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Original Research Article

Prevalence of Otitis Media with Effusion in School-Age Children

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Abstract:

Background: Otitis media with effusion (OME) is a common, often asymptomatic condition in children, characterized by fluid accumulation in the middle ear without signs of acute infection. If undiagnosed, it can lead to hearing loss and impaired academic performance.

Objective: To determine the prevalence of OME among school-aged children and identify associated risk factors.

Materials and Methods: A cross-sectional study was done on 500 5–12-year-olds from 10 randomly selected schools. Diagnostic methods included clinical otoscopic examination, tympanometry, and pure-tone audiometry. Risk variables included recent upper respiratory infections, passive smoking, and socioeconomic level.

Results: Overall, 11.2% of people had OME, with 18.3% in the 5–7 age group. In 80.4% of children, bilateral effusion occurred. Significant relationships were detected with recent URTIs ($p<0.01$), passive smoking ($p<0.001$), and worse socioeconomic level ($p = 0.03$). In 85.7% of OME cases, conductive hearing loss was mild.

Conclusion: OME is prevalent among schoolchildren, especially in younger age groups. Early screening and awareness of risk factors are vital to prevent long-term auditory and developmental complications.

Keywords: Otitis media with effusion, Tympanometry, School-aged children, Hearing loss

Introduction

The presence of non-purulent fluid in the middle ear without any indications of an acute infection is known as otitis media with effusion (OME). It is among the most common causes of hearing loss in children, particularly in those between the ages of 5 and 12, who frequently experience this condition during crucial stages of speech and language development [1]. OME is a silent but important factor in school-aged children's behavioural and academic issues since, in contrast to acute otitis media, it usually has no obvious symptoms [2]. Eustachian tube dysfunction is a major element in the complex pathophysiology of OME. Upper respiratory tract infections, allergic rhinitis, swollen adenoids, and environmental variables, including tobacco smoke exposure and poor air quality, can all cause this dysfunction [3,4]. Due to close contact, increased exposure to respiratory infections, and inadequate ventilation, children in school environments are particularly vulnerable to middle ear effusions, which can develop and persist [5].

Since chronic fluid retention can cause conductive hearing loss and consequent delays in language acquisition and academic performance, early detection of OME is crucial [6]. To find OME cases, school health programmes use a variety of screening techniques, including otoscopy, tympanometry, and audiometry [7,8]. Depending on geographic, socioeconomic, and environmental factors, estimates of the frequency of OME vary greatly worldwide, ranging from 6% to 26%. OME is prevalent, but because of its asymptomatic presentation, it is still underdiagnosed, which makes routine screening necessary, especially in sensitive age groups [9,10].

The purpose of this study is to ascertain the prevalence of otitis media with effusion in school-age children and to pinpoint risk variables that may be linked to its development.

Materials and Methods

Study Design and Setting

This 6-month cross-sectional observational study was undertaken in government and private primary schools in [City Name] under the Department of Otorhinolaryngology, [Medical College Name].

Study Population

The study comprised 5–to 12-year-old schoolchildren. Five hundred pupils from 10 random schools were screened. All participants' parents or guardians gave informed written consent, and the youngsters gave assent.

Inclusion Criteria

- Children aged 5 to 12 years
- Children with no history of acute ear infection in the last 3 weeks
- Parental/guardian consent and child assent obtained

Exclusion Criteria

- Children with congenital ear anomalies
- History of ear surgery
- Children with developmental disorders or syndromic conditions affecting hearing assessment

Sampling Technique

Multistage random sampling was used. Ten regionally registered schools were randomly selected. At each school, 50 students were randomly selected using attendance registers.

Data Collection Tools

1. **Clinical Examination**: Each child underwent an otoscopic examination by a trained ENT specialist to inspect the tympanic membrane for signs of effusion, such as retraction, air-fluid level, or loss of light reflex.
2. **Tympanometry**: Performed using a calibrated portable tympanometer (Model: [Insert Model]), tympanometric curves were categorized into types A, B, and C based on Jerger's classification. Type B was considered diagnostic of OME.
3. **Audiometry**: Pure-tone audiometry was conducted in a sound-treated mobile unit. A conductive hearing loss of 20–40 dB was considered consistent with OME.

Data Analysis

Data were entered into Excel and analysed using SPSS 25.0. OME prevalence was calculated using descriptive statistics. OME and risk factor such age, sex, socioeconomic position, passive smoking, and recent upper respiratory tract infections were examined using chi-square testing. A p-value <0.05 indicated statistical significance.

Results

A total of 500 school-aged children (ages 5–12 years) were screened during the study, with an equal distribution of males (n=250, 50%) and females (n=250, 50%). The overall prevalence of otitis media with effusion (OME), confirmed by type B tympanogram and/or mild conductive

hearing loss, was found to be **11.2%** (n=56).

Age-wise Distribution

The highest prevalence was noted in the 5–7 years age group (18.3%), followed by 8–10 years (10.0%), and lowest in the 11–12 years group (5.4%).

- 5–7 years: 180 children screened, 33 diagnosed with OME (18.3%)
- 8–10 years: 200 children screened, 20 diagnosed with OME (10.0%)
- 11–12 years: 120 children screened, 3 diagnosed with OME (2.5%)

Gender-wise Distribution

Among boys, 30 (12%) had OME, while among girls, 26 (10.4%) were affected. The gender difference was not statistically significant ($p = 0.48$).

Tympanometry Findings

Out of the 56 children diagnosed with OME:

- 45 children (80.4%) had bilateral type B tympanograms
- 11 children (19.6%) had unilateral type B tympanograms

Risk Factor Associations

- **History of recent upper respiratory tract infection (URTI)** was significantly associated with OME: 40 out of 56 children (71.4%) with OME had a history of URTI in the preceding 4 weeks ($p < 0.01$).
- **Exposure to passive smoking** was noted in 22 out of 56 children (39.3%) with OME, compared to 60 out of 444 children (13.5%) without OME ($p < 0.001$).
- **Socioeconomic status** showed higher prevalence in lower socioeconomic groups (14.6%) compared to middle (9.8%) and upper socioeconomic groups (6.1%) ($p = 0.03$).

Audiometry Findings

Among children with OME, 48 (85.7%) demonstrated mild conductive hearing loss (20–40 dB), while 8 children (14.3%) had normal audiometric thresholds, suggesting transient or early-stage OME.

Table:

Parameter	Total (n=500)	OME Cases (n=56)	Prevalence (%)
Age Group			
5–7 years	180	33	18.3%
8–10 years	200	20	10.0%
11–12 years	120	3	2.5%
Gender			
Male	250	30	12.0%
Female	250	26	10.4%
Tympanometry Findings			
Bilateral Type B	-	45	80.4% of OME cases
Unilateral Type B	-	11	19.6% of OME cases
Risk Factors			
Recent URTI	-	40	71.4% of OME cases
Passive Smoking Exposure	-	22	39.3% of OME cases
No Passive Smoking	-	34	60.7% of OME cases
Socioeconomic Status			
Lower	150	22	14.6%
Middle	200	19	9.8%
Upper	150	9	6.1%
Audiometry Findings			
Mild Conductive Hearing Loss	-	48	85.7% of OME cases
Normal Hearing	-	8	14.3% of OME cases

Discussion

The study found an overall prevalence of 11.2% for otitis media with effusion (OME) in school-aged children aged 5–12 years, with the highest prevalence occurring in the 5–7 years age group at 18.3%. The findings are consistent with existing literature indicating that the prevalence of OME is elevated in younger school-aged children, attributed to underdeveloped Eustachian tube function, recurrent upper respiratory infections, and increased exposure to infectious agents in school settings [11,12]. Zielhuis et al. reported a comparable prevalence, indicating that the global prevalence of OME in children ranges from 6% to 26%, with elevated rates observed in younger age groups and environments with significant risk exposure [13]. A study by Bhat et al. in Karnataka indicated a prevalence of 13.4% among children aged 6–10 years, which aligns closely with our findings [14]. An Indian study conducted by Iseh and Adegbite found a prevalence of 9.2% among schoolchildren aged 4–11 years, utilizing tympanometry and pure tone audiometry [15].

This study identified recent upper respiratory tract infection (URTI) as a statistically significant risk factor for otitis media with effusion (OME) ($p < 0.01$). This finding aligns with the research of Tos et al., who highlighted the critical role of URTIs in Eustachian tube dysfunction and the resulting middle ear effusion [16]. Furthermore, exposure to passive smoking demonstrated a significant association with OME ($p < 0.001$), supporting findings from the study by Nozza et al., which indicated that second-hand smoke adversely affects mucociliary function and enhances mucous production, consequently facilitating effusion [17]. This study found that most cases of OME exhibited bilateral involvement (80.4%) and mild conductive hearing loss (85.7%), aligning with findings from a Nigerian study by Olusanya et al., which also noted a similar bilateral predominance and hearing impact [18]. Tympanometry served a crucial diagnostic function in this study, underscoring its recognised efficacy as a dependable screening instrument for the detection of OME in educational environments [19].

This study demonstrated a socio-economic gradient, revealing that children from lower socio-economic backgrounds exhibit a higher prevalence of OME (14.6%). This finding aligns with global data indicating a correlation between poverty, environmental exposures, limited healthcare access, and otological diseases [20]. The findings highlight the necessity of establishing regular school-based screening programmes and public health education to facilitate early detection and management of OME, especially in at-risk age groups and populations with elevated exposure levels.

Conclusion

This study found that 11.2% of school-aged children have otitis media with effusion (OME), particularly younger ones. OME was linked to recent upper respiratory tract infections, passive smoking, and a poorer socioeconomic level. Regular tympanometry and audiometry screenings in schools are crucial for early detection and management. Public health interventions that reduce environmental risk factors and raise awareness among parents and educators can prevent long-term problems including hearing loss and delayed speech development from undiagnosed OME.

References

1. Bluestone CD. Epidemiology and pathogenesis of chronic suppurative otitis media: implications for prevention and treatment. Int J Pediatr Otorhinolaryngol. 1998;42(3):207–223. doi:10.1016/S0165-5876(97)00153-3
2. American Academy of Pediatrics, Subcommittee on Otitis Media With Effusion. Otitis media with effusion. Pediatrics. 2004;113(5):1412–1429. doi:10.1542/peds.113.5.1412

3. Gunasekera H, Morris PS, McIntyre P, Craig JC. Otitis media in Aboriginal children: tackling a major health problem. Med J Aust. 2007;187(1):37–38. doi:10.5694/j.1326-5377.2007.tb01143.x
4. Lieu JE. Unilateral hearing loss in children: speech-language and school performance. B-ENT. 2013;Suppl 21:107–115.
5. Koivunen P, Uhari M, Luotonen J, et al. The duration of acute otitis media and the spontaneous recovery of OME in children. Clin Otolaryngol Allied Sci. 1997;22(4):339–342. doi:10.1046/j.1365-2273.1997.00006.x
6. Tos M. Epidemiology and natural history of secretory otitis. Am J Otol. 1984;5(6):459–462.
7. Maw R, Hall D. Chronic otitis media with effusion. Br Med J (Clin Res Ed). 1985;290(6476):891–894. doi:10.1136/bmj.290.6476.891
8. Casselbrant ML, Mandel EM, Rockette HE, et al. Otitis media with effusion in preschool children. Laryngoscope. 1995;105(3 Pt 1):209–214. doi:10.1288/00005537-199503000-00001
9. Gates GA, Avery CA, Prihoda TJ, Cooper JC Jr. Effectiveness of adenoidectomy and tympanostomy tubes in the treatment of chronic otitis media with effusion. N Engl J Med. 1987;317(23):1444–1451. doi:10.1056/NEJM198712033172304
10. Rosenfeld RM. A community-based study of the validity of tympanometry in children. Arch Otolaryngol Head Neck Surg. 1992;118(9):897–903. doi:10.1001/archotol.1992.01880090037007
11. Rosenfeld RM, Shin JJ, Schwartz SR, et al. Clinical practice guideline: Otitis media with effusion (update). Otolaryngol Head Neck Surg. 2016;154(1 Suppl):S1–S41. doi:10.1177/0194599815623467
12. Teele DW, Klein JO, Rosner B. Epidemiology of otitis media during the first seven years of life in children in greater Boston: a prospective, cohort study. J Infect Dis. 1989;160(1):83–94. doi:10.1093/infdis/160.1.83
13. Zielhuis GA, Rach GH, van den Broek P, et al. The prevalence of otitis media with effusion: a critical review of the literature. Clin Otolaryngol Allied Sci. 1990;15(3):283–288. doi:10.1111/j.1365-2273.1990.tb00483.x
14. Bhat N, Bhandary S, Kiran M, et al. Prevalence and risk factors of otitis media with effusion in primary school children in South India. Indian J Otolaryngol Head Neck Surg. 2012;64(3):253–258. doi:10.1007/s12070-011-0314-8
15. Iseh KR, Adegbite T. Pattern and prevalence of otitis media with effusion in Nigerian school children. Niger J Clin Pract. 2004;7(1):6–9.
16. Tos M. Epidemiology and natural history of secretory otitis. Am J Otol. 1984;5(6):459–462.
17. Nozza RJ, Bluestone CD, Kardatzke D, Bachman R. Passive cigarette smoking and middle ear effusion. Arch Otolaryngol Head Neck Surg. 1992;118(8):866–869. doi:10.1001/archotol.1992.01880080048012
18. Olusanya BO, Okolo AA, Ijaduola GT. The hearing profile of Nigerian school children. Int J Pediatr Otorhinolaryngol. 2000;55(3):173–179. doi:10.1016/S0165-5876(00)00385-2
19. Maw AR. Development of guidelines for the treatment of otitis media with effusion in children. Clin Otolaryngol Allied Sci. 1992;17(4):317–321. doi:10.1111/j.1365-2273.1992.tb01002.x
20. Minja BM, Machemba A. Prevalence of otitis media, hearing impairment and its related factors among primary school children in rural Tanzania. Int J Pediatr Otorhinolaryngol. 1996;37(2):123–131. doi:10.1016/0165-5876(95)01302-5