

## Prevalence of Chronic Suppurative Otitis Media (CSOM) and Associated Hearing Impairment among School Age Children in Muzaffarpur District, Bihar, India.

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Conflict of interest: Nil

### Abstract:

**Objectives:** The present study was to evaluate the prevalence of chronic suppurative otitis media and associated hearing impairment among school age children in Muzaffarpur district, Bihar India.

**Methods:** A total of 384 children with age group  $\leq 5$  to  $\geq 13$  years were selected. A proforma (case record form) was prepared to carry out the study. The initial school survey was carried out and the students were examined according to the pro forma (case record form), which was distributed to the children or to the respective class teachers. All the participants were examined with the help of the otoscope and other standard instruments used for routine ENT checkup.

**Results:** Out of 384 children were selected. Among them, 216(56.25%) were males and 168(43.75%) were females. Among male and female participants, CSOM cases was found in 18(8.33%) males and 12(7.14%) females respectively. Rate of Prevalence of CSOM was 30(7.81%). Majorities of CSOM cases 12(40%) were seen in age group of 9-11 years. And 7(23.33%) CSOM cases were found in 11-13 years. Most of the CSOM cases 135(35.15%) and 8(26.67%) were belonged in upper lower and lower socioeconomic status respectively. Most of the CSOM 23(76.66%) was tubotympanic type. Most of the CSOM cases 13(43.33%) were suffered from moderate hearing impairment. Mild hearing impairment was seen in 10(33.33%) of CSOM cases.

**Conclusions:** CSOM and its associations with hearing impairment was commonly seen in male children with lower socioeconomic status. These findings indicate that CSOM and its association with hearing impairment continue to be a common health problem in low-resource settings. Improving the health services and providing good access to health care among children in such communities is necessary to decrease the burden of illness.

**Key words:** Children, CSOM, Hearing impairment.

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### Introduction

Chronic suppurative otitis media (CSOM) is a disease of middle ear. It is commonly seen in childhood. CSOM is characterised by persistent ear discharge through a perforated tympanic membrane for more than 2 weeks [1]. It is a common health problem in a developing country like India especially in the lower socio-economic status. Overcrowding, poor hygiene and housing conditions, poor nutrition, frequent upper respiratory tract infections are some of the risk factors contributing to the condition [2]. It is one of the leading causes of preventable disabling hearing impairment leading to poor scholastic performance, delayed speech and language development and poor cognition. The global burden of CSOM varies between 1 and 46%, A prevalence of 4% or greater indicates a public health problem that needs urgent attention [3]. Global prevalence rates estimate a

range between 1% and 46%; it has been estimated that 65–330 million individuals have discharging ears, 60% of whom suffer from significant hearing impairment [4].

CSOM - Chronic inflammation of middle ear and mastoid process with perforated tympanic membrane and ear discharge [5]. Destructive and persistent disease with irreversible sequelae and can proceed to serious intra or extra cranial complications [6]. Cholesteatoma is post inflammatory pseudo tumor which is always a consequence of CSOM [7]. Disease of multiple etiologies well known for its persistence and recurrence in spite of treatment [8]. There are 3 types of CSOM based on perforation of middle ear; Tubotympanic, Atticoantral and Marginal [7]. It is the single major cause of conductive deafness and

1.5% of speech disorders [9]. Objectives of our study was to evaluate the prevalence of chronic suppurative otitis media and associated hearing impairment among school age children in Muzaffarpur district, Bihar India.

### Material & Methods

The present study was conducted in the Department of ENT, Shree Krishna Medical College & Hospital, Muzaffarpur, Bihar during a period from September 2023 to December 2023. Attendants of entire subject signed an informed consent which was approved by the institutional ethical committee, SKMCH, Bihar.

Four schools were selected for data collection. All the data was collected by the use of stratified random sampling methods. Socioeconomic status was analysed by the use of Modified Kuppaswamy's socioeconomic scale.

Five schools were selected by the use of random sampling. The schools were selected in such a way that the students of all socioeconomic strata was included.

A total of 384 children with age group  $\leq 5$  to  $\geq 13$  years were selected for the study.

A proforma (case record form) was prepared to carry out the study. The initial school survey was carried out and the students were examined according to the pro forma (case record form), which was distributed to the children or to the respective class teachers. Moreover, the class teachers were asked to fill up the primary information in consultation with parents regarding the name, place of residence, father's

occupation, the living conditions and if possible, the history of major illness in past, in the student or family. The proforma were collected on the next day or, on the next visit to the student. All the study subjects were subjected to detailed ear, nose and throat (ENT) examination at the school.

All the participants were examined with the help of the otoscope and other standard instruments used for routine ENT checkup. The prevalent chronic form of suppurative otitis media in the students was classified into safe (tubotympanic) and unsafe (attico-antral) type.

**Tubotympanic Type:** Central perforations of all variety were included (active, quiescent and inactive state).

**Atticoantral Type:** Posterosuperior marginal perforation and perforation of pars flaccida, retractions with granulations and or cholesteatoma at similar site were included.

### Statistical Analysis

Data was analyzed by using simple statistical methods with the help of MS-Office software. All data was tabulated, and percentages were calculated.

### Observations

In the present study, total 384 children were selected. Among them, 216(56.25%) were males and 168(43.75%) were females. Among male and female participants, CSOM cases was found in 18(8.33%) males and 12(7.14%) females respectively. Prevalence of CSOM was 30(7.81%).

**Table 1: Gender wise distribution of study participants.**

Gender	No of participants	No of CSOM cases
Male	216(56.25%)	18(8.33%)
Female	168(43.75%)	12(7.14%)
Total	384(100%)	30(7.81%)

In the present study, among all participants, majorities of participants 145(37.76%) were seen in age group of 9-11 years. 113(29.43%) and 67(17.45%) participants were in age group of 6-8 years and 11-13 years respectively. Majorities of CSOM cases 12(40%) were seen in age group of 9-11 years. And 7(23.33%) CSOM cases were found in 11-13 years.

**Table 2: Age wise distribution of study participants**

Age group (Years)	No of participants	No of CSOM patients
$\leq 5$	23(5.98%)	1(3.33%)
6-8	113(29.43%)	6(20%)
9-11	145(37.76%)	12(40%)
11-13	67(17.45%)	7(23.33%)
$\geq 13$	36(9.37%)	4(13.33%)
Total	384(100%)	30(100%)

In the present study, most of the participants 135(35.15%) and 187(48.69%) were belonged in upper lower and lower socio-economic status respectively. Most of the CSOM cases 135(35.15%) and 8(26.67%) were belonged in upper lower and lower socioeconomic status respectively.

**Table 3: Socioeconomic status of participants.**

Socioeconomic status	No of participants	No of CSOM cases
Upper	1(0.26%)	00%
Upper middle	4(1.04%)	1(3.33%)
Lower middle	57(14.84%)	4(13.33%)
Upper lower	135(35.15%)	17(56.66%)
Lower	187(48.69%)	8(26.67%)
Total	384(100%)	30(100%)

In the present study, most of the CSOM 23(76.66%) was tubotympanic type. Among them, 13(56.52%) and 10(43.47%) tubotympanic CSOM were males and females respectively. Atticoantral type of CSOM was 7(23.33%). Among them, 5(71.43%) and 2(28.57%) atticoantral CSOM was seen in male and female respectively.

**Table 4: Showing the type of CSOM.**

Type of CSOM	Male	Female	Total
Tubotympanic type	13(56.52%)	10(43.47%)	23(76.66%)
Atticoantral type	5(71.43%)	2(28.57%)	7(23.33%)
Total	18(60%)	12(40%)	30(100%)

In the present study, most of the CSOM cases 13(43.33%) were suffered from moderate hearing impairment. Mild hearing impairment was seen in 10(33.33%) of CSOM cases. Moderately severe hearing impairment was seen in 7(23.33%) CSOM patients.

**Table 5: Showing the hearing impairment of CSOM patients.**

Hearing impairment	No of patients	Percentage
Mild hearing impairment	10	33.33%
Moderate hearing impairment	13	43.33%
Moderately severe hearing impairment	7	23.34%
Severe hearing impairment	0	0%
Profound hearing impairment	0	0%
Total	30	100%

## Discussions

Chronic otitis media (COM) equates with the term chronic “suppurative” otitis media that is no longer advocated as COM is not necessarily a result of “the gathering of pus.” However, the distinction remains between active COM, where there is inflammation and the production of pus, and inactive COM, where there is no inflammation and the production of pus [10]. Incidence of this disease is the higher in developing countries, because of malnutrition, overcrowding, poor hygiene, inadequate health care, and recurrent upper respiratory tract infection [11]. In the developing countries, there is differential prevalence among the different socioeconomic strata of the community [12]. The socioeconomic cost of CSOM is still very high both financially and non-financially for the society. There is a need for capacity building to reduce the burden as well as the associated risk [13]. The HUNT study indicates that CSOM and recurrent acute otitis media in childhood are associated with adult hearing loss, underlining the importance of optimal treatment in these conditions [14].

The burden of CSOM varies. Global prevalence rates estimate a range between 1% and 46%; it has been estimated that 65–330 million individuals have discharging ears, 60% of whom suffer from significant hearing impairment [4].

In the present study, prevalence rate of CSOM was 30(7.81%). Among male and female participants, CSOM cases was found greater in 18(8.33%) males as compared to females 12(7.14%). Most of the cases of CSOM was greatly seen in age 9-11 years.

A study conducted by Parvez et al. [15] at Aligarh, Uttar Pradesh on 610 children estimated the overall prevalence of CSOM to be 6.1% which was found to be 7% in rural area and 1.8% in urban area. Studies in China by Chen et al. [16] have reported prevalence of 9.82%. The prevalence of CSOM was found to be 6% in a study conducted by Rupa et al. [17] in Tamil Nadu while Verma et al. [18] in Haryana have estimated the prevalence of CSOM to be 15.3% which is much higher than that of present study. Two studies in developing country like Bangladesh also reported prevalence of 5.2% and 7.3% among school going children [19, 20].

Though parental illiteracy, overcrowding and poor socioeconomic status has been identified as the independent risk factors for CSOM. Some studies have shown significant association of CSOM between nutritional status of child and standard of living index [15]. Improvement in housing, hygiene and nutrition condition was found to halve the prevalence of CSOM in Maori children between 1978 and 1987 [21]. In the present study, CSOM cases were greatly belonged in upper lower

17(56.66%) and lower 8(26.67%) socioeconomic strata.

There are 3 types of CSOM based on perforation of middle ear; Tubotympanic, Atticoantral and Marginal [7]. It is the single major cause of conductive deafness and 1.5% of speech disorders [9]. The complications occur frequently because of close the relation of middle ear, cleft to facial nerve, auditory labyrinth, lateral sinus and middle and posterior cranial fossae makes it [22]. In the present study, most of the CSOM 23(76.66%) was tubotympanic type. Atticoantral type was only seen in 7(23.33%) cases. Findings of this study is similar to study carried out by Gupta and Mittal, they had reported prevalence of tubotympanic 89.43%) and atticoantral (10.57%) in their study [23].

CSOM is characterised by persistent ear discharge through a perforated tympanic membrane for more than 2 weeks [1]. It is one of the leading causes of preventable disabling hearing impairment leading to poor scholastic performance, delayed speech and language development and poor cognition. In the present study, mild 10(33.33%) and moderate 13(43.33%) hearing impairment was greatly seen in most of the CSOM patients. 7(23.33%) CSOM patients were moderately severe hearing impairment.

This confirms previous evidence from Yemen that CSOM can induce DHI. An earlier detailed hospital-based case-control study found an overall rate of 59% for hearing impairment in both ears in children with CSOM, the majority of whom had conductive DHI [24]. In the Eastern Mediterranean region, a study in Saudi Arabia [25] tested 9,540 children aged up to 12 years old, finding that 125 (1.3%) had CSOM, 17% of who had significant hearing impairment. The level of hearing impairment among children with CSOM is similarly high in other developing countries. A study in Nigeria [26] examined 189 CSOM children and 100 controls aged between four and 150 months and found hearing impairment in 89 (47%) of the children with CSOM, which was conductive in 82% of cases. A study in Dhaka, Bangladesh [27] reported 60% of children with CSOM had a hearing impairment.

### Conclusions

The present study concluded that CSOM and its associations with hearing impairment was commonly seen in male children with lower socioeconomic status. These findings indicate that CSOM and its association with hearing impairment continue to be a common health problem in low-resource settings. Improving the health services and providing good access to health care among children in such communities is necessary to decrease the burden of illness.

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