

Prevalence and Etiological Agents of Chronic Suppurative Otitis Media in a Tertiary Care Hospital: A Cross-Sectional Study**Shashi Kumar¹, Sujeet Kumar²**¹Senior Resident, Department of Ear, Nose and Throat, Sri Krishna Medical College, Muzaffarpur, Bihar, India²Associate Professor, Department of Ear, Nose and Throat, Sri Krishna Medical College, Muzaffarpur, Bihar, India

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Conflict of interest: Nil

Abstract

Background: Chronic suppurative otitis media (CSOM) is a common chronic ear condition characterized by persistent or recurrent ear discharge through a perforated tympanic membrane and may lead to hearing impairment and other complications. The causative organisms and their antibiotic sensitivity patterns may vary between populations and healthcare settings. The present study was conducted to assess the prevalence, clinical features, and etiological agents of CSOM in a tertiary care hospital.

Aim and Objectives: To determine the prevalence of CSOM among patients attending a tertiary care hospital and to identify the common etiological organisms isolated from ear discharge. The study also assessed the clinical presentation and antibiotic sensitivity pattern of the isolated organisms.

Methodology: A hospital-based cross-sectional study was conducted among 80 patients attending the ENT outpatient department. All participants underwent detailed history taking and clinical examination. Patients diagnosed with CSOM were further evaluated for type and laterality of disease. Ear discharge samples were collected under aseptic precautions and subjected to microbiological examination. Antibiotic susceptibility testing was performed using standard laboratory methods. Data were analyzed using frequency, percentage, mean, standard deviation, and chi-square test. A p-value <0.05 was considered statistically significant.

Results: Among 80 participants, 32 were diagnosed with CSOM, giving a prevalence of 40.0%. The mean estimated age was 33.99 ± 19.69 years. CSOM was more frequent among males (43.5%) and rural residents (46.0%), although these associations were not statistically significant. Tubotympanic disease was the predominant type (75.0%), while unilateral involvement was observed in 68.8% of cases. Ear discharge (100%) and hearing loss (84.4%) were the most common clinical features. *Pseudomonas aeruginosa* was the most frequently isolated organism (34.4%), followed by *Staphylococcus aureus* (28.1%). Amikacin showed the highest sensitivity (87.5%), while amoxicillin-clavulanate showed the lowest sensitivity (56.3%).

Conclusion: CSOM showed a considerable prevalence in the study population. *Pseudomonas aeruginosa* and *Staphylococcus aureus* were the major etiological agents. The variable antibiotic sensitivity pattern emphasizes the importance of microbiological examination and antibiotic susceptibility testing for appropriate management of CSOM.

Keywords: Chronic Suppurative Otitis Media; CSOM; Prevalence; *Pseudomonas Aeruginosa*; *Staphylococcus Aureus*; Antibiotic Sensitivity; Ear Discharge.

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Introduction

Chronic suppurative otitis media (CSOM) is a common chronic infection of the middle ear characterized by persistent or recurrent ear discharge through a perforated tympanic membrane. It remains an important cause of preventable hearing impairment, particularly in developing countries.

Repeated ear infections, poor socioeconomic conditions, inadequate access to healthcare, overcrowding, and upper respiratory tract infections may contribute to the development and persistence of CSOM. The microorganisms responsible for CSOM can vary between geographical regions and healthcare settings. Bacterial pathogens such as *Pseudomonas*

aeruginosa, *Staphylococcus aureus*, *Klebsiella* species, *Proteus* species, and *Escherichia coli* are frequently isolated from ear discharge.

Fungal infections may also occur, especially in patients with prolonged disease or previous antimicrobial treatment. Antibiotic resistance has become an important problem in the management of CSOM. Therefore, identifying the causative organisms and determining their antimicrobial sensitivity pattern can help clinician's select appropriate treatment and avoid unnecessary antibiotic use.

The present study was conducted to determine the prevalence of CSOM among patients attending a tertiary care hospital and to identify the microorganisms isolated from ear discharge along with their antibiotic sensitivity pattern.

Aim and Objectives

Aim: To determine the prevalence of chronic suppurative otitis media and identify the etiological agents responsible for CSOM among patients attending a tertiary care hospital.

Objectives

- To determine the prevalence of CSOM among the study participants.
- To describe the socio-demographic characteristics of patients with CSOM.
- To identify the common clinical presentations of CSOM.
- To determine the bacterial and fungal organisms isolated from ear discharge.
- To assess the antibiotic sensitivity pattern of the isolated organisms.
- To assess the association between selected socio-demographic factors and CSOM.

Methodology

Study Design: A hospital-based cross-sectional study was conducted in the Department of Otorhinolaryngology of a tertiary care hospital.

Study Population: The study included 80 patients attending the ENT outpatient department during the study period. Patients were clinically examined for symptoms and signs suggestive of CSOM.

Sample Size: A total of 80 participants were included in the study. Among them, 32 patients were diagnosed with CSOM, giving an overall prevalence of 40.0% in the study population.

Clinical Examination: Each participant underwent a detailed history and ENT examination. Information regarding age, sex, residence, ear discharge, hearing loss, ear pain, tinnitus, and vertigo was recorded. Otoscopic examination was performed to identify tympanic membrane perforation and the type and laterality of disease.

Microbiological Examination: Ear discharge was collected using a sterile swab under aseptic precautions. The specimens were transported to the microbiology laboratory and processed using standard microbiological techniques. Bacterial isolates were identified using routine culture and biochemical methods. Fungal isolates were identified using appropriate mycological techniques.

Antibiotic Sensitivity Testing: Antimicrobial susceptibility testing was performed for the bacterial isolates using standard laboratory procedures. The antibiotics assessed in the present study were ciprofloxacin, amoxicillin-clavulanate, ceftriaxone, gentamicin, and amikacin.

Statistical Analysis: The collected data were summarized using frequency, percentage, mean, and standard deviation (SD). The association between categorical variables was assessed using the chi-square test. A p-value of less than 0.05 was considered statistically significant.

Inclusion Criteria

- Patients aged 5 years and above attending the ENT department.
- Patients clinically diagnosed with CSOM.
- Patients with persistent or recurrent ear discharge associated with tympanic membrane perforation.
- Patients who provided consent to participate in the study.

Exclusion Criteria

- Patients with acute otitis media without evidence of chronic disease.
- Patients with otitis externa.
- Patients who had undergone ear surgery recently.
- Patients who had received systemic antibiotics immediately before specimen collection, where this could interfere with culture results.

Result

Table 1: Socio-Demographic Distribution of Study Participants (N = 80)

Variable	Category	Number (n)	Percentage (%)
Age Group (Years)	<10	10	12.5
	11–20	16	20.0
	21–40	24	30.0
	41–60	18	22.5
	>60	12	15.0

Gender	Male	46	57.5
	Female	34	42.5
Residence	Rural	50	62.5
	Urban	30	37.5
Total		80	100.0

The mean estimated age of the participants was 33.99 ± 19.69 years. The majority of participants were between 21 and 40 years of age. Male participants were slightly more common than female participants. Rural residents constituted nearly two-thirds of the study population.

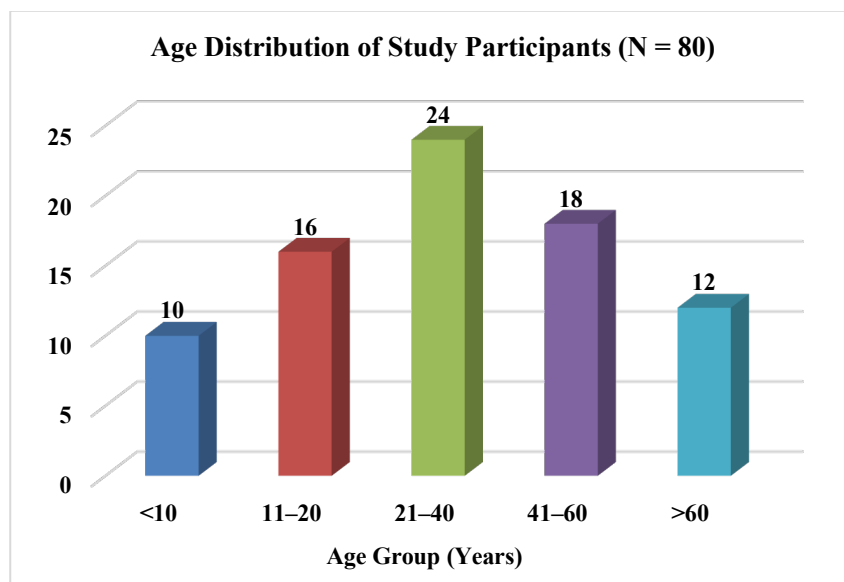


Figure 1: Age Distribution of Study Participants (N = 80)

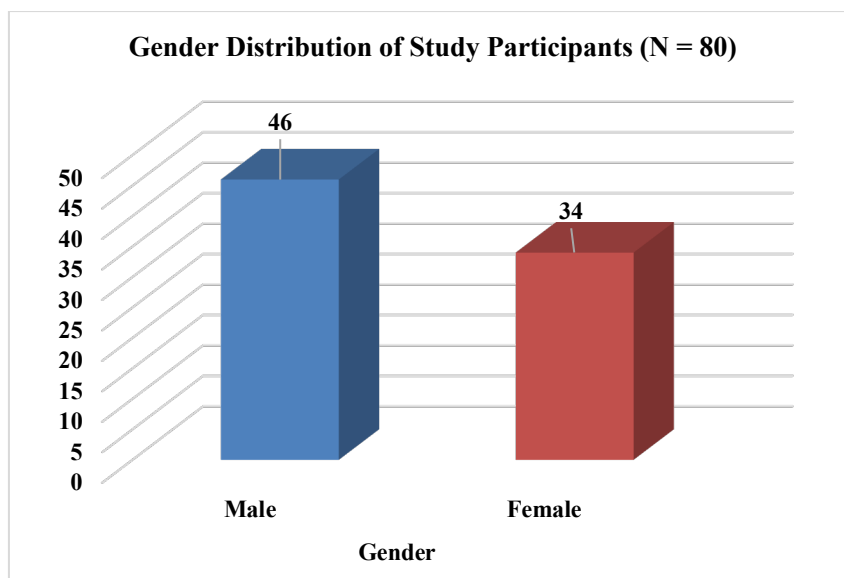


Figure 2: Gender Distribution of Study Participants (N = 80)

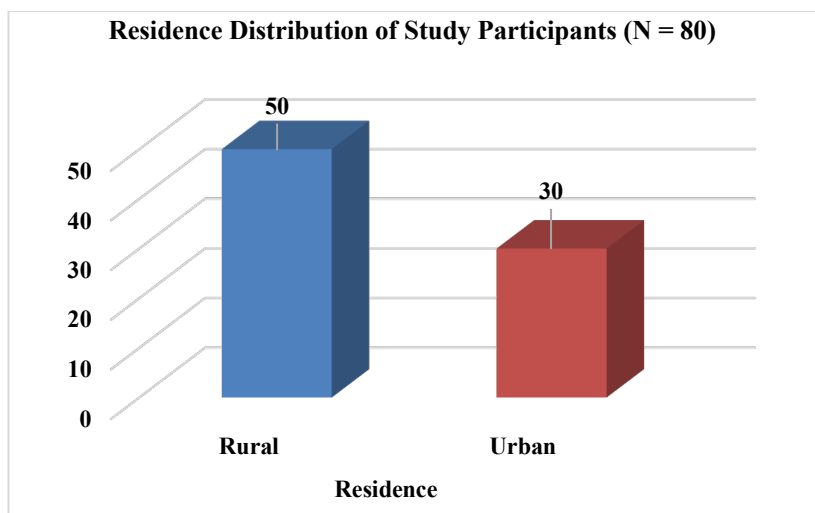


Figure 3: Residence Distribution of Study Participants (N = 80)

Table 2: Prevalence of Chronic Suppurative Otitis Media (CSOM) (N = 80)

Variable	Category	Number (n)	Percentage (%)
Diagnosed CSOM Cases	Yes	32	40.0
	No	48	60.0
Type of CSOM	Tubotympanic	24	75.0*
	Atticoantral	8	25.0*
Laterality	Unilateral	22	68.8*
	Bilateral	10	31.2*

Percentages for type and laterality are calculated among the 32 CSOM patients: Among the 80 participants, 32 were diagnosed with CSOM, resulting in an overall prevalence of 40.0%. Tubotympanic CSOM was the predominant type, accounting for 24 (75.0%) cases, whereas 8 (25.0%) patients had the atticoantral type. Unilateral involvement was observed in 22 (68.8%) patients, while 10 (31.2%) had bilateral disease.

Table 3: Clinical Presentation of CSOM Patients (n = 32)

Clinical Feature	Number (n)	Percentage (%)
Ear Discharge	32	100.0
Hearing Loss	27	84.4
Ear Pain	14	43.8
Tinnitus	7	21.9
Vertigo	3	9.4

Ear discharge was the most common clinical presentation and was reported in all 32 CSOM patients (100.0%). Hearing loss was the second most frequent symptom, reported by 27 (84.4%) patients. Ear pain was present in 14 (43.8%) patients, while tinnitus and vertigo were reported by 7 (21.9%) and 3 (9.4%) patients, respectively.

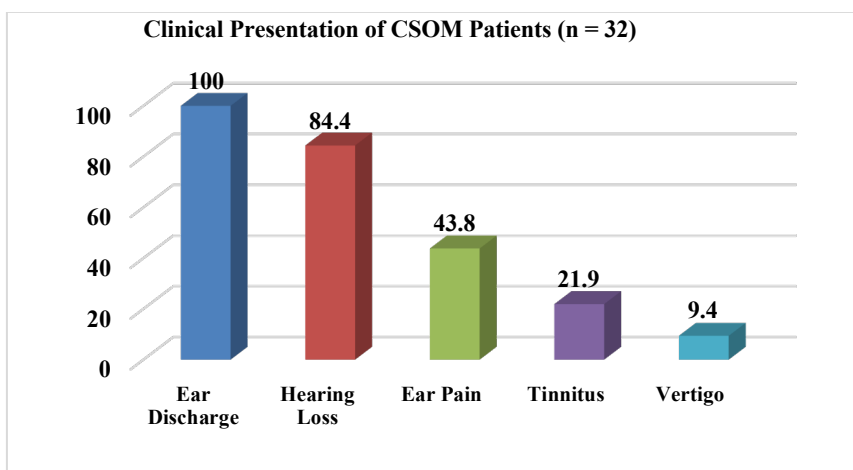


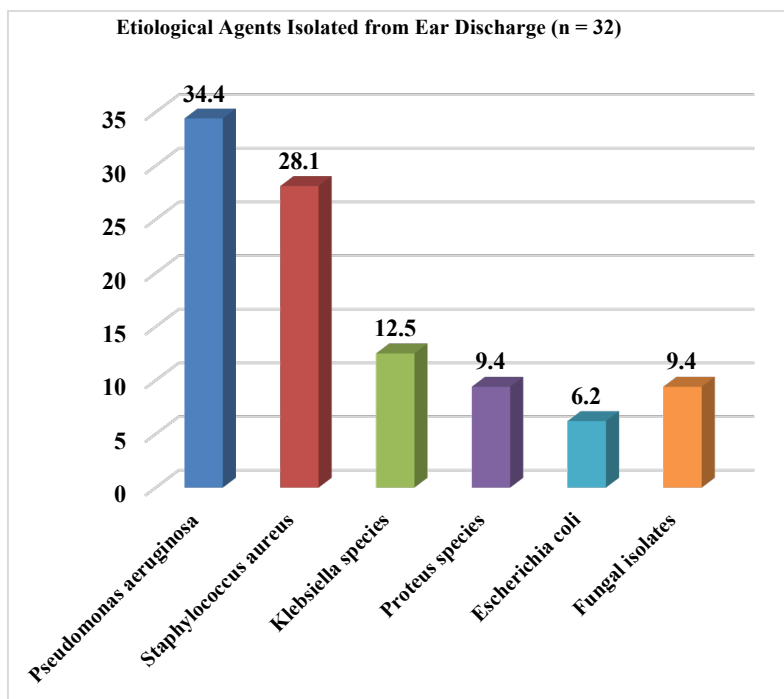
Figure 4: Clinical Presentation of CSOM Patients (n = 32)

Table 4: Etiological Agents Isolated from Ear Discharge (n = 32)

Organism Isolated	Number (n)	Percentage (%)
<i>Pseudomonas aeruginosa</i>	11	34.4
<i>Staphylococcus aureus</i>	9	28.1
<i>Klebsiella species</i>	4	12.5
<i>Proteus species</i>	3	9.4
<i>Escherichia coli</i>	2	6.2
Fungal isolates	3	9.4
Total	32	100.0

Microbiological examination of ear discharge showed that *Pseudomonas aeruginosa* was the most frequently isolated organism, accounting for 11 (34.4%) cases. *Staphylococcus aureus* was the second most common isolate, identified in 9

(28.1%) cases. *Klebsiella species* were isolated in 4 (12.5%) cases, while *Proteus species* and fungal isolates were each identified in 3 (9.4%) cases. *Escherichia coli* was the least frequently isolated bacterial organism, accounting for 2 (6.2%) cases.

**Figure 5: Etiological Agents Isolated from Ear Discharge (n = 32)****Table 5: Antibiotic Sensitivity Pattern of Isolated Organisms (n = 32)**

Antibiotic	Sensitive (n)	Sensitive (%)	Resistant (n)	Resistant (%)
Ciprofloxacin	25	78.1	7	21.9
Amoxicillin-Clavulanate	18	56.3	14	43.7
Ceftriaxone	22	68.8	10	31.2
Gentamicin	24	75.0	8	25.0
Amikacin	28	87.5	4	12.5

The antibiotic sensitivity pattern showed that amikacin had the highest sensitivity, with 28 (87.5%) isolates sensitive to the drug. Ciprofloxacin showed sensitivity in 25 (78.1%) isolates, followed by gentamicin in 24 (75.0%) and ceftriaxone in 22 (68.8%). Amoxicillin-clavulanate showed the lowest sensitivity, with 18 (56.3%) isolates sensitive and 14 (43.7%) resistant.

Association between Socio-Demographic Factors and CSOM: The relationship between selected

socio-demographic variables and CSOM was assessed using the chi-square test. Among males, 20 of 46 participants (43.5%) had CSOM, compared with 12 of 34 females (35.3%). The difference was not statistically significant ($\chi^2 = 0.55$, $p = 0.46$). CSOM was observed in 23 of 50 rural participants (46.0%) compared with 9 of 30 urban participants (30.0%).

Although CSOM was more common among rural participants, the difference was not statistically

significant ($\chi^2 = 2.00$, $p = 0.16$). For age groups, the proportion of CSOM cases varied between the

different age categories, but the association was not statistically significant ($\chi^2 = 1.43$, $p = 0.84$).

Table 6: Association of Socio-Demographic Variables with CSOM

Variable	Category	CSOM Present n (%)	CSOM Absent n (%)	χ^2	p-value
Gender	Male	20 (43.5)	26 (56.5)	0.55	0.46
	Female	12 (35.3)	22 (64.7)		
Residence	Rural	23 (46.0)	27 (54.0)	2.00	0.16
	Urban	9 (30.0)	21 (70.0)		
Age Group	<10	3 (30.0)	7 (70.0)	1.43	0.84
	11–20	5 (31.3)	11 (68.7)		
	21–40	11 (45.8)	13 (54.2)		
	41–60	8 (44.4)	10 (55.6)		
	>60	5 (41.7)	7 (58.3)		

The table shows that CSOM was more common among males (43.5%), rural residents (46.0%), and those aged 21–40 years (45.8%). However, the associations with gender ($p = 0.46$), residence ($p = 0.16$), and age ($p = 0.84$) were not statistically significant. Thus, none of the studied socio-demographic factors showed a significant association with CSOM.

Discussion

In the present study, 80 patients were evaluated and 32 were diagnosed with chronic suppurative otitis media (CSOM), giving a prevalence of 40.0%. The mean estimated age was 33.99 ± 19.69 years, with the 21–40-year age group being the most common. Males and rural residents constituted a greater proportion of participants, although the associations with gender ($p = 0.46$) and residence ($p = 0.16$) were not statistically significant. Similar findings were reported by Bhavsar et al. (2025), who observed a higher proportion of males and greater involvement of young adults among patients with chronic ear disease. Among CSOM cases, tubotympanic disease (75.0%) was more common than atticointral disease (25.0%), while unilateral involvement (68.8%) was more frequent than bilateral disease. Ear discharge was the most common clinical feature (100%), followed by hearing loss (84.4%). Bhavsar et al. (2025) also reported ear discharge as the predominant symptom, with hearing loss being another common presentation, supporting the clinical findings of the present study.

Microbiological examination showed that *Pseudomonas aeruginosa* was the most common isolate (34.4%), followed by *Staphylococcus aureus* (28.1%). This finding is consistent with Taha (2025), who reported *P. aeruginosa* and *S. aureus* as the major pathogens in children with CSOM. Similarly, Bhavsar et al. (2025) reported *Pseudomonas* as the predominant isolate (34.54%). Khan et al. (2025) also identified *Pseudomonas* and *Staphylococcus aureus* as important pathogens in CSOM, supporting the present findings.

Fungal isolates were detected in 9.4% of cases. This was lower than the finding of Suttle et al. (2024), who reported fungal organisms in 20.8% of cases. Such differences may be related to geographical location, patient characteristics, previous antibiotic use, and differences in laboratory methods. Regarding antimicrobial susceptibility, amikacin showed the highest sensitivity (87.5%), followed by ciprofloxacin (78.1%), gentamicin (75.0%), and ceftriaxone (68.8%). Amoxicillin-clavulanate showed the lowest sensitivity (56.3%). Suttle et al. (2024) reported 76.2% ciprofloxacin sensitivity among *Pseudomonas* isolates, which was comparable to the present finding. In contrast, Taha (2025) reported high resistance to amoxicillin-clavulanate among *Pseudomonas* isolates, demonstrating the variation in antimicrobial susceptibility between study settings. Khan et al. (2025) also reported considerable resistance to commonly used antibiotics.

No statistically significant association was observed between CSOM and age ($p = 0.84$), gender ($p = 0.46$), or residence ($p = 0.16$). The relatively small sample size may have limited the ability to detect significant associations. Overall, the study confirms that *Pseudomonas aeruginosa* and *Staphylococcus aureus* are important causes of CSOM and highlights the value of culture and antibiotic sensitivity testing for appropriate treatment, particularly in patients with persistent or recurrent ear discharge.

Conclusion

The present study found that chronic suppurative otitis media (CSOM) was common among the 80 patients evaluated, with a prevalence of 40.0%. Tubotympanic CSOM and unilateral disease were more frequent, while ear discharge and hearing loss were the main clinical features. *Pseudomonas aeruginosa* was the most commonly isolated organism, followed by *Staphylococcus aureus*. Among the antibiotics tested, amikacin showed the highest sensitivity, whereas amoxicillin-clavulanate

showed comparatively greater resistance. Although no significant association was found between CSOM and age, gender, or residence, the findings highlight the importance of early diagnosis, proper microbiological examination, and antibiotic sensitivity testing to guide effective treatment and reduce antibiotic resistance.

Ethical Consideration: Ethical clearance was obtained from the Institutional Ethics Committee of Sri Krishna Medical College and Hospital before commencement of the study. Informed consent was taken from all participants, and confidentiality of patient information was strictly maintained throughout the research.

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Conflict of Interest: The authors declare that there are no conflicts of interest in any form; personal, professional, or financial to the conduct and publishing of this study.

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