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ORIGINAL ARTICLE

Burden of Chronic Suppurative Otitis Media and Hearing Loss among Primary and Secondary School Children – A Cross-Sectional Study

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ABSTRACT

Introduction: *Chronic suppurative otitis media (CSOM) is a chronic inflammation of the middle ear with perforation of the tympanic membrane and frequent or continuous discharge from the ear, typically resulting in hearing loss. The aim of this study is to ascertain the burden of hearing loss and chronic suppurative otitis media in children in primary and secondary schools.* ***Methods & Materials:*** *It was a cross-sectional survey conducted between January 2024 to December 2024 in 76 children who were 6-16 years of age, studying in primary and secondary schools, in North Bengal Medical College & Hospital to assess the burden of chronic suppurative otitis media (CSOM) and hearing loss following it. Data analysis was performed using SPSS version 26.0.* ***Result:*** *In the current study of 76 school children with a mean age of 10.8 ± 2.9 years, 35.5% of them had chronic suppurative otitis media (CSOM) with a majority being unilateral (81.5%) and tubotympanic type (77.8%). Duration of discharge from the ear was 2.4 ± 1.1 years. In 92.6% of the infected children, impaired hearing was described primarily as mild to moderate conductive impairment (85.2%), averaging 38.4 ± 9.2 dB in hearing threshold, indicating heavy disease burden and accompanying auditory deficit in this subgroup.* ***Conclusion:*** *This study sets a colossal burden of chronic suppurative otitis media (CSOM) and associated hearing loss in primary and secondary school children with a prevalence rate of 35.5% and hearing impairment observed in 92.6% of the cases.*

Keywords: *Chronic Suppurative Otitis Media, Hearing Loss, School Children, Tubotympanic*

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INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) is an international ear health problem and one of the most frequent preventable causes of hearing loss among school-aged children. The disease involves chronic inflammation of the middle ear mucosa often leading to recurring or continuous discharge of the ear through a perforated eardrum. Although there has been enhanced ear-care and public health intervention, it is still a huge burden to healthcare services. It also affects the learning, communication, and socialization of children in developing and developed countries. Globally, an estimated 65–330 million people are affected by CSOM, and more than half of them experience hearing impairment [1]. This high burden underscores the condition's substantial contribution to global childhood morbidity. The World Health Organisation states that untreated hearing loss, including that caused by chronic otitis media, significantly impairs communication skills, academic achievement, and psychological adjustment [2]. A reduced quality of life is experienced by millions of children worldwide as a result. Early detection and intervention are thus required in order to mitigate against these effects. Early detection and intervention are thus key to avoiding these long-term consequences. CSOM remains prevalent across regions, with environmental, socioeconomic, and healthcare disparities remaining a significant contributor. Recent evidence from hospitals in children has proven that CSOM and other morbidities of the ear remain common among children accessing healthcare centers, which signifies ongoing disease burden despite increased vaccination and antibiotic coverage. School children, particularly primary and secondary school children, are vulnerable due to regular upper respiratory tract infections and poor awareness

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regarding ear hygiene and early warning signs [3]. The most disabling outcome of CSOM is hearing loss, which may be conductive, mixed, or sensorineural depending on the extent of middle ear and inner ear damage. Conductive loss typically results from tympanic membrane perforation and ossicular erosion, while prolonged infection can induce cochlear involvement [5]. Guo et al., in their analysis of the Global Burden of Disease Study, found that hearing impairment in children and adolescents remains a major contributor to disability-adjusted life years (DALYs) worldwide, significantly affecting learning potential and social integration. Similarly, Khairkar et al. emphasised that untreated or poorly managed CSOM may progress silently, leading to moderate or severe hearing loss by adolescence [4]. Auditory deficiency during formative educational years impairs speech perception, classroom attention, and overall academic achievement. The consequences extend beyond learning difficulties, influencing emotional development and self-esteem. A cross-sectional survey in Malawi by Hunt et al. [6] demonstrated that more than 5% of children aged 4–14 years had CSOM, with over half exhibiting measurable hearing deficits. Such data highlight the importance of incorporating ear and hearing assessments into school health programs globally. The burden of CSOM and its sequelae transcends regional and socioeconomic boundaries, affecting children in both rural and urban settings [7]. This study aims to assess the burden of chronic suppurative otitis media and hearing loss among primary and secondary school children.

METHODS & MATERIALS

This was a cross-sectional study conducted from January 2024 to December 2024 among 76 primary and secondary school children (6–16 years), at North Bengal Medical College & Hospital, to ascertain the burden of chronic suppurative otitis media (CSOM) and hearing impairment. Enrolled were children with chronic or ongoing ear discharge, but congenital malformations of the ear, history of ear surgery, or systemic conditions with effect on hearing were excluded. The participants were enrolled by a purposive sampling method from study schools in the study area. Detailed sociodemographic and clinical data were collected by structured interviews and otoscopic examination. Diagnosis of CSOM and classification into tubotympanic or atticoantral forms was carried out by the conventional otoscopic criteria and laterality and duration of discharge were recorded. Hearing assessment was conducted by pure tone audiometry to categorize the type and severity of hearing impairment. Data were examined using SPSS 26.0, with descriptive (frequency, percentage, mean, and standard deviation) and inferential (Chi-square test) statistics employed to examine associations between CSOM and potential risk factors. Ethical approval was given by the institutional review board, and informed written consent was obtained from parents or guardians before participation.

RESULTS

The majority of the children (32.9%) were between 9 and 11 years of age, while the least represented group was aged 15–16 years (13.2%). The gender distribution was equal, indicating no sampling bias between males and females. [Table I]

Table – I: Distribution of Study Population by Age and Gender (*n*=76)

Age Group (years)	Male n (%)	Female n (%)	Total n (%)
6–8	10 (26.3)	9 (23.7)	19 (25.0)
9–11	13 (34.2)	12 (31.6)	25 (32.9)
12–14	10 (26.3)	12 (31.6)	22 (28.9)
15–16	5 (13.2)	5 (13.1)	10 (13.2)
Total	38 (50.0)	38 (50.0)	76 (100.0)

Mean age = 10.8 ± 2.9 years.

Out of 76 children examined, 27 (35.5%) were diagnosed with CSOM. Among these cases, the majority (81.5%) had unilateral disease, while 18.5% had bilateral involvement. This pattern aligns with findings from other community-based studies in South Asia, where unilateral CSOM predominates. [Table II]

Table – II: Prevalence and Laterality of Chronic Suppurative Otitis Media (*n*=76)

Parameter	Frequency (n)	Percentage (%)
CSOM present	27	35.5
CSOM absent	49	64.5
Total	76	100.0
Laterality among CSOM cases (n=27)		
Unilateral	22	81.5
Bilateral	5	18.5

The tubotympanic type of CSOM was more prevalent (77.8%) compared to the atticoantral type (22.2%). Most children had ear discharge lasting 1–3 years (48.1%), with an overall mean duration of 2.4 ± 1.1 years, suggesting chronic and neglected infection patterns similar to those seen in comparable regional studies. [Table III]

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Table – III: Distribution of CSOM Cases by Clinical Type and Duration (*n*=27)

Characteristics	Frequency (n)	Percentage (%)
Clinical Type		
Tubotympanic	21	77.8
Atticoantral	6	22.2
Duration of Discharge (years)		
<1 year	8	29.6
1–3 years	13	48.1
>3 years	6	22.3
Mean duration ± SD	2.4 ± 1.1 years	

Among children with CSOM, 92.6% had measurable hearing impairment. Conductive hearing loss was the most common type (85.2%), with the majority falling within the mild to moderate range. Only 2 cases (7.4%) demonstrated a mixed hearing loss pattern. These findings are consistent with previous studies reporting conductive loss as the predominant type due to tympanic membrane perforation and middle ear pathology. [Table IV]

Table – IV: Degree and Type of Hearing Loss among CSOM Cases (*n*=27)

Type of Hearing Loss	Mild (26–40 dB)	Moderate (41–55 dB)	Moderately Severe (56–70 dB)	Total n (%)
Conductive	14	7	2	23 (85.2)
Mixed	1	1	0	2 (7.4)
Sensorineural	0	0	0	0 (0.0)
Normal Hearing	-	-	-	2 (7.4)
Total	15 (55.6)	8 (29.6)	2 (7.4)	27 (100.0)

Mean hearing threshold among CSOM cases = 38.4 ± 9.2 dB.

Recurrent upper respiratory tract infections (URTI), poor ear hygiene, and low socioeconomic status were significantly associated with the presence of CSOM ($p < 0.05$). A family history of ear disease, although more common among affected children, did not reach statistical significance. These findings emphasize the role of preventable risk factors, consistent with studies from India and Nigeria showing similar environmental and socioeconomic influences. [Table V]

Table – V: Association Between CSOM and Possible Risk Factors (*n*=76)

Risk Factor	CSOM Present (n=27)	CSOM Absent (n=49)	p-value
Recurrent URTI	20 (74.1%)	14 (28.6%)	<0.001
Poor Ear Hygiene	18 (66.7%)	13 (26.5%)	0.001
Low Socioeconomic Status	19 (70.4%)	18 (36.7%)	0.009
Family History of Ear Disease	9 (33.3%)	8 (16.3%)	0.102 (NS)

NS = not significant (p > 0.05)

DISCUSSION

This study confirmed that the participants were engaging between 9 and 11 years, with their sex ratio being equal. This pattern is in agreement with Kamal et al. and Ologe and Nwawolo, who reported CSOM to mainly be present among school children, evidence of higher exposure to upper respiratory tract infections and poor hygiene practice during this phase of growth [8,9]. Comparable age pattern and gender equality have been reported in Indian and Nepali studies [10,11], indicating that both genders are equally at risk when there is high prevalence of risk factors such as poor socioeconomic status and lack of hygiene. The prevalence of CSOM among this population was found to be 35.5%, which compares significantly higher with other studies. Kamal et al. reported a prevalence of 7.39% among Bangladeshi slum children, while Ologe and Nwawolo found 6% in Nigerian school pupils [8,9]. Likewise, Parmar et al. and Adhikari reported prevalence rates of 2–5% in Indian and Nepalese school children, respectively [10,4]. The higher prevalence in our study could be attributed to sampling from areas with limited healthcare access and poor hygienic conditions, supporting the view that CSOM is primarily a disease of poverty and neglect. The predominance of unilateral disease (81.5%) in our findings parallels that of Ologe and Nwawolo and Maharjan et al., who also noted unilateral involvement in most cases [9,12]. This study also showed that the tubotympanic type was the commonest variant (77.8%), while atticoantral disease accounted for 22.2% of cases. These proportions are comparable to findings by Bellad et al. and Islam et al., who reported tubotympanic predominance in 70–80% of cases [13,14]. The mean duration of discharge (2.4 ± 1.1 years) indicates chronic and poorly managed disease, a finding similar to that of Maharjan et al., who reported a mean duration of 2.2 years [12]. This underscores the lack of early intervention and inadequate access to otologic care in affected children. Moreover, this study demonstrated that 92.6% of CSOM cases were associated with hearing loss, primarily of the conductive type (85.2%), and mostly mild to moderate in

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degree. This result is in line with the studies by Kamal et al., who found hearing loss in 60% of affected children, and by Adhikari, who documented conductive loss in 75% of CSOM cases [8,11]. Islam et al. also observed that conductive loss accounted for over 80% of hearing deficits in CSOM, emphasizing the role of tympanic membrane perforation and ossicular damage [14]. The higher proportion of hearing impairment in our study may reflect longer disease duration and greater chronicity, both of which correlate with more severe auditory damage [12]. His study also highlighted significant associations between CSOM and recurrent upper respiratory tract infections (URTI), poor ear hygiene, and low socioeconomic status ($p < 0.05$). Similar risk associations were reported by Parmar et al. and Bellad et al., who found that children from lower socioeconomic backgrounds and those with repeated URTIs had a 3–5 times higher risk of developing CSOM [13]. Kamal et al. also emphasized poor hygiene and overcrowding as major contributing factors [8,10]. The lack of significance for family history suggests that environmental rather than hereditary influences play the dominant role.

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

This study reveals a high burden of chronic suppurative otitis media (CSOM) and associated hearing loss among primary and secondary school children, with a prevalence of 35.5% and hearing impairment observed in 92.6% of affected cases. The disease predominantly presented as the tubotympanic type and was closely linked to recurrent upper respiratory infections, poor ear hygiene, and low socioeconomic conditions.

RECOMMENDATION

Regular school-based ear screening programs should be implemented to facilitate early detection and management of chronic suppurative otitis media (CSOM) among children. Health education campaigns focusing on ear hygiene, prompt treatment of upper respiratory tract infections, and parental awareness should be strengthened.

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REFERENCES

1. *Monasta L, Ronfani L, Marchetti F, Montico M, Vecchi Brumatti L, Bavcar A, Grasso D, Barbiero C, Tamburlini G. Burden of disease caused by otitis media: systematic review and global estimates. PloS one. 2012 Apr 30;7(4):e36226.*
2. *World Health Organisation. World report on hearing. World Health Organisation; 2021 Mar 3.*
3. *Ruffin WC, Crouch JB, Burruss CP, Bush ML. Sociodemographic factors and health care utilization in pediatric chronic suppurative otitis media. The Laryngoscope. 2023 Mar;133(3):700-5.*
4. *Khairkar M, Deshmukh P, Maity H, Deotale V. Chronic suppurative otitis media: a comprehensive review of epidemiology, pathogenesis, microbiology, and complications. Cureus. 2023 Aug 18;15(8).*
5. *Guo Z, Ji W, Song P, Zhao J, Yan M, Zou X, Bai F, Wu Y, Guo Z, Song L. Global, regional, and national burden of hearing loss in children and adolescents, 1990–2021: a systematic analysis from the Global Burden of Disease Study 2021. BMC Public Health. 2024 Sep 16;24(1):2521.*
6. *Hunt L, Mulwafu W, Knott V, Ndamala CB, Naunje AW, Dewhurst S, Hall A, Mortimer K. Prevalence of paediatric chronic suppurative otitis media and hearing impairment in rural Malawi: A cross-sectional survey. PLoS One. 2017 Dec 21;12(12):e0188950.*
7. *Ginni D, Nitish B, Vandana M. Unsafe CSOM still a challenge in rural areas. Online Journal of Otolaryngology. 2014 Apr 1;4(2):1.*
8. *Kamal N, Joarder AH, Chowdhury AA, Khan AW. Prevalence of chronic suppurative otitis media among the children living in two selected slums of Dhaka City. Bangladesh Medical Research Council Bulletin. 2004 Dec 1;30(3):95-104.*
9. *Ologe FE, Nwawolo CC. Chronic suppurative otitis media in school pupils in Nigeria. East African medical journal. 2003;80(3):130-4.*
10. *Parmar SM, Sood A, Chakkal HS. Prevalence of chronic suppurative otitis media in schoolgoing children. Indian Journal of Otology. 2018 Oct 1;24(4):223-6.*
11. *Adhikari P, Joshi S, Baral D, Kharel B. Chronic suppurative otitis media in urban private school children of Nepal. Brazilian Journal of Otorhinolaryngology. 2009;75:669-72.*
12. *Maharjan M, Phuyal S, Shrestha M, Bajracharya R. Chronic otitis media and subsequent hearing loss in children from the Himalayan region residing in Buddhist Monastic schools of Nepal. Journal of Otology. 2020 Dec 1;15(4):144-8.*
13. *Bellad SA, Kavi A, Mudhol RS. Prevalence of chronic suppurative otitis media among school children residing in the Rural Area of Belagavi, South India. Indian Journal of Otolaryngology and Head & Neck Surgery. 2019 Nov;71(Suppl 2):1549-52.*
14. *Islam MS, Islam MR, Bhuiyan MA, Rashid MS, Datta PG. Pattern and degree of hearing loss in chronic suppurative otitis media. Bangladesh Journal of Otorhinolaryngology. 2010;16(2):96-105.*