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DEMOGRAPHIC, CLINICAL AND RISK FACTOR PROFILE OF CHRONIC SUPPURATIVE OTITIS MEDIA IN CHILDREN AT A TERTIARY CARE HOSPITAL IN LARKANA

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Abstract

Background: *Chronic suppurative otitis media (CSOM) is, by far, the major public health problem that continues to afflict children of developing countries.*
Objective: *This research work was aimed at analyzing the demographic, clinical, and risk factor profiles of children suffering from CSOM who came to a tertiary care hospital.*
Methods: *The study involved a descriptive cross-sectional design, and the setting of the research was ENT Department of Chandka Medical College Teaching Hospital, Larkana. The time frame of this study was six months. Data on sociodemographic characteristics and hygiene, nutrition, and associated ENT disorders were obtained from 98 CSOM diagnosed children aged 5-15 years through structured questionnaires and clinical examinations.*
Results: *The average age of the participants was 9.91±3.16 years, and out of them, 55.1% had been males. The percentage of urban and rural people was 52% and 48%, respectively, which were almost equal. The middle and poor socioeconomic classes accounted for the highest numbers of cases at 37.8% and 33.7%, respectively. Half of the patients were suffering from malnutrition, and nearly the same number of patients had poor hygiene. Most of the patients had mucopurulent discharge (53.1%) and tympanic membrane perforations (50%) of their ears. One-third of the children (35.7%) exhibited bilateral involvement of CSOM. Most frequently observed comorbidity was sinusitis in 61.2%. The major risk factors were maternal illiteracy (58.2%) and bottle feeding (44.9%).*
Conclusion: *The occurrence of CSOM in children may be attributed to various factors such as poor hygiene, poverty, lack of nutrients, exposure to the environment, and sinonasal comorbidities.*

INTRODUCTION

CSOM is an inflammatory disease of the middle ear and mastoid cavity. The condition often follows protracted acute otitis media and is characterized by the presence of recurrent or persistent discharge through a perforation of the tympanic membrane for more than three months (Şahin et al., 2025). Globally, CSOM affects between 65 and 330 million people and accounts for approximately 28,000 deaths annually (Dhingra et al., 2023). Children are prone to middle ear diseases which may progress to CSOM due to persistent infections, inadequate treatment, or repeated reinfections (Heward et al., 2024).

CSOM has conventionally been described as a disease of poverty and poor hygiene (Das & Sen, n.d.). It is indeed more common in the countryside, where nutritional deficiencies and

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overcrowding are common (Eslick et al., 2025). However, recent studies reveal that urbanization introduces its own sets of risk factors, such as air pollution, crowded conditions in childcare, and increased allergen and tobacco smoke exposure (Bowatte et al., 2018). Middle and higher socioeconomic groups are also at risk (Ruffin et al., 2023). This trend represents a shift and challenges the simplification of an association of CSOM with low socioeconomic status and poor hygiene alone. Like other developing countries, Pakistan carries a huge burden of CSOM, yet there is limited local data concerning specific demographic, clinical, and risk factor outlines in various regions. Larkana offers a vital opportunity, from both urban and rural populations along with varying socioeconomic backgrounds, to investigate how anatomical, environmental, nutritional, and social factors combine to contribute to CSOM in children.

LITERATURE REVIEW

CSOM are a widespread global health issue, particularly in low-income areas, because they cause hearing impairment and developmental disability (Khairkar et al., 2023). CSOM is an infection characterized clinically by recurrent middle ear discharge through a persistent perforation of the tympanic membrane more than three months (Barua et al., 2024). A perforation becomes permanent when its edges are covered by squamous epithelium and it does not heal spontaneously. An ear examination of a patient with CSOM typically shows a hole (perforation) in the eardrum (Bedarkar Santoshkumar Chimnaji & Sonali Sujay Dodal, 2025). The condition is divided into two main categories: tubotympanic, which is the most common form, making up roughly 90% of cases, and attico-antral, which is a less common form, accounting for about 10% of cases, and is often linked to abnormal skin growth called a cholesteatoma. If not treated early and appropriately, the size of the tympanic perforation may increase over time and destruction of the ossicular chain ensues with a change in the tympanic mucosa (Barua et al., 2024).

It is important to distinguish CSOM from other forms of otitis media. Different types of ear infections such as Acute otitis media (AOM) and otitis media with effusion (OME) are major health problems. Diagnosing CSOM can be difficult because ear drainage looks identical across multiple conditions. To make an accurate diagnosis, CSOM must be distinguished from related disorders and physical findings, including AOM, OME and dry perforation (Li et al., 2015; Bedarkar & Dodal, 2025)

CSOM affects an estimated 200 million individuals, with the highest prevalence reported in low-resource settings, reflecting a substantial public health burden and associated disability due to hearing impairment (Onifade et al., 2025; WHO, 2004). The occurrence of this ailment is elevated in developing nations, particularly within socioeconomically disadvantaged populations, owing to factors such as malnutrition, overcrowded living conditions, suboptimal hygiene practices, insufficient healthcare access, and recurrent upper respiratory tract infections. In one study, 138(57.74%) patients with poor socioeconomic status and overcrowded families were frequently attacked with CSOM. Overcrowding families with 4-6 members (42.67%) and 7 or more members (33.05%) suffered from CSOM more frequently (Barua et al., 2024; Li et al., 2015).

Epidemiological studies indicate that otitis media is common across all age groups but occurs with greatest frequency among children, with peak incidences observed in early childhood. Most children usually have an ear infection before the age of five (StatPearls, 2023). In clinical studies, children aged 0-10 years constituted 30.9% of the population. Gender distribution reveals inconsistent findings across studies (Dong et al., 2024).

Additionally, several host and environmental have been implicated in the development and persistence of otitis media. Recurrent upper respiratory tract infections, allergic disorders, passive tobacco smoke exposure, and low socioeconomic status have consistently emerged as significant risk factors in observational studies (Heward et al., 2023; Kong & Coates, 2009).

Ear discharge and hearing loss were significantly more common in chronic otitis media compared

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to acute otitis media and otitis media with effusion (Bedarkar Santoshkumar Chimnaji & Sonali Sujay Dodal, 2025). Ear discharge (72.7%), ear pain (63.6%), and hearing loss (61.4%) were the most common clinical features (Getaneh et al., 2019). Ear discharge was the most common presenting symptom (72.7%), followed by ear pain (63.6%) and hearing loss (61.4%) (Tadesse et al., 2019). Fever was observed in 38.6% of patients (Zohda Tayyaba et al., 2023). Ear discharge, mostly foul-smelling, may be associated with unsafe CSOM, harboring complications (Khalique et al., 2022). The duration of symptoms varied, with 34.1% of patients presenting within 2 weeks, 40.9% within 2-12 weeks, and 25.0% after 12 weeks (Bedarkar Santoshkumar Chimnaji & Sonali Sujay Dodal, 2025). The majority (94.14%) of patients had symptoms of CSOM for more than 12 weeks, consistent with the WHO definition requiring more than 2 weeks of otorrhoea (Barua et al., 2024; Onifade et al., 2025).

CSOM results in mild-to-moderate hearing impairment in 50% of cases and stands as a significant contributor to hearing loss in the developing regions (Barua et al., 2024). The disease and its related issues create an unseen challenge, jeopardizing children's academic success, hindering the development of language and speech, and impacting cognitive abilities in future (Verma et al., 2026). The developmental consequences of otitis media-related hearing loss extend across multiple domains of child functioning and accumulate over time. During the first three years of life, the central auditory system undergoes rapid maturation characterized by synaptic refinement and myelination that depends on adequate sensory input. Intermittent or persistent hearing loss during this critical window disrupts the acoustic signal necessary for phonetic discrimination, phonological awareness, and vocabulary acquisition (Gribble et al., 2004). Overall, 75.5% of patients were found to have conductive hearing loss, 15% with mixed hearing loss (Khalique et al., 2022). The deficits extend beyond language to encompass behavioral regulation, social competence, and attention (Gribble et al., 2017). Regarding otoscopic findings, among patients with CSOM, 41.4% had right-sided involvement, 30.1% had left-sided involvement. The distribution of age group, gender and laterality was similar in both safe and unsafe types. On the assumption of an event rate of 21.5%, this implies 64 million have bilateral disease (Onifade et al., 2025).

Moreover, a considerable percentage of individuals with untreated CSOM (1-18%) manifest severe complications such as mastoid abscess, otitic meningitis, venous sinus thrombosis and cholesteatoma (Aho et al., 2022). Rhinitis and nasopharyngitis usually allow spread of pathogenic organisms from the nasopharynx into the middle ear via the eustachian tube and cause inflammation in mucoperiosteum of middle ear cleft resulting in ear discharge (Diana & Haryuna, 2017). In clinical studies, 54.8% suffered from rhinosinusitis, 41.4% had deviated nasal septum, and 36.8% had hypertrophy of inferior turbinate. Additionally, 25.9% had history of adenoids (Bedarkar Santoshkumar Chimnaji & Sonali Sujay Dodal, 2025). According to Rambe et al., 2013), allergic rhinitis has a threefold more significant impact on eustachian tube dysfunction, which persists in chronic otitis media.

In the literature, there are many causative agents for chronic suppurative otitis media (CSOM), but Pseudomonas aeruginosa and Staphylococcus aureus are consistently reported as the most common bacterial pathogens isolated from infected middle ear clefts (Kombade et al., 2021). Excessive and inappropriate use of antibiotics is a major source of increased global antibiotic resistance, highlighting a critical and urgent need for judicious antimicrobial stewardship within ear, nose, and throat care frameworks (Shariati et al., 2022). The clinical management of CSOM is usually empirical, based on the administration of topical fluoroquinolones and alternative droppable solutions such as ciprofloxacin, ofloxacin, or rifampicin, frequently implemented in combination with systemic antibiotics to treat deep-seated mucoperiosteal involvement (Onali et al., 2018; Sihotang et al., 2022). Depending on the pathological presentation or safe versus unsafe variants, these targeted antibiotics can be utilized alone as an isolated monotherapy regimen, or they may be integrated in addition to alternative

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conservative care methods for CSOM, including the application of specialized micro-antiseptics or periodic mechanical ear cleaning (Onali et al., 2018; Sihotang et al., 2022).

METHODOLOGY

A descriptive cross-sectional study was carried out in the ENT Department of Chandka Medical College Teaching Hospital, Larkana, for six months. The study was started only after approval from the Institutional Ethical Review Committee was obtained (Approval No.: No.SMBBMU/OFF ERC/158). Patients were enrolled through nonprobability consecutive sampling. Sample size (n = 98) was determined by using a standard formula for studies designed to estimate prevalence (1). Children aged 5 to 15 years presenting with a clinical diagnosis of CSOM were included in the present study. CSOM was considered if there was a persistent discharge from the ear through a perforated tympanic membrane for at least three months. Children having congenital anomalies of the ears, sensorineural hearing loss, craniofacial syndromes, or immune disorders were excluded. Non-probability sampling was used, and all the cases which fulfilled the inclusion criteria were recruited. Using a well-structured questionnaire, age, gender, area of residence, socioeconomic status, hygiene conditions, nutrition, feeding history, maternal education, and the family history of diseases of ears was obtained with the consent of patient/guardian.

All the enrolled children underwent detailed otological and ENT examinations. Detailed otoscopy was done to note the characteristics of the ear discharge: type and amount of discharge, laterality of disease, type of tympanic membrane perforation, and any associated diseases of the ENT: sinusitis, nasal allergy, chronic tonsillitis, deviated nasal septum, and recurrent URTI.

The data were entered and analyzed using SPSS (version 20). Descriptive statistics such as means, standard deviations, frequencies, and percentages were calculated for demographic and clinical variables. For the categorical variables, data were expressed as proportions

RESULTS

A total of 98 children with CSOM were the subjects of the research, with the average age being 9.91 ± 3.16 years and the age range extending from 5 to 15 years. Males accounted for 55.1% of the total subjects. The children were nearly equally divided between the urban and rural areas, with 52% coming from the urban and 48% from the rural background (Table 1).

The majority of the participants were from the middle socioeconomic class (37.8%), followed by poor (33.7%) and rich (28.6%). 48% of children were found to have poor personal hygiene, and 51% were malnourished (Table 1).

On clinical examination, it was found that 55.1% of the children had scanty ear discharge and 44.9% had profuse discharge. 35.7% of the patients had bilateral CSOM, whereas 32.7% and 31.6% had the disease on the right and left side, respectively. Most of the patients had mucopurulent discharge, which was observed in 53.1% of the subjects. Perforations of the tympanic membrane, either central or marginal, were seen in about half of the children (Table 1).

Besides, a large number of associated conditions and risk factors were recorded. Among the associated conditions, sinusitis was the most common. It was the most common comorbidity, which was observed in 61.2% of children, followed by nasal allergies at 52%, Chronic tonsillitis 49%, Deviated septum 48%, and Upper Respiratory Tract Infections 65.6% of children. In 45.9% of the cases, infections were present. Ear diseases were common in the families of patients, with 52% of them giving such a history. Maternal illiteracy was found in 58.2%, and 44.9% of the children had been previously fed by a bottle (Table 1).

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Table. 1. Demographic, Clinical and Risk Factor Profile of Children with CSOM

Domain	Variable	Findings (n, %)
Age Characteristics	Mean age ± SD	9.91 ± 3.16 years (Range: 5–15 years)
Sex Distribution	Male	55.1%
	Female	44.9%
Residence	Urban	52%
	Rural	48%
Socioeconomic Status	Middle class	37.8%
	Poor class	33.7%
	High class	28.6%
Hygiene Status	Good hygiene	52%
	Poor hygiene	48%
Nutritional Status	Malnourished	51%
Ear Discharge	Scant discharge	55.1%
	Profuse discharge	44.9%
Laterality of Disease	Bilateral involvement	35.7%
	Right ear	32.7%
	Left ear	31.6%
Type of Ear Discharge	Mucopurulent	53.1%
Tympanic Membrane Status	Central/marginal perforation	50%
ENT Comorbidities (Risk Factors)	Sinusitis	61.2%
	Nasal allergy	52%
	Chronic tonsillitis	49%
	Deviated nasal septum (DNS)	48%
	Recurrent URTIs	45.9%
Family and Feeding History	Positive family history	52%
	Maternal illiteracy	58.2%
	History of bottle feeding	44.9%

DISCUSSION

The research study details a profile of children with CSOM, which includes significant demographic, clinical, and risk factors that are associated with the disease. These factors help us to understand the disease burden in this population more deeply.

The average age of CSOM patients was 9.91 years, indicating that the burden of chronic ear disease persists well into the school-age years. This finding aligns with a recent study conducted in Swat, Pakistan, which reported an approximately similar mean age among school-going children with chronic otitis media (Mahid et al., 2021). Interestingly, this study found an equal distribution of CSOM cases between urban and rural areas. Historically, CSOM was largely linked to rural habitation. However, recent evidence suggests that rapid urbanization in developing countries has led to overcrowding and poor sanitation, thus equalizing the risk factors (Heward et al., 2024). The slight male predominance (55.1%) in CSOM cases is in line with some previous epidemiological studies conducted by Muftah et al. (2015) and Onifade et al. (2025). This is frequently attributed to healthcare-seeking behavior in developing countries, where male children are often prioritized for medical consultation, leading to their overrepresentation in clinical datasets (Thakkar & Thakkar, n.d.).

Energy deprivation influences health conditions noticeably, as most of the kids were found to be from middle and poor socioeconomic groups, which is consistent with the established

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relationship between lower socioeconomic conditions and a higher incidence of CSOM. This connection is further elaborated by the facts of bad hygiene in almost half of the children and a high rate of malnutrition (51%). These findings highlight the critical synergistic role of nutritional deficiency and poor environmental hygiene in the pathogenesis of CSOM. This observation aligns with recent investigations, such as the study by Gupta et al. (2024), which reaffirmed CSOM as a disease of poverty, and Dong et al. (2025), who reported its occurrence in approximately 50% of individuals with poor hygiene.

Most of the children clinically had scant ear discharges (55.1%) as opposed to profuse discharges (44.9%), and the rate of mucopurulent discharge was also very high, which may show that the severity and the time the patients have had the disease may vary. This distribution suggests heterogeneity in disease severity and chronicity, potentially reflecting variations in Eustachian tube dysfunction, bacterial load, or treatment-seeking delays (Sadiq et al., 2024).

There was a nearly equal distribution of unilateral involvement for CSOM between right and left ears, while more than one-third of the children had bilateral disease. Such bilateral prevalence aligns with epidemiological data reported by Hunt et al. (2017) in children diagnosed with CSOM, highlighting a similar propensity for widespread involvement in resource-limited settings. It is important to note that the presence of tympanic membrane perforations in half of the cohort indicates prolonged inflammatory damage. It shows progression beyond temporary middle-ear effusion to established mucosal disease with structural damage (Mansour et al., 2018).

Along the same line, the presence of a high percentage of comorbidities such as sinusitis (61.2%), nasal allergy (52%), chronic tonsillitis (49%), and deviated nasal septum (48%) suggests a more extensive upper respiratory tract involvement and, therefore, supports the idea of a common pathophysiological spectrum (Şahin et al., 2025). Half of the children with recurrent upper respiratory infections also point to the fact that mucosal immunity could be weakened or the children may be exposed to pathogens repetitively (Yuan et al., 2025). The considerable percentage of cases with a positive family history (52%) underscores the potential role of genetic predisposition or shared environmental influences as significant contributors to disease susceptibility (Bhutta et al., 2017).

Besides these factors, maternal illiteracy in more than half of the participants and a history of bottle feeding in roughly 45% offer valuable sociocultural information and point to the fact that parental education and infant feeding might be influential factors for the occurrence of the disease as well as its management outcomes (Heward et al., 2024).

CONCLUSION

In conclusion, this study shows the complex nature of CSOM in children resulting from the interplay of different factors such as age, socioeconomic status, hygiene, nutrition, and a range of associated upper respiratory conditions. They call for the need for comprehensive public health programs that among other things promote hygiene, provide nutritional supplements, educate parents, and ensure timely treatment of comorbidities to alleviate the CSOM burden. The results of this research open avenues for the formulation of prevention strategies that are focused and indicate that taking a holistic approach that deals with environmental, clinical, and social factors can be instrumental in the improvement of children with CSOM.

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