Original Article

Frequency of Hearing Loss in Children with Adenoid Hypertrophy

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ABSTRACT

Objective: To determine the frequency of hearing loss in children with adenoid hypertrophy.
Study Design: Descriptive, cross sectional study.
Place and Duration of Study: This study was conducted at the Department of Otorhinolaryngology, Sir Ganga Ram Hospital, Lahore from August 2, 2024, and February 1, 2025.
Methods: Total 95 patients with adenoid hypertrophy who are between the ages of 1 to 15 years were included, regardless of gender. cleft palate, bleeding disorders, sinonasal polyposis, choanal atresia, a significant deviated nasal septum, tumors of the nose and nasopharynx, ototoxic medication use, acoustic neurinoma, middle ear diseases, abnormal tympanometric curves, or barotrauma in their anamnesis were not included. A calibrated digital audiometer, the ALPS AD 2100, was used for the audiometric testing, which was conducted in a noise-free office setting. The hearing threshold for each ear was assessed between 250 and 8 kHz, and a threshold of more than 35 dB was considered to be suggestive of hearing loss.
Results: The mean age in this study was 8.71 ± 2.79 years, with a range of 1 to 15 years. 51 patients, or 53.68% of the total, were between the ages of 9 and 15. With a male to female ratio of 1.7:1, 60 (63.16%) of the 95 patients were men and 35 (30.84%) were women. In our study, the average length of illness was 6.47 ± 1.74 months. The average adenoid size was 2.67 ± 1.14 cm. 45 patients (47.37%) in our study had hearing loss in children with adenoid hypertrophy.
Conclusion: The study's findings demonstrate the high frequency and wide range of hearing loss in kids with hypertrophic adenoids, with mild conductive hearing loss being particularly common.

Key Words: Adenoids hypertrophies, hearing loss, Audiometry

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INTRODUCTION

The adenoid, also known as the pharyngeal tonsil, is a lymphatic tissue that produces antibodies and is situated in the superior region of the nasopharynx posteriorly, close to the choana and the eustachian tube entrance.[1] It increases in size during childhood, peaking in size in children aged 3 to 7 and then starting to decline during puberty.[2] Due to the comparatively lower volume of the nasopharynx and choanal aperture, children under the age of seven are more susceptible to the symptoms of an enlarged adenoid. The adenoid's physiologic growth and regression pattern is followed by the predominance of AH (pathologic enlargement).[3] These symptoms could include a nasal voice, trouble breathing through the nose, snoring at night, and irregular sleep patterns. These kids breathe through their mouths, therefore they keep their mouths open all the time.[1]

Adenoids, or enlarged pharyngeal tonsils, are one of the primary causes of eustachian tube dysfunction in children.[4] Blockage of the eustachian tube causes middle ear illness by causing negative pressure and inadequate ventilation of the middle ear. Chronic otitis media (COM) and otitis media with effusion (OME) have been identified as the most common causes of hearing loss in young infants.[5] The majority of research suggest worry, despite differing views regarding the degree of impact on the child's learning capacity. The issue is exacerbated in less-than-ideal listening environments where even a slight hearing loss might impede speech perception.[6] Hearing loss is a burden on both individuals and the country, negatively impacts learning capacity, and is mainly preventable.[7] According to one study, 56% of children with adenoid hypertrophy had hearing loss.[8]

The literature on the effect of adenoids on childhood hearing loss is insufficiently supported. Finding out how common hearing loss is in local children with adenoid hypertrophy is the goal of my research. Adenoidal hearing loss might go undiagnosed, although it is easily treated with medicinal and surgical techniques. An early diagnosis and course of treatment are necessary to avoid adenoidal consequences. Additionally, my research will contribute to the local literature.

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METHODS

The Department of Otorhinolaryngology at Sir Ganga Ram Hospital in Lahore conducted this descriptive cross-sectional study between August 2, 2024, and February 1, 2025. After the institutional ethical review committee gave its approval, non-probability sequential sampling was used to choose 95 patients who satisfied the inclusion criteria. The informed consent of each patient will be sought. A sample size of 95 cases has been established with a 56.0%[8] frequency of hearing loss, a 10% margin of error, and a 95% confidence level. All patients with adenoid hypertrophy who are between the ages of 1 to 15 years and who come with symptoms such as sore throat, difficulty swallowing, nasal blockage, plain radiographs of the postnasal area, and an adenoid nasopharyngeal ratio (ANR) >0.4 was considered positive. Based on the proportion of adenoid tissue that causes posterior choana obstruction, it will be divided into the following four grades: The following grades were included, regardless of gender: In Grade I, adenoid tissue blocks 0% to 25% of the posterior choana; in Grade II, it blocks 26% to 50%; in Grade III, it blocks 51% to 75%; and in Grade IV, it blocks 76% to 100% of the posterior choana. The following conditions were excluded: cleft palate, bleeding disorders, sinonasal polyposis, choanal atresia, a significant deviated nasal septum, tumors of the nose and nasopharynx, ototoxic medication use, acoustic neurinoma, middle ear diseases, abnormal tympanometric curves, or barotrauma in their anamnesis.

Age, gender, length of symptoms, adenoid size, adenoid grade, and residence were among the demographic characteristics recorded. Following this, a consultant surgeon performed audiometry on each patient to determine whether or not they had hearing loss. A calibrated digital audiometer, the ALPS AD 2100, was used for the audiometric testing, which was conducted in a noise-free office setting. The hearing threshold for each ear was assessed between 250 and 8 kHz, and a threshold of more than 35 dB was considered to be suggestive of hearing loss. The proforma had all of the data.

SPSS version 25 was used to enter and evaluate the data. The mean and SD for age, symptom duration, and adenoid size were displayed. Frequencies and percentages for gender, adenoid grade (I/II/III/IV), place of residence (rural vs. urban), and hearing loss (present vs. absent) were displayed. Age, gender, length of symptoms, adenoid size, adenoid grade (I/II/III/IV), and place of residence (rural vs. urban) were all stratified. Additionally, the post-stratification chi-square test was used. A P-value of less than 0.05 was deemed significant.

RESULTS

The mean age in this study was 8.71 ± 2.79 years, with a range of 1 to 15 years. 51 patients, or 53.68% of the total, were between the ages of 9 and 15. With a male to female ratio of 1.7:1, 60 (63.16%) of the 95 patients were men and 35 (30.84%) were women. In our study, the average length of illness was 6.47 ± 1.74 months. The average adenoid size was 2.67 ± 1.14 cm. Table I displays the distribution of patients with additional confounding variables.

45 patients (47.37%) in our study had hearing loss in children with adenoid hypertrophy (Figure I). Table II displays the stratification of hearing loss by age, gender, duration of symptoms, adenoid size, adenoid grade, and place of residence.

Table No.2: Distribution of patients with other confounding variables (n=95)

Confounding variables		Frequency	%age
Age (years)	1-8	44	46.32
	9-15	51	53.68
Gender	Male	60	63.16
	Female	35	36.84
Duration of disease (months)	≤6	53	55.79
	>6	42	44.21
Size of adenoid (cm)	≤3	73	76.84
	>3	22	23.16
Grade of adenoid	I	07	7.37
	II	35	36.84
	III	40	42.11
	IV	13	13.68
Place of residence	Rural	36	37.89
	Urban	59	62.11

Table No.4: Stratification of hearing loss with respect to age, gender, duration of symptoms, size of adenoid, grade of adenoid and place of living.

		Present (n=45)	Absent (n=50)	P-value
Age (years)	1-8	18 (40.91%)	26 (59.09%)	**0.241**
	9-15	27 (52.94%)	24 (47.06%)	
Gender	Male	33 (55.0%)	27 (45.0%)	**0.051**
	Female	12 (34.29%)	23 (65.71%)	
Duration of disease (months)	≤6	24 (45.28%)	29 (54.72%)	**0.647**
	>6	21 (50.0%)	21 (50.0%)	
Size of adenoid (cm)	≤3	34 (46.58%)	39 (53.42%)	**0.778**
	>3	11 (50.0%)	11 (50.0%)	
Grade of adenoid	I	03 (42.86%)	04 (57.14%)	**0.607**
	II	18 (51.43%)	17 (48.57%)	

	III	20 (50.0%)	20 (50.0%)	
	IV	04 (30.77%)	09 (69.23%)	
Residence	Rural	17 (47.22%)	19 (52.78%)	**0.982**
	Urban	28 (47.46%)	31 (52.54%)	

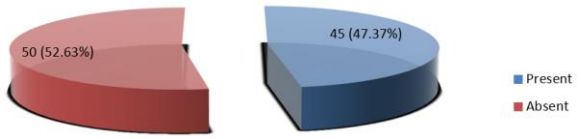

Figure No.I: Frequency of hearing loss in children with adenoid hypertrophy (n=95).

DISCUSSION

Our study's demographic analysis showed that participants' ages ranged widely, with the largest group being those between the ages of 9 and 15 (53.68%). The study included a somewhat higher percentage of males (63.16%) than females (36.84%) in terms of gender distribution. The greater frequency of children from urban regions compared to those from rural areas was an intriguing finding that might point to a regional variation in the incidence of hypertrophic adenoids.

In contrast, Inoshita A et al.'s 2018 study shown that girls had greater OSA indices than boys, highlighting gender differences in craniofacial features and the severity of OSA in pre-adolescent groups.[9] Although our study did not directly look into this aspect, this may point to a possible association between the development of hypertrophic adenoids in different genders and changes in craniofacial anatomy.

A high prevalence of Type B tympanometry, especially in the left ear, was also discovered in a 2021 investigation by Hazem M. Abdel Tawab.[10] This resemblance emphasizes how important tympanometry is for identifying middle ear disorders in kids with hypertrophic adenoids. Regarding auditory outcomes, 45 patients (47.37%) had hearing loss in children with adenoid hypertrophy.

These results are supported by a 2018 study by Vadisha Bhat, which showed that individuals with chronic otitis media with effusion had a considerable rate of conductive hearing loss.[11] The World Health Organization said that the study's CHL ranged from mild to moderate, or 26 dB to 55 dB.[12] A hearing loss between 26 and 40 dB was present in 97.10% of case ears, while 2.89% of case ears had a hearing loss between 41 and 55 dB. The mean hearing loss was 31.69 decibels. This series' findings regarding hearing threshold were comparable to those of a research conducted by Sarwar et al.[13]

In 2022, Kishore Kumar Halder conducted research on how adenoidectomy affected hearing in kids with otitis media with effusion. A post-operative PTA and tympanometry were performed three months after the patients' sedated adenoidectomy surgeries. The study demonstrated adenoidectomy's function in lowering middle ear effusion, enhancing hearing, and supporting speech and language development in children with enlarged adenoids by revealing notable improvements in hearing and alterations in tympanometric findings after surgery.[14]

Sultan Badar Munir and associates looked on the frequency of hearing loss in middle ear infection patients in 2021. According to their findings, most of the patients had hearing loss of some kind, from mild to severe.[15] In 2022, David E. Tunkel, MD, carried out a different study that looked at the prevalence of otolaryngologic surgery among people with achondroplasia. The study discovered that a sizable percentage of patients were having tympanostomy tube insertions and pharyngeal surgeries, such as adenoidectomies, underscoring the necessity of close observation and possible surgical procedures in this population.[16]

Adenoid hypertrophy was identified in this investigation as a potential contributing factor to the occurrence of OME and CHL. Additionally, it was discovered that when adenoids grew in size, the incidence of CHL increased. According to our research, the more adenoidal obstruction there was, the higher the degree of CHL. Children who had third- or fourth-degree adenoids at presentation had a five-fold increased risk of developing CHL. Therefore, symptoms that are caused by third- and fourth-degree adenoid might be regarded as one of the selection factors for surgical therapy.[17,18]

The thorough demographic, tympanometric, and audiometric data in this study are its strongest points; they offer important new information about the features of hearing loss in kids with hypertrophic adenoids. Limitations, however, include the absence of a thorough examination of plausible causes, such as genetic predispositions or environmental impacts, which would offer a more comprehensive explanation of the illness. Furthermore, the cross-sectional nature of the study makes it difficult to draw conclusions about causality or the evolution of hearing loss over time.

It is advised that a longitudinal strategy be used in future studies to gain a better understanding of how hearing loss develops in kids with hypertrophy adenoids. A more thorough understanding of the illness might also be obtained by looking into the effects of dietary practices, genetic predisposition, and environmental factors. Additionally, broadening the study's geographic focus to encompass a wider range of populations may aid in detecting possible regional variations in the frequency and intensity of hypertrophic adenoids and related hearing loss.

CONCLUSION

The study's findings demonstrate the high frequency and wide range of hearing loss in kids with hypertrophic adenoids, with mild conductive hearing loss being particularly common. The demographic distribution showed a somewhat higher percentage of men and a higher representation of older children. The results highlight how crucial it is to regularly evaluate children with hypertrophic adenoids' hearing, especially in metropolitan environments. The study also suggests that in order to address and manage hearing loss in this population, focused interventions and awareness campaigns may be necessary.

Author's Contribution:

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Drafting or Revising Critically:	Maria Asif, Waqas Javaid
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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REFERENCES

1. Galić MZ, Klančnik M. Adenoid size in children with otitis media with effusion. Acta Clin Croat 2021;60(3):532–9.
2. Arambula A, Brown JR, Neff L. Anatomy and physiology of the palatine tonsils, adenoids, and lingual tonsils. World J Otorhinolaryngol Head Neck Surg 2021;7:155–60.
3. Niedzielski A, Chmielik LP, Mielnik-Niedzielska G, Kasprzyk A, Bogusławska J. Adenoid hypertrophy in children: a narrative review of pathogenesis and clinical relevance. BMJ Paediatr Open 2023;7:e001710.
4. Mashat GD, Tran HH-V, Urgessa NA. The correlation between otitis media with effusion and adenoid hypertrophy among pediatric patients: a systematic review. Cureus 2022;14:e30985.
5. Goulioumis AK, Gkorpa M, Athanasopoulos M. The eustachian tube dysfunction in children: anatomical considerations and current trends in invasive therapeutic approaches. Cureus 2022; 14:e27193.
6. Basavaraju KP, Ranjani SK, Sri Vaibhava V. Correlation between tympanometric findings and adenoid hypertrophy among children without hearing loss in tertiary care hospital. Egypt J Otolaryngol 2024;40:9.
7. Khadgi A, Koirala K, Maharjan S, Chalise K, Dhungana I, Karki BB. Correlation of conductive hearing impairment with sizes of adenoids in the pediatric age group: an observational case-control study. Cureus 2023;15(8):e44439.
8. Khan I, Bibi A. Frequency of hearing loss and otitis media in children with adenoid hypertrophy. J Postgrad Med Inst 2018;32(4):403-6.
9. Inoshita A, Kasai T, Matsuoka R, Sata N, Shiroshita N, Kawana F, et al. Age-stratified sex differences in polysomnographic findings and pharyngeal morphology among children with obstructive sleep apnea. J Thorac Dis 2018; 10:6702–10.
10. Abdel Tawab HM, Tabook SMS. Correlation between adenoid hypertrophy, tympanometry findings, and viscosity of middle ear fluid in chronic otitis media with effusion, southern Oman. Ear Nose Throat J 2021;100(3):NP141–NP146.
11. Bhat V, Mani P, Aroor R, Saldanha M, Goutham M, Pratap D. Association of asymptomatic otitis media with effusion in patients with adenoid hypertrophy. J Otol 2018;14(3):106-10.
12. Abraham ZS, Kahinga AA, Massawe ER, Bukanu F. Prevalence of middle ear effusion among children with adenoid hypertrophy at a national referral hospital in Tanzania. South Sudan Med J 2023;16(3):102-5.
13. Sarwar SM, Rahman M, Ali MI, Alam MM, Hossain MA, Sanyal NP. Correlation of enlarged adenoids with conductive hearing impairment in children under twelve. Bangladesh J Otorhinolaryngol 2015;21:62–8.
14. Halder KK, Shafiullah M, Islam MS, Kabir AL, Mondal BR, Choudhury MA, et al. Pattern of Adenoidectomy in Children with Alone in Otitis Media with Effusion. Glob Acad J Med Sci 2022;4.
15. Munir SB, Saeed I, Khan SG, Ur Rehman SS, Ghayas R, Sikander M, et al. Frequency of hearing impairment in children between the age of 2 to 10 years with middle ear infection. J Pak Med Assoc 2021;71(6):1662–65.
16. Tunkel DE, Gough E, Bober MB, Hashmi SS, Hecht JT, Legare JM, et al. Otolaryngology utilization in patients with achondroplasia: results from the CLARITY Study. Laryngoscope 2022; 132(8):1548-54.
17. Grewal JS, Cohn JE, Burdett J, Tampio A, Licata J, Davis III WJ, et al. Otitis Media and Hearing Loss in Patients With Nonsyndromic Craniosynostosis: A Multicenter Study. Cleft Palate-Craniofac J 2021:10556656211017795.
18. Augustian SM, Vasu RK, Reynolds AM. Prevalence of asymptomatic otitis media with effusion in children with adenoid hypertrophy and its relation to adenoid size: a cross-sectional study. J Clin Diagn Res 2022;16(9):MC01–MC05.