Original Research Article

Incidence of Otitis Media with Effusion in School-Aged Children

Sanjeev Kumar[1], Manoj Kumar[2], Varun Kumar Thakur[3], Md. Ozair[4]

[1]Associate Professor, Department of ENT, Lord Buddha Koshi Medical College & Hospital, Saharsa, Bihar, India

[2]Assistant Professor, Department of ENT, Darbhanga Medical College &Hospital, Darbhanga, Bihar, India

[3]Professor and HOD, Department of ENT, Lord Buddha Koshi Medical College, & Hospital, Saharsa, Bihar, India

[4]Professor and HOD, Department of ENT, Darbhanga Medical College & Hospital, Darbhanga, Bihar, India

Abstract:

Background: Otitis media with effusion (OME) is a prevalent condition in children, characterized by the accumulation of fluid in the middle ear without signs of acute infection. It can lead to hearing loss and adversely affect academic performance and quality of life. This study aimed to determine the prevalence of OME among school-aged children and identify associated risk factors, such as respiratory infections and exposure to second-hand smoke.

Methods: A multicentric, cross-sectional study was conducted over 10 months, involving 55 children aged 5-12 years. Data were collected through questionnaires and clinical examinations, including otoscopic examination and tympanometry. Statistical analysis was performed using SPSS version 20.0. Descriptive statistics summarized demographic data and prevalence rates. Chi-square tests identified associations between OME and categorical variables, and logistic regression determined predictors of OME.

Results: The prevalence of OME was found to be 21.8%. Significant associations were identified between OME and a history of respiratory infections ($p = 0.011$) and exposure to second-hand smoke ($p = 0.016$). Logistic regression analysis revealed that children with a history of respiratory infections had over five times the odds of having OME (OR = 5.25, $p = 0.015$), while those exposed to second-hand smoke had nearly five times the odds (OR = 4.75, $p = 0.019$).

Conclusion: OME is prevalent among school-aged children, with respiratory infections and exposure to second-hand smoke as significant risk factors. These findings underscore the importance of addressing modifiable risk factors to prevent and manage OME in children.

Recommendations: Preventive measures should focus on reducing exposure to second-hand smoke and managing respiratory infections effectively. Public health initiatives and parental education are essential to mitigate these risk factors and lower the incidence of OME.

Keywords: Otitis media with effusion, Prevalence, School-aged children, Risk factors, Respiratory infections.

Introduction

Otitis media with effusion (OME) is a prevalent condition characterized by the presence of fluid in the middle ear without signs or symptoms of acute ear infection. This condition is particularly common among children, often leading to hearing impairments and impacting their quality of life and academic performance.

Recent studies indicate that OME affects approximately 80% of children by the age of four, with recurrent cases observed in 30-40% of children, and 5-10% experiencing episodes lasting a year or longer [1]. The etiology of OME is multifactorial, involving factors such as Eustachian tube dysfunction, previous acute otitis media (AOM), allergies, and environmental influences like exposure to tobacco smoke. A study conducted in Saudi Arabia highlighted the significant prevalence of OME among school-aged children, with environmental factors playing a crucial role. Similarly, research in Turkey emphasized the impact of recurrent respiratory infections and poor socioeconomic conditions on the incidence of OME [2].

The clinical management of OME has evolved with the establishment of guidelines aimed at timely diagnosis and intervention to prevent long-term auditory and developmental consequences. According to the American Academy of Otolaryngology-Head and Neck Surgery, a conservative approach involving watchful waiting is recommended for most cases, as spontaneous resolution occurs in many children within three months [3]. However, persistent cases may require medical or surgical interventions, including tympanostomy tube insertion, to alleviate symptoms and restore hearing [4].

This study aimed at determining the prevalence of otitis media with effusion (OME) in school-aged children.

Methodology

Study Design: Amulticentric, observational, cross-sectional study.

Study Setting: The study was conducted over a period of 10 months across multiple centers, including various schools and pediatric clinics to ensure a diverse participant pool.

Participants: A total of 55 school-aged children were included in the study.

Inclusion Criteria

- Children aged 5 to 12 years
- Children attending the selected schools and pediatric clinics
- Consent obtained from parents or guardians

Exclusion Criteria

- Children with a history of chronic ear infections
- Children with congenital ear abnormalities
- Children currently undergoing treatment for any ear-related issues
- Children with severe systemic illnesses

Bias: To minimize selection bias, random sampling was used in selecting participants from the schools and clinics. Efforts were made to ensure an equal distribution of participants across different age groups and genders.

Variables: Variables included age, gender, socioeconomic status, history of respiratory infections, environmental factors, presence of otitis media with effusion.

Data Collection

Data were collected through:

- **Questionnaires:** To gather demographic information, medical history, and environmental exposure.
- **Clinical Examination:** Otoscopic examination and tympanometry were performed by trained otolaryngologists to diagnose OME.

Procedure

1. Consent was obtained from parents or guardians.
2. Questionnaires were administered to collect demographic and medical history data.
3. Clinical examinations, including otoscopic examination and tympanometry, were performed to identify the presence of OME.
4. Findings were recorded and categorized based on the presence or absence of OME.

Statistical Analysis: Data were analyzed using SPSS version 20.0. Descriptive statistics were used to summarize the demographic data and prevalence rates. Chi-square tests were used to identify associations between OME and categorical variables.

Logistic regression analysis was conducted to determine the predictors of OME. A p-value of <0.05 was considered statistically significant.

Result

Table 1: Demographic Data

Risk Factor	Total (n=55)	OME Present (n=12)	OME Absent (n=43)	p-value
Age (mean ± SD)	8.4 ± 2.1	7.9 ± 2.0	8.5 ± 2.2	0.329
Gender				
• Male	28 (50.9%)	6 (50.0%)	22 (51.2%)	0.927
• Female	27 (49.1%)	6 (50.0%)	21 (48.8%)	
Socioeconomic Status				
• Low	30 (54.5%)	9 (75.0%)	21 (48.8%)	0.086
• High	25 (45.5%)	3 (25.0%)	22 (51.2%)	

A total of 55 school-aged children were included in the study. The age distribution ranged from 5 to 12 years, with a mean age of 8.4 years (SD = 2.1). There were 28 males (50.9%) and 27 females (49.1%).The overall prevalence of OME among the study participants was found to be 21.8% (12 out of 55 children).Table 1 provides a summary of the demographic and socioeconomic characteristics of the participants and the prevalence of OME.

Table 2: Association with Risk Factors

Risk Factor	Total	OME Present	OME Absent	p-value
History of Respiratory Infections	15 (27.3%)	7 (58.3%)	8 (18.6%)	0.011
Exposure to Second-Hand Smoke	20 (36.4%)	8 (66.7%)	12 (27.9%)	0.016

The study examined potential risk factors for OME, including history of respiratory infections and exposure to second-hand smoke.

Table 3: Logistic Regression Analysis

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age	0.92	0.76-1.12	0.388
Gender (Female)	1.04	0.30-3.65	0.949
Low Socioeconomic Status	3.57	0.91-14.00	0.069
History of Respiratory Infections	5.25	1.39-19.82	0.015
Exposure to Second-Hand Smoke	4.75	1.30-17.34	0.019

Logistic regression analysis was performed to identify predictors of OME. The results are presented in Table 3.

Discussion

A total of 55 children, aged between 5 and 12 years, were included in the study, with a nearly equal distribution of males (50.9%) and females (49.1%). The overall prevalence of OME was found to be 21.8%, indicating that approximately one in five children in the sample were affected by this condition.

Demographic analysis revealed no significant differences in age or gender between children with OME and those without the condition. However, there was a noticeable trend towards higher prevalence among children from low socioeconomic backgrounds, although this was not statistically significant (p = 0.086).

The study identified two significant risk factors for OME: a history of respiratory infections and exposure to second-hand smoke. Children with a history of respiratory infections had a significantly higher prevalence of OME (58.3%) compared to those without such a history (18.6%), with a p-value of 0.011. Similarly, exposure to second-hand smoke was significantly associated with OME, with 66.7% of exposed children affected compared to 27.9% of unexposed children, yielding a p-value of 0.016.

Logistic regression analysis further confirmed the significance of these risk factors. Children with a history of respiratory infections had over five times the odds of having OME (OR = 5.25, p = 0.015), while those exposed to second-hand smoke had nearly five times the odds (OR = 4.75, p = 0.019). These findings underscore the importance of respiratory health and a smoke-free environment in preventing OME in children.

Overall, the study highlights a substantial prevalence of OME in school-aged children and identifies key modifiable risk factors. Interventions aimed at reducing respiratory infections and minimizing exposure to second-hand smoke could potentially lower the incidence of OME, thereby improving the overall health and quality of life of affected children. The results emphasize the need for public health initiatives and parental education to address these risk factors effectively.

A study compared the prevalence of OME in mentally handicapped versus normal school-going children, highlighting seasonal variations. The study found that OME affected all school children uniformly, with a higher concern for complications in mentally handicapped children during winters [5]. The incidence and predisposing factors of OME was studied in 1488 school-going children in Muzaffarnagar, India. The incidence was found to be 7.5%, with significant associations to age less than 8 years, larger family size, lower maternal education, recurrent acute otitis media, and living in rural areas [6]. A study found a higher incidence of OME in Nigerian children with cleft palate compared to controls. Significant risk factors included younger age, male sex, and larger cleft size [7]. Research reported a 2.6% prevalence of OME in primary school children in Mersin, Turkey, with all cases being bilateral. The study emphasized the need for preventive health services for early detection [8]. A study found a high incidence (21.3%) of undiagnosed OME in children aged 5-8 years in Ajmer, Rajasthan. The study highlighted the importance of awareness programs for parents and teachers to facilitate early diagnosis [9].

A study found an OME prevalence of 11.5% in preschool-aged children, with the highest rate observed in spring. The prevalence was higher in suburban areas compared to urban areas [10]. A study reported that OME was the most common cause of hearing loss in children aged 3-15 years in Faridkot, India, with a higher prevalence in the 6-8 years age group [11].

Conclusion

This study found a 21.8% prevalence of otitis media with effusion (OME) in school-aged children, highlighting it as a significant health concern. The analysis identified a history of respiratory infections and exposure to second-hand smoke as major risk

factors. These findings underscore the need for targeted interventions to manage respiratory health and reduce environmental risk factors to prevent OME and its associated complications in children. Public health initiatives focusing on these areas could significantly reduce the incidence and impact of OME.

References

1. Prevalence of Otitis Media with Effusion in Children with Hearing Loss. Indian Journal of Otolaryngology and Head & Neck Surgery. 2021;73(3):311-315.
2. Alharbi FA, Ahmed RA. Evaluation of hearing among kindergarten children in Jazan (Kingdom of Saudi Arabia). Interv Med Appl Sci. 2015;7(3):91-94.
3. Humaid AH, Ashraf AH, Masood KA, et al. Prevalence and risk factors of Otitis Media with effusion in school children in Qassim Region of Saudi Arabia. Int J Health Sci (Qassim). 2014;8(4):325-334.
4. Sanli A, Tasdemir O, Eken M, Celebi O, Yilmaz SH. Prevalence of otitis media with effusion among primary school age-children and etiopathogenic examination. Indian J Otolaryngol Head Neck Surg. 2014;66(1):95-98.
5. Sheikh N, Nadeem K. Comparison of seasonal prevalence of Otitis media with effusion (OME) in mentally handicapped versus normal school-going children. The professional medical journal. 2020;27:309-316.
6. Khan M, Parmar SM, Goel S, Chaudhary M. Incidence and Predisposing factors of Otitis Media with effusion in Muzaffarnagar school going children. Indian journal of applied research. 2018;7.
7. Edetanlen E, Saheeb B. Otitis media with effusion in Nigerian children with cleft palate: incidence and risk factors. The British journal of oral & maxillofacial surgery. 2019;57:36-40.
8. Vayisoglu SK, Erdoğan O, Öncü E, Mutlu M. Prevalence and risk factors of otitis media with effusion in primary school children in Mersin. Journal of Health Sciences and Medicine. 2020.
9. Choudhary S, Verma DP, Singh B. Undiagnosed otitis media with effusion in children: Incidence & effect. International Journal of Medical and Biomedical Studies. 2019.
10. Koye ZMA, Shem AAM. Prevalence of otitis media with effusion among preschool-age children in Erbil governorate. Zanco Journal of Medical Sciences. 2018;22:282-291.
11. Parmar S, Davessar J, Singh G, Arora N, Kansal L, Singh J. Prevalence of Otitis Media with Effusion in Children with Hearing Loss. Indian Journal of Otolaryngology and Head & Neck Surgery. 2018;71:1276-1281.