

## Research Article

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# A cross sectional study of chronic suppurative otitis media and its associated factors among primary school children in rural and urban areas of Aligarh, India

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## ABSTRACT

**Background:** Chronic suppurative otitis media in the school children is an important public health concern as it may lead to hearing loss and thereby affecting the intellectual performance. Present study aims to estimate the prevalence of CSOM and to determine some of its socio-demographic, environmental, personal hygiene and nutritional status factors among the primary school children, in the rural and urban field practice areas of Dept. of Community Medicine, JNMCH, AMU, Aligarh, India.

**Methods:** An estimated sample of 630 was chosen. The number of children from the individual schools was taken as per probability proportionate to size (PPS) while Stratified random sampling was used to identify the individual subject. The children were interviewed using semi-structured format followed by general and otoscopic examination.

**Results:** The overall prevalence of Chronic Suppurative Otitis Media (CSOM) among study population was estimated to be 6.1% (95% CI 4.4-8.2) which was found to be 7% (95% CI 5.0-9.6) in rural areas and 1.8% (95% CI 0.5-6.3) in urban areas. It was found to significantly associated ( $p<0.05$ ) with nutritional status of the child and standard of living Index (SLI), while no significant association ( $p>0.05$ ) was observed with other socio-demographic variables such as father's occupation, mother's education, over-crowding and exposure to smoke. Conclusion: present study shows a high prevalence of CSOM especially in the rural areas, which warrants the urgent action to be taken for preventing the future occurrence of hearing impairment.

**Conclusions:** The prevalence of CSOM in our study was found to be high as per the WHO otitis media expert committee recommendations. CSOM is an important preventable cause of hearing impairment, so this level of prevalence represents a cause of concern.

**Keywords:** Otitis media, CSOM, Prevalence, School children

## INTRODUCTION

Chronic Suppurative Otitis Media (CSOM) means infection in the middle ear (the middle ear is active) causing a discharge for two weeks or more. Otitis media is a preventable cause of hearing impairment; about half of the cases develop mild to moderate degree of conductive hearing loss, which in consequence affects the

intellectual performance of the individual.<sup>1</sup> As proposed by World Health Organization, during a WHO/CIBA workshop of otitis media experts in 1996, CSOM prevalence rate of 1-2% was considered low and 3-6% to be high. With a national average of CSOM to be 4%, India has been classified as the high prevalence country.<sup>1</sup> This disease is particularly important in school children in the context of prevention of future occurrence of

hearing impairment and thereby promoting the intellectual development of the children. Because of insidious onset and chronic course, this disease fails to get due attention especially in the under privileged sections of the society.

A school is considered to be the reflection of community for that specific age group representation. As not many studies have been conducted in Uttar Pradesh, present study was done among the primary school children in the rural and urban field practice areas of dept of community Medicine, JNMCH, AMU, Aligarh with the following aims and objectives;

1. To estimate the prevalence of Chronic Suppurative Otitis Media in primary school children of rural and urban areas registered under R.H.T.C. and U.H.T.C., Department of Community Medicine, J N Medical College, A.M.U., Aligarh.
2. To find out the association of Chronic Suppurative Otitis Media with Personal Hygiene and nutritional status.

## METHODS

Present study is a part of a larger study that was conducted in 12 primary schools in registered areas of Rural and Urban Health Training Centers under the Department of Community Medicine, J N Medical College, Aligarh Muslim University, Aligarh.

### Study duration

One Year (August 2010 to July 2011).

### Sample size

An estimated sample of 630 children from both rural and urban areas was chosen.

### Sample size calculation

Present study is part of a larger study that was conducted among the study population with the objective of finding out the prevalence of common ear diseases and the sample size was calculated to be 630, by using the formula  $n = 4 pq/l^2$ ; (where  $p$  taken to be 15.3% which is the prevalence of CSOM as reported in a study conducted among children age 5-15 years in a rural area in Haryana <sup>2</sup>,  $q = 100-p$ ). After taking relative error ( $l$ ) of 20 % of  $p$  and non-response of 10%, the final sample size came out to be 628, rounded off to 630.

### Non-response

Out of the total 630 school children, 20 were found to be non-responsive thereby giving the non-response rate of about 3.0%. Therefore final analysis in our study was done on 610 cases.

### Sampling procedure

The total number of children to be taken from each school and class was calculated by the Probability Proportionate to Size method. Attendance register was used as sampling frame. The required number of children from a particular class was picked up by using the Simple random sampling, with the help of Random number table, applied on the attendance register (sampling frame). If a child was found to be absent on the day of interview, the next child in the attendance register was taken into account. If that child is also found to be absent, then next child in the attendance register was taken into the study.

### Inclusion criteria/exclusion criteria

The consent of the principal of the school was taken as the criteria for including/excluding a child into study.

### Data collection

The selected children were interviewed through a semi-structured, pre-tested format followed by ear examination. The ear examination was done through otoscope, for which prior training was taken. The final diagnosis was done on the basis of the findings of the otoscopic examination.

### Case definition

CSOM was defined as an infection of middle ear causing perforation of ear drum and muco-purulent discharge, with or without foul smell, lasting continuously for 2 weeks or more, also cases of dry Perforation.

### Statistical analysis

The data collected so, was tabulated and presented as percentages and proportions. Appropriate statistical tests were applied.

### Ethical issues

The study had been approved from institutional ethics committee, JNMCH, AMU, Aligarh. Consent was taken from the principals of the school. Children in need of medical attention were either referred at RHTC/UHTC. Health education regarding ear hygiene practices for the prevention of ear diseases was provided to all children.

## RESULT

### Socio-Demographic Profile of study subjects

As shown in table 1, the study sample was dominated by the rural children (81.8%). Age wise majority of the children were in the age group of 8-10 years (38.5%) followed by 6-8 years (36.4%). Male to female ratio was approximately same (49.9% males vs. 51.1% females) in the study sample. Majority of the children's father were

Unskilled/ Semiskilled laborers (38.8%) followed by skilled laborers (30.6%) while majority of the children's mothers were illiterate (60.2%) followed by just literate/non-formally educated. With respect to 'Standard of Living' Index, majority of the children belonged to High (54.6 %) followed by Medium (33.1%) and Low Standard of living Index (12.3%) families.

**Table 1: Descriptive statistics of study sample (n=610).**

Characteristics	Frequency n (%)
<b>Age</b>	
Less than 6 years	19 (3.1)
6 to 8 years	222 (36.4)
8 to 10 years	235 (38.5)
10 to 12 years	111 (18.2)
More than 12 years	23 (3.8)
<b>Sex</b>	
Male	298 (48.9)
Female	312 (51.1)
<b>Place of School</b>	
Rural	499 (81.8)
Urban	111 (18.2)
<b>Occupation of Father *(N=599)</b>	
Unemployed	19 (3.2)
Unskilled/Semiskilled	231 (38.6)
Skilled	183 (30.6)
Business(Shop/Farm)	104 (17.4)
Service	61 (10.2)
Professional	1 (0.2)
<b>Mother's Education **(N=605)</b>	
Illiterate	364 (60.2)
Just Literate/No formal education	114 (18.8)
Up to primary school	61 (10.1)
Up to middle school	34 (5.6)
Up to High school	21 (3.5)
Up to 12 class	7 (1.2)
Graduate and above	4 (0.7)
<b>Standard of living Index (SLI)</b>	
Low	75 (12.3)
Medium	202 (33.1)
High	333 (54.6)

**Table 2: Prevalence of chronic suppurative otitis media (CSOM) among study population (n=610).**

CSOM	Frequency n (%)	95% CI	p
Rural (n=499)	35 (7.0)	5.0-9.6	<b>p &lt; 0.05,</b> $\chi^2 =$ $4.330, d.f. = 1,$
Urban (n=111)	2 (1.8)	0.5-6.3	
Overall (n=610)	37 (6.1)	4.4-8.2	

### Prevalence of CSOM

As shown in table 2, the prevalence of Chronic Suppurative Otitis Media (CSOM) was found to be 6.1% (37/610) in our study, which was observed to higher among rural children (7%) as compared to their urban counterparts (1.8%). The association of CSOM with place of school (rural/urban) was found to be statistically significant ( $p < 0.05$ ).

### CSOM with respect to Nutritional Status and Personal Hygiene

CSOM was observed to be significantly higher among the thin and severely thin children (10.3%) as compared to those without thinness (3.6%), while this association between CSOM and nutritional status was found to be statistically significant ( $p < 0.05$ ). It was also observed to be slightly higher among children with poor hygiene (6.6%) as compared to those with good personal hygiene (3.6%), but it was not observed to be statistically significant ( $p > 0.05$ ) (table 3).

**Table 3: Chronic suppurative otitis media (CSOM) with respect to nutritional status and personal hygiene.**

1.Nutritional status	CSOM		p
	Present (%)	Absent (%)	
Normal (n=389)	14 (3.6)	375 (96.4)	<b>p &lt; 0.05</b>
Thin/severely thin(n=221)	23(10.4)	198 (89.6)	$\chi^2 = 11.465,$ d.f. = 1
<b>2.Personal Hygiene</b>			
Good (n=111)	4 (3.6)	107 (96.4)	$p > 0.05$
Poor/fair (n=499)	33(6.6)	466 (93.4)	$\chi^2 = 1.44,$ d.f. = 1,
Total (N=610)	37 (6.1)	573 (93.9)	

### CSOM according to selected socio-demographic characteristics

Table 4 shows the association of CSOM with certain socio-demographic variables. Gender wise, it was found to almost similar among boys and girls (6.0% and 6.1%). Like-wise, no significant difference ( $p > 0.05$ ) was observed among different age groups, though; the proportion of CSOM was found to higher in the age group >12 years followed by <6 years (table 4). Among the various factors studied, it was found to be significantly associated with standard of living index (SLI) while no significance association was observed with respect to fathers' occupation, mother's education, over crowding and exposure to smoke.

**Table 4: Chronic suppurative otitis media (CSOM) according to socio-demographic characteristics (N=610).**

Socio-demographic factors	CSOM		p
	Present	Absent	
<b>Age</b>			
<6 years (n=19)	2 (10.5)	17 (89.5)	p > 0.05
6 to 8 years (n=222)	11 (5.0)	211 (95.0)	$\chi^2 = 3.481$ , d.f.=4
8 to 10 years (n=235)	13 (5.5)	222 (94.5)	
10 to 12 years (n=111)	8 (7.2)	103 (92.8)	
> 12 years (n=23)	3 (13.0)	20 (87.0)	
<b>Sex</b>			
Male (n=298)	18 (6.0)	280 (94.0)	p>0.05
Female (n= 312)	19(6.1)	293 (3.9)	$\chi^2 = 0.001$ , d.f.=1,
<b>Father's Occupation</b>			
Unemployed (n=19)	0 (0.0)	19 (100.0)	p>0.05
Unskilled/Semi-skilled (n=231)	17 (7.4)	214 (92.6)	$\chi^2 = 4.53$ , d.f. = 4
Skilled (n=183)	12 (6.6)	171 (93.4)	
Business, Shop-Keeper, Farmer (n=104)	5 (4.8)	99 (95.2)	
Service, Professional (n=62)	1 (1.6)	61 (98.4)	
<b>Mother's Education</b>			
Illiterate (n=364)	22 (6.0)	342 (94.0)	p>0.05
Just Literate/No Formal Education (n=114)	7 (6.1)	107 (93.9)	$\chi^2 = 3.594$ , d.f.= 5,
Primary School (n=61)	2 (3.3)	59 (96.7)	
Middle School (n=34)	4 (11.8)	30 (88.2)	
High School (n=21)	1(4.8)	20 (95.2)	
Intermediate & above (n=11)	0 (00)	11 (100)	
<b>Standard of Living Index (SLI)</b>			
Low (n=75)	17 (22.7)	58 (77.3)	<b>p&lt; 0.05</b>
Medium (n=202)	11(5.4)	191 (94.6)	$\chi^2 = 43.023$ , d.f.= 2,
High (n=333)	9 (2.7)	324 (97.3)	
<b>Overcrowding</b>			
Present (n=530)	33 (6.2)	497 (93.8)	p > 0.05
Absent (n=80)	4 (5.0)	76 (95.0)	$\chi^2 = 0.183$ , d.f. = 1
<b>Exposure to Smoke (Environmental/Tobacco)</b>			
Present (n=493)	28 (5.7)	465 (94.3)	p> 0.05,
Absent (n=117)	9 (7.7)	108 (92.3)	$\chi^2 = 0.672$ , d.f.=1

## DISCUSSION

Present study was conducted among 610 children in 12 primary schools in registered field practice areas of Rural and Urban Health Training Centers under the Department of Community Medicine, J N Medical College, Aligarh Muslim University, Aligarh. In our study the prevalence of CSOM among school children was found to be 6.1%, which was significantly higher in rural areas as compared to urban. No significant difference was observed in its prevalence with respect to gender and age of the children while it was observed to be significantly associated with socio-economic status.

Some studies have reported lower prevalence of CSOM as compared to our study, such as by Chen Y et al in China<sup>3</sup> who reported the prevalence of CSOM to be

0.19%. In a study conducted by Sophia A et al in Tamil Nadu, India, the prevalence of CSOM was found to be

1.4%.<sup>4,5</sup> Wakode PT et al in Maharashtra, India have reported the prevalence of CSOM to be 3.0 %. In a study conducted by Zakzouk S M et al in Saudi Arabia, the prevalence of CSOM was found to be 1.31 %.<sup>6</sup> In a study conducted by Minja B M et al on 802 primary school children in Dar es Salaam, Tanzania, the prevalence of CSOM was found to be 2.6 %.<sup>7</sup> The reasons for these differences from our study may be different geographical location with respect to socio economic and environmental conditions, different age group of the children studied and different diagnostic criteria used for diagnosing CSOM.

Various studies have reported the prevalence of CSOM to be much higher than that reported in the present study. For instance, in a study conducted by Adhikari P in

Nepal, the prevalence of CSOM was reported to be 7.6 %, Akinpelu OV et al in Nigeria found the prevalence of CSOM to be 33.75%.<sup>8,9</sup> The prevalence of CSOM was found to be 7.8 % in a study conducted by Jacob A et al (1997) in Tamil Nadu while Verma A K et al in Haryana found out the prevalence of CSOM to be 15.3 % which is much higher than that of our study.<sup>2,10</sup>

## CONCLUSION

The prevalence of CSOM in our study was found to be high as per the WHO otitis media expert committee recommendations. CSOM is an important preventable cause of hearing impairment, so this level of prevalence represents a cause of concern. It was observed to be significantly higher among the thin and severely thin children while a significant association was observed with socio-economic status as measured by standard of living index (SLI) and highest prevalence was observed among the lower SLI class. So it can be seen in the overall context of socio-economic scenario that ensues the circle of poverty, malnutrition and infection. Further in depth research activities need to be carried out in Uttar Pradesh in order to properly assess magnitude of different ear diseases and to find out the associated/causal factors for different ear diseases. Limitation of the study was the small sample size in our study may be considered as a limitation as far as estimating the prevalence is concerned. Secondly, keeping in mind the low school enrolment among the lower sections of the society, these children could not be considered as representative for that specific age in the community.

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## REFERENCES

1. World Health Organization. Chronic Suppurative Otitis Media: burden of illness and management options. WHO 2004. Geneva.
2. Verma A K, Vohra A, Maitra A, Banarjee M, Singh R, Mittal S K et al. Epidemiology of chronic suppurative otitis media and deafness in a rural area and developing an intervention strategy. *Indian J Pediatr.* 1995;62:725-9.
3. Chen Y, Li X, Xu Z, Li Z, Zhang P, He Y et al. Ear diseases among secondary school students in Xi'an, China: The role of portable audio device use, insomnia and academic stress. *BMC Public Health.* 2011;11:445.
4. Sophia A, Issac R, Rebekah G, Brahmadathan K, Rupa V. Risk factors for otitis media among preschool, rural Indian children. *International Journal of Pediatric Otorhinolaryngology.* 2010;74: 677-83.
5. Wakode PT, Joshi SV, Gawarle SH. Chronic suppurative otitis media in school going children. *Indian Journal of Otolaryngology and Head and Neck Surgery.* 2006;58(2):152-5.
6. Zakzouk SM, Hajjaj MF. Epidemiology of chronic suppurative otitis media among Saudi children-a comparative study of two decades. *International Journal of Pediatric Otorhinolaryngology.* 2002;62(3):215-8.
7. Minja BM, Machemba A. Prevalence of otitis media, hearing impairment and cerumen impaction among school children in rural and urban Dar es Salaam, Tanzania. *Int. J. Pediatr. Otorhinolaryngol.* 1996;31(1):29-34.
8. Adhikari P, Joshi S, Baral D, Kharel B. Chronic suppurative otitis media in urban private school children of Nepal. *Braz J Otorhinolaryngol.* 2009; 75(5):669-72.
9. Akinpelu OV, Amusa YB. Otological diseases in Nigerian children. *Am J Otolaryngol.* 2007;7(1).
10. Jacob A, Rupa V, Job A, Joseph A. Hearing impairment and otitis media in a rural primary school in South India. *International Journal of Pediatric.* 1997;39(2):133-8.

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