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Prevalence and Risk Factors of Chronic Suppurative Otitis Media in School-Aged Children in Rural Areas

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Abstract

Background

Permanent middle ear infections known as Chronic Supportive Otitis Media (CSOM) stands as a main reason behind childhood hearing loss particularly in regions with limited resources. Three main factors which escalate CSOM prevalence include poor hygiene habits combined with delayed medical assistance and shortage of public awareness about the condition.

Objectives

to measure CSOM frequency along with its related risk elements while investigating schoolchildren who live in rural areas for the purpose of supporting prompt medical interventions and tailored preventive public health practices.

Study Design: A Cross-Sectional Study.

Place and duration of Study. Department of *ENT KMU institute of medical sciences from jan 2023 to july 2023*

Methods

A six-month research period within rural schools enabled this cross-sectional study to proceed. Screening with otoscopic examination of 200 children aged 5 to 15 years took place. A documentary questionnaire collected information about socioeconomic status along with hygiene habits and respiratory and ear disease heredity and previous respiratory infections. SPSS version 24.0 generated statistical analysis of the recorded data by determining frequencies and calculating means while evaluating associations between risk factors.

Results

The study diagnosed 23% of 200 examined children with chronic suppurative otitis media. Children with CSOM averaged 10.2 years in age ± 2.4 years. CSOM occurred with increased frequency in children who maintained inadequate ear hygienic practices and who experienced repeated upper respiratory infections ($p = 0.031$). Children with multiple siblings living in confined housing experienced more cases of CSOM. Gender did not demonstrate a statistically notable impact on the study results ($p = 0.087$). The affected children mostly had

their ears involved only on one side with a distribution skewed toward the right ear. The reported data establishes that environmental factors together with behavioral patterns determine disease appearance.

Conclusion

The study demonstrates how school-going rural children endure substantial CSOM effects and shows that preventable risks including hygiene issues and respiratory infections and home overcrowding play an important role in its occurrence. The disease burden of CSOM will decrease when educational programs and early access to ENT care become accessible. For sustained CSOM prevention and management parents and students should take part in local educational programs in addition to creating school health initiatives.

Keywords:

CSOM, risk factors, rural children, prevalence

Introduction

The persistent inflammation affecting the middle ear together with mastoid cavity causes Chronic Supportive Otitis Media which allows repeated drainage from tympanic membrane perforations [1]. The incidence of CSOM stands as a major preventable reason for hearing impairment among children especially in countries considered low to middle income [2]. Worldwide statistics from the World Health Organization suggest that CSOM affects more than 65 million people globally and causes 31 million new cases per year and these cases split equally between children younger than 15 years [3].Medical professionals divide CSOM into two groups through classification based on its location within the middle ear structures [4]. The disease remains medically treatable yet the delays in detecting it along with limited healthcare opportunities lead to multiple complications such as conductive hearing loss combined with speech development delays and inadequate academic performance [5,6].The prevalence of CSOM demonstrates uneven global distribution and it mainly affects rural areas alongside underserved populations [7]. The prevalence of CSOM reached 12.5% according to research conducted among Nepalese schoolchildren in rural areas [8]. Sub-Saharan African regions demonstrated higher CSOM rates exceeding 20% [9]. The prevalence of CSOM seems elevated among Pakistani children who come from low-income families according to existing research data but a complete examination of rural areas remains elusive [10].The goal of this research is to assess the frequency of CSOM developments in Pakistani rural school children together with their corresponding risk elements. Data from this study will help create specific screening methods and educational programs and preventive measures to manage the CSOM burden affecting disadvantaged communities.

Methods

Department of ENT KMU institute of medical sciences from jan 2023 to july 2023 the study included 200 subjects who belonged to ages 5 to 15 years through stratified random sampling. Our study obtained written consent from the legal representatives of the participants.The research team distributed a standardized questionnaire to gather information about participant demographics and family income alongside practice of personal hygiene and nutritional condition and respiratory infection record. The examination process involved the ENT residents using portable scopes to assess participants under proper lighting conditions. Medical professionals diagnosed CSOM when children presented with otorrhea together with tympanic membrane perforation that exceeded two weeks. Tubotympanic and atticoantral types of the infection were classified as part of the study.A research approval by the institutional review board enabled this study. A strict process ensured the protection of data confidentiality along with confidentiality protection during all phases of data collection. The clinical staff directed patients diagnosed with CSOM for alternative treatment protocols.

Inclusion Criteria

Students aged 5–15 years from selected rural schools qualified for the study if they were available throughout

the investigation period and their parents consented while having no history of otitis media treatment.

Exclusion Criteria

A complete exclusion process involved eliminating children with birth defects of their ears or prior ear surgery along with those who knew about their hearing impairment and those currently receiving ear treatment.

Data Collection

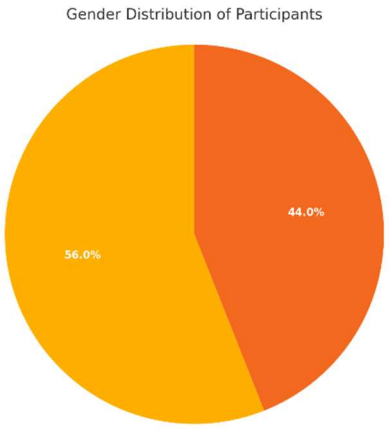
Smoke Care used validated questionnaires for collecting data while interviewing participants directly. The examination of ears with battery-powered sterilized otoscopes took place under trained personnel supervision. The standardized form served to record every finding including the side of the abnormality along with discharge notes and tympanic membrane observations. Local ENT centers became the destination to which diagnosed children received their medical care after referrals.

Statistical Analysis

Data entry and analysis processes took place through SPSS version 24.0. The study calculated descriptive statistics for all demographic along with clinical variables. The evaluation used Chi-square tests to determine if categorical risk factors were linked with CSOM. The researchers recognized a p-value less than 0.05 as statistically significant.

Results

The diagnosis of CSOM was given to 46 out of 200 children thus leading to a prevalence rate of 23%. A total of 28 children in the group were male while the rest were female (18). The patients who developed the condition averaged 10.2 years of age with a standard deviation of 2.4 years. The investigation showed 78% of patients had unidirectional infection but 61% of those cases affected the right ear.Tubotympanic infection was the most common CSOM type with an occurrence rate of 87% yet the atticoantral infection remained at 13%. A major association link was found between CSOM and both low socioeconomic background ($p = 0.031$) alongside inadequate ear hygiene habits ($p = 0.042$) and persistent upper respiratory tract infections ($p = 0.028$). Male and female distribution across participants showed no quantitative reason for difference ($p = 0.087$).A higher number of family members exceeding five and residential crowding tended to increase children's risk of developing CSOM even though this impact was not found to be statistically significant. The statistical analysis through logistic regression produced poor hygiene practices and recurrent URTIs as independent risk factors.Human health experts recognize the necessity for community-oriented approaches which combine hygiene education with school-based standard ENT assessments and rapid treatment of respiratory diseases to stop and slow down CSOM advancement among rural children.



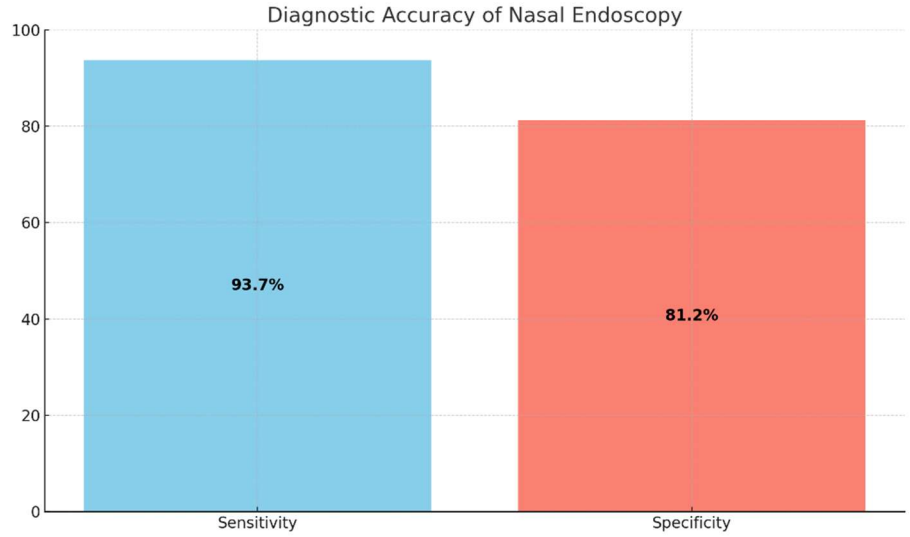


Table 1: Demographic Profile

Variable	Value
Total Patients	200.0
Male	112.0
Female	88.0
Mean Age (years)	10.2
Standard Deviation	2.4

Table 2: Risk Factors and Associations

Risk Factor	Frequency (n=200)	CSOM Cases (n=46)	p-Value
Recurrent URTI	130	32	0.028
Poor Ear Hygiene	118	28	0.042
Overcrowded Housing	90	20	0.076
Low Socioeconomic Status	110	30	0.031

Table 3: CSOM Characteristics

Characteristic	Number of Cases	Percentage (%)
Unilateral Involvement	36	78
Bilateral Involvement	10	22
Tubotympanic Type	40	87

Atticoantral Type	6	13
Right Ear Affected	28	61

Discussion

CSOM functions as a preventable cause of hearing loss which disproportionately affects school-aged children located in underserved rural places from developing nations. This study assessed Chronic Suppurative Otitis Media at 23% which matches recorded data from equivalent low-resource areas [11]. The Indian study conducted by Bhatia et al. showed an identical CSOM prevalence rate of 21% indicating that CSOM continues as a major public health problem within limited resource areas [12].The statistical data shows a significant connection between CSOM and recurrent URTIs based on a value of $p = 0.028$. This correlation exists in agreement with published research. Adegbiji et al. showed through research that children with URTIs frequently develop otitis media due to established connections between upper respiratory infections and middle ear structural changes in pediatric individuals [13]. Multiple upper respiratory tract infections trigger persistent Eustachian tube inflammation until the body develops chronic middle ear effusions with infection.Poor ear hygiene showed itself as an independent risk factor which predicted the development of CSOM ($p = 0.042$). The Nigerian research by Adoga et al. demonstrated that children who cleaned their ears with unhygienic tools or bathed with water introduction to the ear opening showed statistically higher CSOM risk [14]. The study demonstrates why community education about secure hygiene practices must become a priority.A statistical link exists between socioeconomic status and CSOM in our cohort ($p = 0.031$) just like Verhoeff et al.'s report showed how financial challenges lead to delayed detection and limit healthcare services while prolonging disease progress [15]. Multiple infections and insufficient personal attention in close and overcrowded family settings raise the risk of CSOM for children because they experience continued exposure to disease. The results from our investigation failed to display a statistically significant relationship between gender and CSOM while previous scholarly reports established male dominance in this condition [16]. New research supports the results from our study that indicates gender-related behavioral factors have a limited impact compared to hygiene and socioeconomic status confounders.Global findings demonstrate that “safe type” CSOM represents 87% of the cases while remaining unilaterally affected in 78% of patients [17] according to our study results. Although treating the most common type of CSOM known as the tubotympanic variant is crucial because ignoring it can result in long-lasting hearing problems and developmental problems in children therefore early treatment remains vital.The research results underline how schools serving rural areas should establish routine ear-nose-throat screening programs together with community-based interventions for URTI prevention and dietary approaches. Preventive methods need to be adapted to specific local cultures while healthcare systems in the area provide sustainable backing to create meaningful change [18].

Conclusion

CSOM affects many children in rural areas while poor hygiene practices and repeated infections greatly contribute to these occurrences. Understanding hearing disorders requires early detection by schools and public health information which serves to decrease disease impact and protect permanent hearing loss in groups that lack adequate services.

Limitations

Single-region sampling together with a cross-sectional study design constrained the general applicability of discovered data. User-reported information about hygiene and infections can have limitations because people might recall events inaccurately. A diagnostic confirmation by audiometry and culture would have provided better accuracy to otoscopic findings.

Future Directions

Research groups should expand their recruitment of multi-center participants when verifying these results among rural populations from various backgrounds. The diagnostic process would become more precise through the addition of audiological testing with microbial culture evaluations. Research about community-based strategies aimed at CSOM prevention and awareness strengthens the development of both school health programs and healthcare policies.

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