

Prevalence of Chronic Otitis Media and Its Associated Hearing Impairment among School Going Children

<https://doi.org/10.47210/bjohns.2024.v32i1.45>

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ABSTRACT

Introduction

Chronic Otitis Media (COM) is one of the common diseases of the ear, particularly in children which causes significant impact in speech, cognitive, educational and psychological development. In this study we aimed to determine the prevalence of COM and associated hearing impairment among school going children aged 5 to 15 years.

Materials and Methods

This was a cross sectional study conducted in the Department of ENT, between September 2018 to August 2020. The study procedures involved completing a questionnaire, otoscopic examination, tuning fork test and audiometric test.

Results

A total of 525 school children were examined for COM and associated hearing impairment. Total 57 (10.8%) cases of COM were detected with male predominance (6.1% vs 4.8%). Unilateral disease was seen in 77.2% and 26.3% had active disease. Around 98.2% had tubotympanic type of disease. This study revealed statistically significant association of COM with parent illiteracy, overcrowding, swimming in local pools and recurrent respiratory tract infections.

Conclusion

Health education through school health program, improvement of socioeconomic status and health facilities should be used in early detection and management of this disease thereby reducing the prevalence of COM.

Keywords

Chronic Otitis Media; Hearing Impairment; Prevalence; School Children

Chronic otitis media (COM) is persistent inflammation of the middle ear or mastoid cavity, characterised by recurrent or persistent ear discharge over 2 to 6 weeks through a perforation of the tympanic membrane.¹ It is one of the most common community health disorders of children in many developing countries including India. Its incidence has been reported to depend on race and socio-economic factors. Overcrowding, poor living conditions, poor hygiene, lack of breast feeding, impaired immunologic status, frequent upper respiratory tract infections, passive smoking and inadequate or unavailable health care have been suggested as a basis for the widespread prevalence of COM in developing countries.² In children, undetected

hearing loss can impact and cause significant delay in speech, cognitive, educational and psychological development.³ It was also found that complications of COM were commonest in the first two decades of life.⁴ Many of these complications could probably have been

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prevented by early identification and treatment of the pre-existing COM.

In developing countries there is a differential prevalence of COM among the different socio-economic strata of the community and it varies from 4% to 33.3% whereas the prevalence is less than 1% in USA and UK. Now a days, with the advent of antimicrobial therapy and the improvement of health care system, the incidence and prevalence of COM have been markedly decreased in developing countries.⁵ The present study was aimed to determine the prevalence of COM and its associated hearing impairment among school going children.

Materials and Methods

This cross sectional study was conducted in the Department of ENT & Head and Neck Surgery between September 2018 to August 2020. All school going children aged between 5 and 15 years old attending ENT OPD with ear complaints irrespective of gender, religion, mode of presentation, duration of illness and severity of condition were included in the study. Children parents / guardian unwilling to give informed consent, children who were unable to participate due to illness, children who had recent treatment for an ear infection, children with traumatic perforation of tympanic membrane & children with cleft palate and congenital anomaly were excluded from the study.

Ethical approval was obtained from the Institutional Research Ethics Board (Ref.No.A/206/REB-Comm (SP)/

RIMS/2015/513/131/2018). After taking written informed consent from the parents/guardians, the entire study sample underwent detailed history taking, clinical ENT examination, otoscopic examination and audiological examination and their parents were interviewed regarding their education, income, housing, total family members and health practices regarding COM.

All the collected data were coded and entered in a proforma and data analysis were performed using software SPSS version 21 (SPSS Inc.,USA). Statistical analysis were performed with the appropriate statistical tests for categorical values. A p-value of 0.05 or less were considered statistically significant.

Results

Total 525 school children age ranged from 5 to 15 years were enrolled in this study. Over half of the children (n=296, 56.4%) were boys. A total of 57 children had COM, either in one or both ears. The prevalence of COM was 10.8%. Among 57 children, 32 were boys and 25 were girls (Table I) with M:F ratio of 1.3:1. Mean age of children was 11.4 years with Standard Deviation (SD) \pm 2.64.

Table I: Distribution of children by gender (n=57).

GENDER	NO OF CHILDREN (%)
MALE	32 (56.1)
FEMALE	25 (43.9)

Table II: Distribution of different type and site of COM among affected children (n=57).

SIDE OF COM	TYPE OF COM		TOTAL (%)
	TUBOTYMPANIC (%)	ATTICOANTRAL (%)	
RIGHT	29 (50.9)	0	29 (50.9)
LEFT	14 (24.6)	1 (1.8)	15 (26.4)
BOTH	13 (22.7)	0	13 (22.7)
TOTAL	56 (98.2)	1 (1.8)	57 (100.0)

Among them 56 (98.2%) were tubotympanic type and only 1 (1.8%) were atticofacial type (Table II). Around 26.3% were active COM (Table III).

Table III: Distribution of active and inactive COM (n=57).

COM	NO OF CHILDREN (%)
ACTIVE	15 (26.3)
INACTIVE	42 (73.7)
TOTAL	57 (100.0)

Degree of hearing impairment (DHI) in the affected ear was found in 23 (40.4%) of the 57 children. Of the 23 children with COM, 26.3% had mild hearing impairment in the affected ear in one or more of the frequencies, while 14.0% suffered from moderate hearing impairment. No children had severe or profound hearing impairment. In the 23 children with DHI, conductive hearing impairment was predominant (n=20, 86.9%), 3 children (13.1%) had sensorineural hearing impairment (Table IV).

It has been shown that COM was more prevalent (14.9%) among the children of the illiterate parents than

literate one. The relation between the parental education and the prevalence of COM was found statistically significant ($p=0.001$). Overcrowding (more than 2 families per house) and URTI (>3 times per year) both significantly increased the risk of COM. Most of the children in this study (48.2%) used to take bath in pond, canal or river water. It was shown that children who used to bath in pond or river water were affected more by COM (17.8%) than that of tube well users (4.4%). As the risk of COM increases, school performance decreases (Table V).

Table IV: DHI among children with COM (N=57)

DEGREE OF HI	NO OF CHILDREN (%)
NORMAL (0-25dB)	34 (59.7)
MILD (26-40dB)	15 (26.3)
MODERATE (41-60dB)	8 (14.0)
SEVERE (61-80dB)	0 (0)
PROFOUND (>81dB)	0 (0)
TOTAL	57 (100.0)

Table V: Associations between COM status and Social characteristics (N=57)

SOCIAL CHARACTERISTICS		PROPORTION OF COM		P VALUE
		YES	NO	
PARENTS ILLITERACY	YES	46 (14.9%)	263 (85.1%)	0.001
	NO	11 (5.1%)	205 (94.9%)	
OVERCROWDING	YES	48 (17.4%)	228 (82.6%)	<0.001
	NO	9 (3.6%)	240 (96.4%)	
SWIMMING IN LOCAL POOLS	YES	45 (17.8%)	208 (82.2%)	<0.001
	NO	12 (4.4%)	260 (95.6%)	
URTI (>3 TIMES/YEAR)	YES	38 (16.3%)	195 (83.7%)	0.001
	NO	19 (6.5%)	273 (93.5%)	
SCHOOL PERFORMANCE	POOR	32 (15.0%)	181 (85.0%)	0.015
	GOOD	25 (8.0%)	287 (92.0%)	

Discussion

The findings are essential in addressing the burden of this clinical problem, in developing better ear care for children, and in contributing to meeting the Millennium Development Goals for improving child survival.

COM is one of the common community health problems of childhood in all developing countries. It is more common in children of rural community where health facilities are least available.⁶ In this cross sectional study among the 525 school going children, total 57 cases of COM were detected and the prevalence of COM was 10.8%. Its ratio in other regions of India as revealed by previous studies varies from 6.1% by Parvez A et al,⁷ 5.1% by Parmar SM et al.⁸ This higher prevalence of COM in our study can be due to poor socio economic status as well as due to lower educational status of the parents.

No significant relationship was found between residence and the prevalence of COM, in contrast to several reports that have indicated a higher prevalence of COM among rural children. The study conducted by Parvez A et al⁷ in Aligarh, India interviewed and examined 630 primary school children in rural and urban areas and found a prevalence of 7% COM among rural children compared to only 1.8% of urban children. The fact that children in urban areas are more likely to have better access to health care than children in rural areas could explain this.

In this study, regarding COM, 29 (50.9%) children had right sided COM, 15 (26.4%) had left sided COM and 13 (22.7%) had bilateral COM as listed in table 2, of which 56 (98.2%) of COM were tubotympanic type and rest of other (1.8%) had atticointral type. This result is consistent with other studies done by Basak B et al.⁹ This study also revealed that 26.3% had active COM similar to the study done by Ologe FE et al¹⁰ which was 27.7% and Audhikari P et al¹¹ which was 26.0%.

The risk factors for COM are many. Poverty, overcrowding, inadequate housing and poor hygiene are known to contribute to high rates of COM. The four

factors found to have the strongest association with COM in this study were parental illiteracy, recurrent respiratory tract infection of more than three times per year, swimming in local pools, overcrowding of more than 2 families per house. A study by Muftah S et al¹² also identified recurrent respiratory tract infections, illiteracy as the independent risk factor of COM. It is crucial that these factors be considered in developing any management or intervention programmes for COM in children.

Regarding the parental education of the children in this study, 64.2% of their parents were illiterate. It was shown that COM was more prevalent (14.9%) among the children of illiterate parents. The relation between the parental education and the prevalence of COM was statistically significant ($p \leq 0.001$) (OR 3.3, 95% CI 1.7 – 6.4). This finding mimics with a study done among the children of the rural areas of Bangladesh by Mazharul S et al¹³. Moreover, parental education has got direct relation with personal hygiene, health consciousness, nutrition, treatment seeking practice and other factors that influence overall health of the children. Most of the children in this study were from medium sized family (52.6%). It was shown that COM was more prevalent (17.4%) among the children from that group. The relation between the overcrowding and the prevalence of COM was statistically significant ($p \leq 0.001$) (OR 5.2, 95% CI 2.7 – 11.7).

Most of the children in this study used to bath in the pond, canal or river (48.2%). It was shown that children who used to bath in pond or river water were affected more by COM (17.8%) than that of tube well users (4.4%). There was a statistically significant association between bathing habit and COM ($p \leq 0.001$) (OR 4.7, 95% CI 2.4 – 9.1). Bathing in the polluted water of the ponds, rivers or canals allows the contaminated water to enter into nose and nasopharynx and frequently infect the middle ear cleft and also enter the middle ear through the pre-existing pathology or perforation of the tympanic membrane which cause the ear chronically infected before it had time to heal. There was a statistically significant association between URTI (>3 times per year) and COM ($p \leq 0.001$) (OR 2.8, 95% CI 1.6 – 5.0). Lower socio

economic group, poor housing which are less ventilated, humid and less hygienic all these predispose to URTI and subsequent COM. This was supported by Bellad SA et al.¹⁴

An important finding of this study was quite a sizeable population becomes deaf due to discharging ears occurring secondary to mismanaged or neglected URTI like common cold, tonsillitis and adenoiditis or at times due to bare negligence of the parents either due to poor economic condition or due to illiteracy, indicating that children with COM are more likely to develop substantial amount of hearing impairment. In the children found to have DHI, conductive hearing impairment was observed in 86.9%. Most of these children had either mild or moderate hearing impairment (26.3% & 14.0%). No cases of severe and profound hearing impairment were identified. This confirms that COM can induce DHI. A detailed hospital based case control study from Rohit BJ et al¹⁵ found an overall rate of 77% for hearing impairment in both ears in children with CSOM, the majority of whom had conductive loss. The level of hearing impairment among children with COM is similarly high in other developing countries. A study in Dhaka, Bangladesh by Islam MR et al¹⁶ examined 160 cases of COM children and found hearing impairment in 117 (73.1%) children with COM, which was conductive in 89.5% of cases. These findings indicate that COM 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.

Conclusion

This study shows that the prevalence of COM was 10.8% among school going children. Factors like parental illiteracy, overcrowding, swimming in local pools, recurrent respiratory infection have been identified as being responsible for this high prevalence. The burden of COM in the children studied indicates high level of DHI. Regular

screening of primary school children to identify cases of COM, primary ear care, immunization, health education, improvement of socio-economic status and health facilities will be helpful in reducing the prevalence of chronic suppurative otitis media and deafness.

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