB=Mild hearing loss	9(28.1)	9(28.1)	
41 to 55 dB=Moderate hearing loss	8(25.0)	10(31.2)	
56 to 70 dB=Moderately severe hearing loss	4(12.5)	5(15.6)	
71 to 90 dB=Severe hearing loss	3(9.4)	3(9.4)	
91-120 dB=Profound hearing loss	3(9.4)	2(6.3)	
Mean \pm SD	48.87 \pm 24.29	49.35 \pm 20.94	0.932

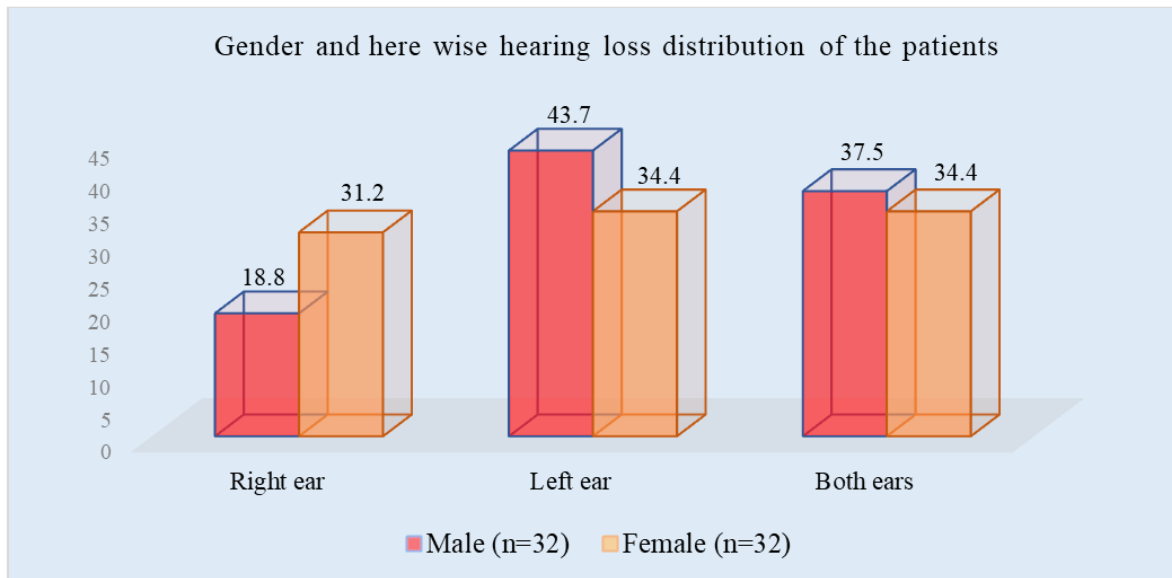


Figure II: Column chart showed gender and ear wise hearing loss distribution of the participants (N=64)

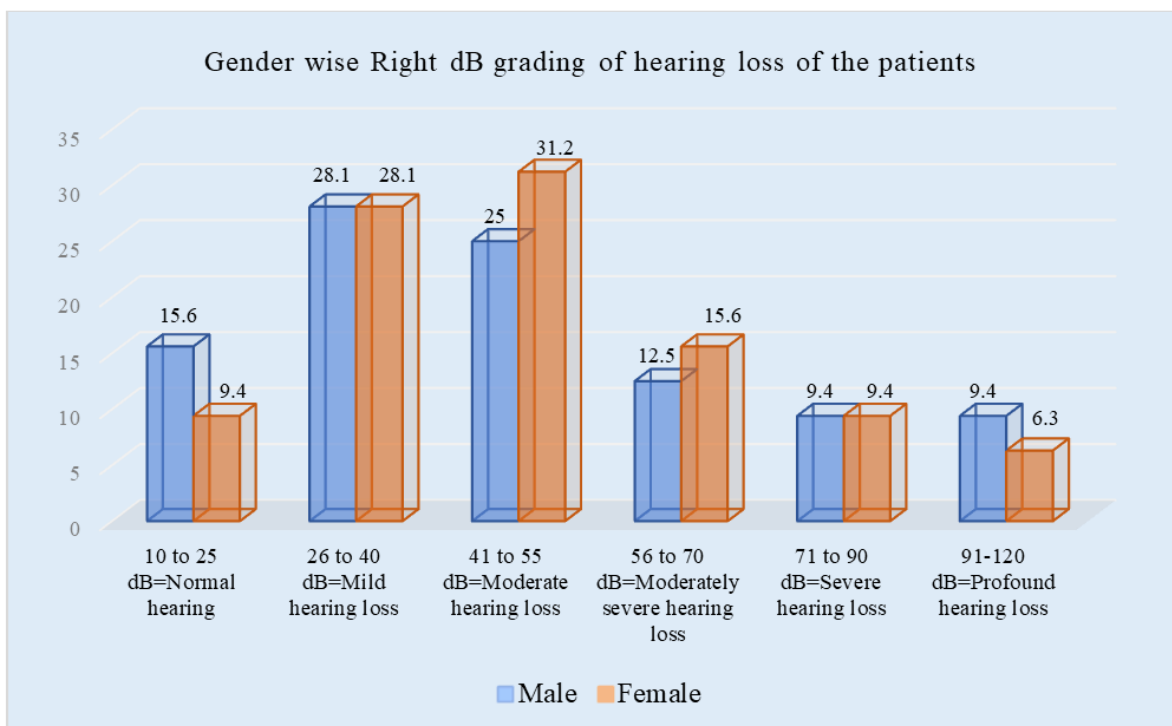


Figure III: Column chart showed gender wise right dB grading of hearing loss of the participants (N=64)

Table 4: Left dB grading of hearing loss of the patients (N=64)

Left dB (PTA)	Male n(%)	Female n (%)	P-value
10 to 25 dB=Normal hearing	1(3.1)	2(6.3)	0.721
26 to 40 dB=Mild hearing loss	9(28.1)	9(28.1)	
41 to 55 dB=Moderate Hearing Loss	10(31.3)	6(18.8)	
56 to 70 dB=Moderately severe hearing loss	5(15.6)	9(28.1)	
71 to 90 dB=Severe hearing loss	3(9.4)	5(15.6)	
91-120 dB=Profound hearing loss	3(9.4)	1(3.1)	
No response	1(3.1)	0(0.0)	
Mean ±SD	51.57±23.93	51.68±19.83	0.983

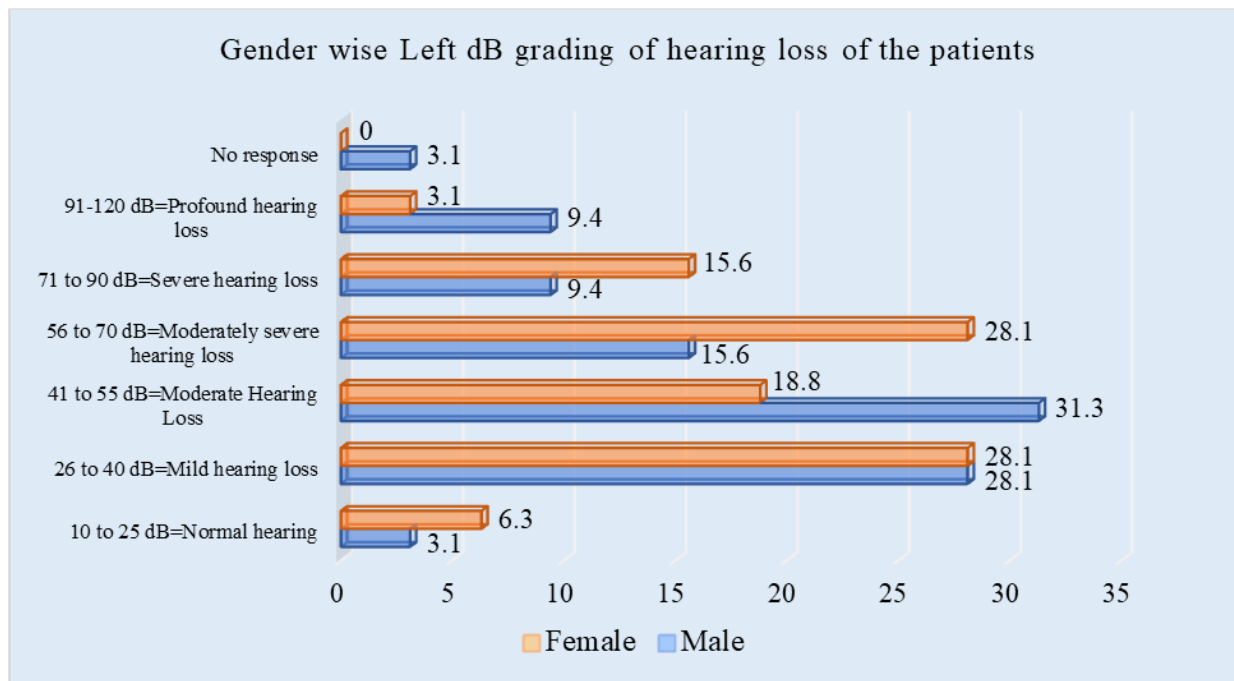


Figure IV: Bar chart showed gender wise left dB grading of hearing loss of the patients (N=64)

Table 5: Right ear comments of the patients (N=64)

Right ear comments	Male n(%)	Female n(%)	P-value
Hearing within normal limits	5(15.6)	3(9.4)	0.228
Mild conductive type hearing loss	9(28.1)	6(18.8)	
Mild to moderate conductive hearing loss	0(0.0)	1(3.1)	
Mild to moderate mixed hearing loss	0(0.0)	1(3.1)	
Moderate conductive hearing loss	6(18.7)	7(21.7)	
Moderate mixed type hearing loss	2(6.3)	3(9.4)	
Moderately severe conductive hearing loss	3(9.4)	3(9.4)	
Moderately severe mixed hearing loss	1(3.1)	2(6.3)	
Profound sensorineural hearing loss	3(9.4)	2(6.3)	
Severe mixed type hearing loss	3(9.4)	3(9.4)	
Slight conductive type hearing loss	0(0.0)	1(3.1)	

Table 6: Left ear comments of the patients (N=64)

Left Ear Comments	Male n(%)	Female n(%)	P-value
Hearing with in normal limits	1(3.1)	2(6.3)	0.628
Mild conductive type hearing loss	8(25.0)	7(21.9)	
Mild to moderate conductive type hearing loss	0(0.0)	1(3.1)	
Moderate conductive type hearing loss	8(25.0)	5(15.6)	
Moderate mixed type hearing loss	2(6.3)	1(3.1)	
Moderately severe conductive type hearing loss	4(12.5)	4(12.5)	
Moderately severe mixed type hearing loss	1(3.1)	5(15.6)	
Profound sensorineural type hearing loss	3(9.4)	1(3.1)	
Severe conductive type hearing loss	0(0.0)	1(3.1)	
Severe mixed type hearing loss	2(6.3)	3(9.5)	
Severe to profound mixed type hearing loss	0(0.0)	1(3.1)	
Severe to profound sensorineural type hearing loss	1(3.1)	0(0.0)	
Slight conductive type hearing loss	1(3.1)	1(3.1)	
No response	1(3.1)	0(0.0)	

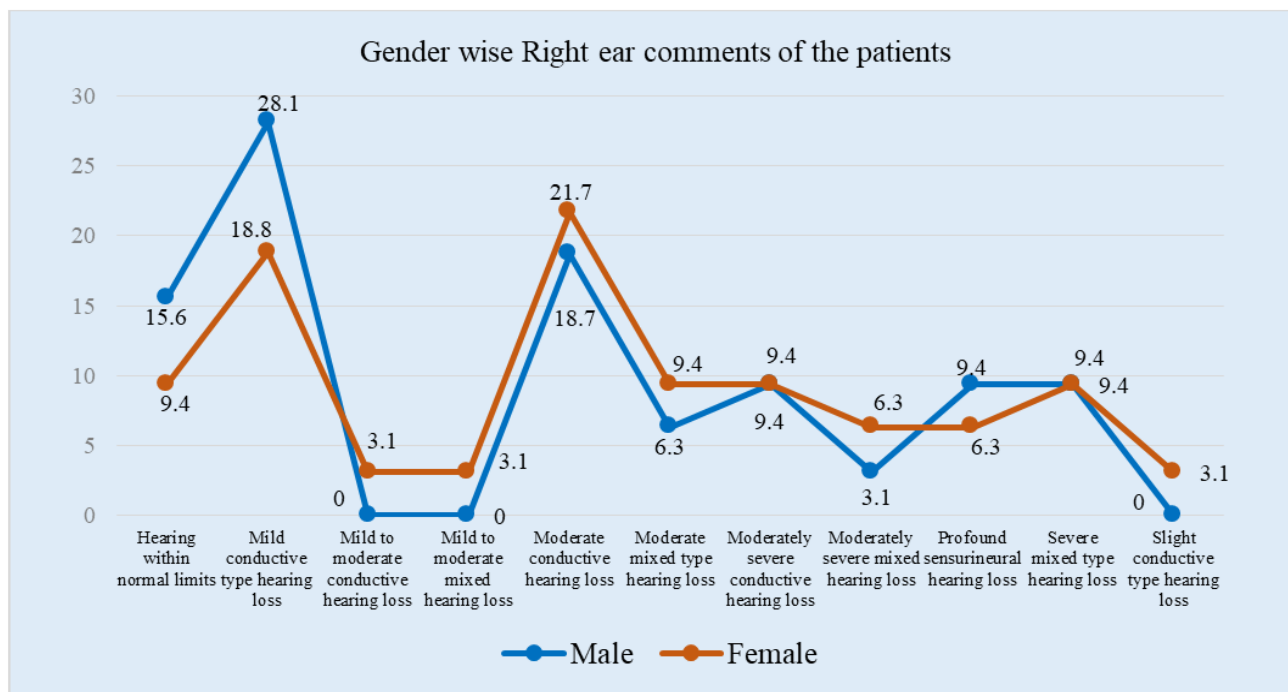


Figure V: Line chart showed gender wise Right ear comments of the patients (N=64)

DISCUSSION

The aim of the study was to evaluate the correlation of the degrees of hearing loss between male and female patients with otitis media. In this study, 50% study participants were male and the rest 50% were female. In the study performed by Kurian *et al.*, on 120 patients, the percentages of male and female were 55% and 45% respectively [13] and that was similar to our study. The mean ages of the male and female participants were 38.63 ± 14.81 and 39.50 ± 17.32 years respectively. We did not find any significant correlation of OM between the ages of both the groups. In another study, the age of the patients ranged from 15-45 years, the mean age of presentation being 30.6 ± 7.8 years; the majority of the patients (n=62) were found to be in the age group of 26-35 years [14]. In this study, in analyzing the hearing loss status of the patients regarding ear involvement we observed that, in 6(18.8), 14(43.7) and 12(37.5) male participants, right ear, left ear and both ears were found involved respectively which were found in 10(31.2), 11(34.4) and other 11(34.4) female respondents respectively. In comparing the ear involvement in hearing loss between the male-female groups, we did not find any significant correlation (P=0.427). In a study conducted by Mohsin *et al.*, [15] it was observed that the SNHL was higher in males than females. The mean right dB grading of hearing loss was 48.87 ± 24.29 in male group and 49.35 ± 20.94 in female group (P=0.932). On the other hand, the mean left dB grading of hearing loss was 51.57 ± 23.93 in male group and 51.68 ± 19.83 in female group (P=0.983). In another

study, assessing the hearing loss among the patients with chronic OM, there was slight female dominance for the occurrence of chronic OM, with a male to female ratio at 1:1.17 [16]. In comparing the right and left ear comments of the patients in both groups we did not find any significant correlation; the P-value was 0.228 and 0.618 respectively.

Limitation of the Study

This was a single-centered study with small-sized samples. Moreover, the study was conducted over a very short period. So, the findings of this study might not reflect the exact scenario of the whole country.

CONCLUSION & RECOMMENDATION

Regarding the hearing loss status of the patients of ear involvement, right dB grading, left dB grading, right ear comments and left ear comments among male and female patients there may not have any significant correlation. We can conclude that, there is no significant correlation of degrees of hearing loss between male and female patients with otitis media. All the findings of this current study may be helpful in further similar studies. For getting more specific results, we would like to recommend conducting similar more studies in several places with larger sized samples.

REFERENCES

1. Kodiya, A. M., Afolabi, O. A., & Ahmad, B. M. (2012). The burden of hearing loss in Kaduna, Nigeria: A 4-year study at the National Ear Care

- Centre. *Ear, Nose & Throat Journal*, 91(4), 156-163.
2. Brobby, G. W. (1988). Causes of congenital and acquired total sensorineural hearing loss in Ghanaian children. *Tropical Doctor*, 18(1), 30-32.
 3. Okokhere, P. O., Ibekwe, T. S., & Akpede, G. O. (2009). Sensorineural hearing loss in Lassa fever: two case reports. *Journal of Medical Case Reports*, 3, 1-3.
 4. Amali, A., Hosseinzadeh, N., Samadi, S., Nasiri, S., & Zebardast, J. (2017). Sensorineural hearing loss in patients with chronic suppurative otitis media: Is there a significant correlation?. *Electronic physician*, 9(2), 3823-7.
 5. Bakir, S., Kinis, V., Bez, Y., Gun, R., Yorgancilar, E., Ozbay, M., ... & Meric, F. (2013). Mental health and quality of life in patients with chronic otitis media. *European Archives of Oto-rhino-laryngology*, 270, 521-526.
 6. Dar, B. S., Manzoor, R., & Mehta, K. S. (2022). A Study of Sensorineural Hearing Loss in Patients with Chronic Suppurative Otitis Media. *Int J Sci Stud*, 10(9), 40-42.
 7. Reiß, M., & Reiß, G. (2010). Suppurative chronic otitis media: Etiology, diagnosis and therapy. *Med Monatsschr Pharm*, 33, 11-6.
 8. Noordzij, J. P., Dodson, E. E., Ruth, R. A., Arts, H. A., & Lamberts, P. R. (1995). CSOM and sensorineural hearing loss: Is there a clinically significant relation? *Am J Otolaryngol*, 16, 420-3.
 9. Azevedo, A. F., Pinto, D. C. G., Souza, N. J. A., Greco, D. B., & Goncalves, D. U. (2007). Sensorineural Hearing Loss in Chronic Suppurative Otitis Media with and without Cholesteatoma. *Brazilian Journal of Otorhinolaryngology*, 73, 671-674.
 10. Kaur, R., Singh, S. P., & Singh, J. (2018). A Study of Determinants of Sensorineural Hearing Loss in Chronic Suppurative Otitis Media with or without Cholesteatoma. *International Journal of Otolaryngology and Head & Neck Surgery*, 7, 148-159.
[https://doi.org/10.1016/S1808-8694\(15\)30128-2](https://doi.org/10.1016/S1808-8694(15)30128-2).
 11. World Medical Association. (2001). World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. *Bulletin of the World Health Organization*, 79(4), 373-374. World Health Organization.
<https://apps.who.int/iris/handle/10665/268312>.
 12. Voigt, P., & Axel von dem, B. (2017). "Enforcement and fines under the GDPR." *The EU General Data Protection Regulation (GDPR)*. Springer, Cham, 201-217.
 13. Kurian, C. A. (1996). Homologous dura for myringoplasty. *Indian J Otolaryngol Head Neck Surg*, 48(2), 150-2.
 14. John, N., Karthik, S., & Rodrigues, A. (2019). A study on correlation of size and site of tympanic membrane perforation with degree of conductive hearing loss in chronic otitis media. *Int J Otorhinolaryngol Head Neck Surg*, 5, 954.
 15. Mohsin, A., Mohsin, M. A., Kumar, M., Reddy, B., & Ravikumar, D. (2013). Sensorineural hearing loss in chronic suppurative otitis media of tubotympanic variety. *National J Otorhinolaryngol Head Neck Surg*, 10.
 16. Shariff, M. (2019). Analysis of hearing loss by pure tone audiometry in patients with chronic suppurative otitis media. *Natl J Physiol Pharm Pharmacol*, 1.