

PREVALENCE OF CHRONIC OTITIS MEDIA AND ITS ASSOCIATED FACTORS AMONG RURAL SCHOOL CHILDREN OF TIRUNELVELI DISTRICT AFTER THE LOCKDOWNS BETWEEN 2020-2021 DUE TO COVID-19: A CROSS-SECTIONAL STUDY

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Abstract

INTRODUCTION : Chronic otitis media (COM) is a major health problem throughout the world especially in underdeveloped and developing countries including India. In India, the prevalence of COM varies from 1.4 to 15.3 in various previous studies. This study was conducted in post covid period, to estimate the prevalence, the significance of certain risk factors of chronic otitis media among school children, and also to evaluate their level of health seeking behavior in COM.

METHODS : A cross sectional study involving 3432 school children from schools around Model Rural Health Research Unit Tirunelveli, was undertaken after the schools reopened from the COVID-19 lockdown period between November, 2021 to March 2022. Detailed report of symptoms, habits, treatment history were recorded from parents/guardian. Complete otological examination was done by ENT Surgeon and findings were recorded. Risk factors included were age, sex, nutritional status, source of drinking water, passive smoking in home, overcrowding, parent literacy status, habit of ear picking, habit of taking bath in ponds, and recurrent nasal infections among the children.

RESULTS : The overall prevalence of chronic otitis media is 1.14%. The major symptoms among those with COM are ear pain (11.7%) and ear discharge (28%). Among the risk factors, habit of ear picking (p value= 0.04), recurrent nasal infections (p value < 0.000) were found to be significantly associated with COM. The students with h/o ear discharge were classified into new (8%), persistent (18%), recurrent (26%) and dry perforated (46%), because of which it was found out 50% of the children were not seeking definitive care for their problem.

CONCLUSION : This study which was conducted post lockdowns of 2020-2021 due to COVID-19 which was able to establish a lower prevalence rate of chronic otitis media when compared to other studies done in similar settings before this period. The percentage of children seeking appropriate treatment is 50%, so chronic otitis media still continues to exist as a public health problem. This highlights a need for better awareness on this issue among both teachers and parents in order to weed out the problem among school going children. Better screening practices and better referral mechanisms at primary level is necessary.

KEYWORDS : Otitis , COM, CSOM

INTRODUCTION

Otitis media is the inflammation of the middle ear, mastoid and eustachian tube. It is classified into acute otitis media, otitis media with effusion and chronic otitis media. Acute otitis media (AOM) is one of the most common diseases in children. By the end of 3 years 50 to 70 % of all children would have suffered at least one episode of acute otitis media.¹ The course of AOM is variable and in certain times it is also self-resolving.² practices of treatment for the AOM also varies depending on the availability of the health care services. Inadequate or improper treatment may lead it to a chronic disease or sometimes to a partly contained form

with retained effusion within the middle ear.^{3,4} Inflammation of the middle ear , mastoid cavity leading to a discharge for more than 2 weeks is called chronic otitis media. Because of recurrent and persistent discharge of middle ear cavity through a perforation of the tympanic membrane it is also referred as chronic suppurative otitis media.^{5,6,7} The factors



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related to development of chronic otitis media include inadequate antibiotic treatment, frequent upper respiratory tract infections, nasal disease⁸, and poor living conditions with poor access to medical care.^{3,4,5,6,7} WHO recognize a prevalence of > 1% in school children as an avoidable burden and if more than 4% it represents massive public health problem requiring urgent interventions. In a report by WHO in 2004, the prevalence of CSOM among Indian school children was 7.8% and India was listed among the group with highest prevalence.⁹ In the same classification American Indians and United Kingdom were listed in group with lowest prevalence (<1%). In a school-based study done in south India in 1995 states that the prevalence of all forms of otitis media was 17.6%.¹⁰. But in another study by¹¹.in 2010 showed the prevalence was 8.6% in India and 7.4% in Yemen¹² which is almost half of that value in the previous century. In an Uttar Pradesh based study in 2016 the prevalence of CSOM was 6.1%.¹³. There was a difference in prevalence among rural and urban school students, 1.41% and 5.46% correspondingly in another study done from Patiala in 2017.¹⁴ In Tamil Nadu the public health facilities have been largely improved in the past decade and there is a need to study about present scenario in otitis media.

AIM AND OBJECTIVES

Our objective was to estimate the prevalence of COM and to find the associated factors.

METHODOLOGY

We conducted a cross sectional descriptive study involving 3432 children aged 5 to 19 years, studying in 35 schools in Kallur, MRHRU (Model Rural Health Research Unit) field practice area, Tirunelveli, established by the Department of Health Research, Government of India which is linked to the Tirunelveli Medical College. It is mentored by the ICMR – National Institute of Epidemiology, Chennai.

MRHRU field practice area has a population of 36,663 and is an area that falls under Papakudi and Mannur blocks in Tirunelveli district; comprising of 14 village clusters. There are 28 Primary Schools, 2 Middle Schools, 2 High Schools and 3 Higher Secondary School. The total number of school going children in MRHRU field practice area were 3851. Among them 3432 students who were present on the day of the school camp, between the age group of 5 to 19 years, were screened by a team consisting of Otorhinolaryngologist and allied health workers including the Principal Investigator (PI) period between November, 2021 to March 2022. Permission was obtained from all the necessary authorities from District

to block level and from the institutional ethics committee Tirunelveli medical college before the start of the study. The Headmasters of each school fixed a date one week prior for the screening of students. For children studying up to 8th grade Informed written consent and assent was obtained from parents/guardians and students respectively . For the rest of the children only written consent was obtained from Parents/guardians and they were informed to be present on the day of screening.

CLINICAL AND AUDIOLOGICAL EXAMINATION

At the time of examination 125 students were found to have excessive wax , who were excluded ,so 3267 students were considered for further evaluation . And each student is assigned with computer generated unique identification number. This number is fixed throughout the child's curriculum for future reference. Examination data are collected in 2 parts. Part I includes demographic profiles, Part II contain all clinical examination including otoscopic ear examination, precise nose, throat and neck examination details. Screening audiogram is done for those children with complaints of hard of hearing and those with otitis media.

RESULTS

A total of 3432 children were screened between the ages of 5 and 19 years. Out of them 1659 (48.3%) were boys and 1773 (51.7%) girls. 1893 (55.1%), 1463 (42.6%) and 76 (2.2%) children were in the age groups of 5 to 9 years, 10 to 14 years, 15 to 19 years respectively. 54%, 28%, 17% and 1% of the students were studying in primary, middle, secondary and higher secondary schools respectively. (Table 1)

CHRONIC OTITIS MEDIA

Out of the children examined only 38 (1.14%) were found to have COM (Figure 1). Squamous and mucosal types of the disease were found in 10.52% and 89.47% of the students respectively.

The predominant ear related history among all the students was ear pain 89 (2.50%). Out of which those with ear pain for more than 1 week are 6 (6.74%) . 28 (31.46%) students reported to have recurrent ear pain in the past 1 year. 26 (0.75%) students had complained of having ear discharge, out of whom 14 (50%) had recurrent discharge, 11 (42.30%) of them with history of ear discharge had CSOM. (Table 2)

Both male and female children have been affected by CSOM in equal number (19). School children of ages 5-9 (1.11%) and 10-14 (1.16%) were equally affected by CSOM.

But none of those in ages of 15-19 were found to have the disease, this could also be because of the very low proportion of students in that age group constituted our study population (2.21%). Strong association with COM was found among students with children having history of ear picking (P= 0.041), history of more than 5 episodes of throat pain in the past 1 year (P= 0.038), history of more than 5 episodes of nasal block in the past 1 year (P=0.010). Among the symptoms ear pain (11.71%) and ear discharge (28.94%) was the most frequent among those with COM and had a strong association with values of P=0.010, P<0.00 respectively, predominant number of those who had COM were examined to have mild to moderate hearing loss (92.10%). (Table 2)

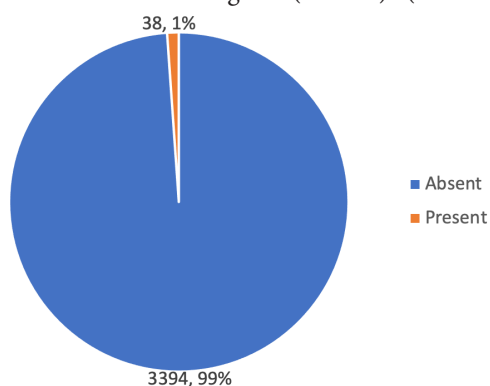


Figure 1: COM Prevalence

Table 1: Socio- Demographic Profile of the Students

Characteristics	Count	Percentage
Education Category	Primary	1840 54%
	Secondary	963 28%
	High School	584 17%
	Higher Sec School	45 1%
Sex	Male	1659 48.30%
	Female	1773 51.70%
Age Category	5-9	1893 55%
	10-14	1463 43%
	15-19	76 2%
Family Type	Nuclear Family	2589 75.4%
	Joint Family	649 18.9%
	Single Parent	160 4.7%
	Guardian Custody	26 0.8%
	Others	8 0.2%
Father Occupation	Unemployed	326 9.5%
	Laborer	582 17.0%
	Self-employed	1124 32.8%
	Farmer	850 24.8%
	Clerical	182 5.3%
	Shop Keeper	167 4.9%
	Semi professional	16 0.5%
Professional	11 0.3%	
Mother Occupation	Unemployed	267 7.8%
	Laborer	615 17.9%
	Self-employed	1131 33.0%
	Farmer	879 25.6%
	Clerical	316 9.2%
	Shop Keeper	145 4.2%
	Semi professional	18 0.5%
Professional	6 0.2%	

Table 2 : COM Association with risk factors

S. No	Characteristics	Com		Chi-Square	
		Absent	Present		
1.	Sex	Male	1640(98.85 %)	19(1.15 %)	0.837
		Female	1754(98.93 %)	19(1.07 %)	
2.	Age	5 - 9	1872(98.89 %)	21(1.11 %)	1.000*
		10 - 14	1446(98.84 %)	17(1.16 %)	
		15 - 19	76(100 %)	0(0 %)	
3.	Class	Primary	1821(98.97 %)	19(1.03 %)	0.068*
		Secondary	946(98.23 %)	17(1.77 %)	
		High School	582(99.66 %)	20(3.4 %)	
		Higher Sec. School	45(100 %)	0(0 %)	
		Nuclear Family	2557(98.76 %)	32(1.24 %)	
4.	Family Type	Joint Family	646(99.54 %)	3(0.46 %)	0.175*
		Single Parent	158(98.75 %)	2(1.25 %)	
		Guardian Custody	25(96.15 %)	1(3.85 %)	
		Others	8(100 %)	0(0 %)	
		Nuclear Family	2557(98.76 %)	32(1.24 %)	
5.	Does your child have habit of ear picking?	Yes	67(95.71 %)	3(4.29 %)	0.041*
		No	3327(98.96 %)	35(1.04 %)	
6.	Does your child have the habit of taking bath in public ponds/rivers?	Yes	331(98.51 %)	5(1.49 %)	0.414*
		No	3063(98.93 %)	33(1.07 %)	
7.	Residential status	Hostel	27(100 %)	0(0 %)	1.000*
		Home	3363(98.88 %)	38(1.12 %)	
		Others	4(100 %)	0(0 %)	
		Public transport	471(98.95 %)	5(1.05 %)	
8.	Mode of transport to school	Bicycle	119(98.35 %)	2(1.65 %)	0.905*
		Walk	2021(98.78 %)	25(1.22 %)	
		Parent/care take drop	208(99.52 %)	1(0.48 %)	
		Private transport (auto/ car/ van)	493(99 %)	5(1 %)	
		Others	82(100 %)	0(0 %)	
		Protected	3837(98.88 %)	32(1.12 %)	
9.	Source of Drinking water at household	Unprotected	526(98.87 %)	6(1.13 %)	1.000
		Protected	3240(98.87 %)	37(1.13 %)	
10.	LPG	Yes	123(99.19 %)	1(0.81 %)	1.000*
		No	616(98.25 %)	11(1.75 %)	
11.	Firewood	Yes	2747(99.03 %)	27(0.97 %)	0.093
		No	407(97.56 %)	12(4.44 %)	
12.	Kerosene	Yes	332(98.9 %)	37(11 %)	0.371*
		No	20(100 %)	0(0 %)	
13.	Electric stove	Yes	3343(98.88 %)	38(1.12 %)	1.000*
		No	2273(99.9 %)	23(1 %)	
14.	Is there provision for Exhaust facility for kitchen smoke in your kitchen?	Yes	1090(98.64 %)	15(1.36 %)	0.355
		No	14(100 %)	0(0 %)	
15.	No. of members in the family	2	219(98.21 %)	4(1.79 %)	0.694*
		3	1561(98.8 %)	19(1.2 %)	
		4	994(99.3 %)	7(0.7 %)	
		5	384(98.21 %)	7(1.79 %)	
		6	222(99.55 %)	10(4.5 %)	
		7	51(100 %)	0(0 %)	
		Others	3343(98.88 %)	38(1.12 %)	
16.	Does anybody in your family have the habit of smoking inside home?	Yes	27(100 %)	0(0 %)	1.000*
		No	3367(98.88 %)	38(1.12 %)	
17.	Did your child have more than five episodes of fever in the past 1 year?	Yes	26(92.86 %)	2(7.14 %)	1.000*
		No	3368(98.94 %)	36(1.06 %)	
18.	Did your child have more than five episodes of throat pain in the past 1 year?	Yes	46(95.83 %)	2(4.17 %)	0.038*
		No	3348(98.94 %)	36(1.06 %)	
19.	Did your child have more than five episodes of nasal discharge in the past 1 year?	Yes	38(92.68 %)	3(7.32 %)	0.010*
		No	3356(98.97 %)	35(1.03 %)	
20.	Did your child have more than five episodes of nasal block in the past 1 year?	Yes	82(95.35 %)	4(4.65 %)	0.014*
		No	3312(98.98 %)	34(1.02 %)	
21.	Does your child have ear pain?	Yes	15(57.69 %)	11(42.31 %)	0.000*
		No	3379(99.21 %)	27(0.79 %)	
22.	Does your child have ear discharge?	Yes	13(100 %)	0(0 %)	1.000*
		No	3381(98.89 %)	38(1.11 %)	

*Fisher's Exact Test

Only 4 people fit the criteria for a newly discharging untreated ear. While 9 students had a persistently discharging initially treated ear, 14 students had a recurrently discharging ear and 15 had a dry perforated ear drum with hearing. The predominant number of those with COM fell in 3rd category (36.84%) or 5th category (39%). (Table 3)

Table 3: Classification of children based on their presentation with ear discharge as given by WHO's Global burden of otitis media, 2004

Classification	Number of students
A newly discharging untreated ear	4
A persistently discharging, initially treated ear	9
A recurrently discharging ear	14
A discharging ear with headache, fever dizziness and other danger signs	0
A dry perforated ear drum with hearing loss	15

Other findings

The prevalence of Acute Suppurative Otitis Media (ASOM), Otitis Media Externa (OME) were 2.97% and 3.67% respectively.

Table 4: Prevalence of other related ear findings

Disease	Prevalence
ASOM	2.97%
OME	3.67%
ME	0.14%

DISCUSSION

This study done among school children in MRHRU field practice area in southern most district of Tirunelveli, it is the first of its kind in this part of India. And it had been conducted in the post the period post lockdown due to COVID-19, as soon as the schools reopened. All necessary precautions were taken as per the government guidelines that prevailed at that time. The prevalence of chronic otitis media was 1.14% which was much lower than the previous studies which reported prevalence rates of 8.6% and 6% among preschool children and school children respectively, while a recent study done in Karnataka in 2019 among rural students has estimated the prevalence to be 5.2%^{15, 16, 17}. Availability and accessibility of good primary healthcare in that area and improvement in public hygiene over years should be considered as a reason for reduced prevalence. The long periods of online classes, lockdowns, ban on major festivals and other gatherings during the COVID-19 pandemic are the other factors to be considered. The children were mostly homebound, and the possibility of cross infection was drastically low. The media advertisement of wearing masks, hand hygiene and social distancing could be other factors that reduced spread of respiratory tract infections and thereby leading to control and reduced prevalence of chronic otitis media.

In this study a strong association was found to be present between CSOM and symptoms related to history of recurrent respiratory tract infections like recurrent nasal block and throat pain and h/o cleaning of ear with various objects. This is in accordance with the result described by Kumari et al and Muftah et al who also identified recurrent respiratory tract infections of more than three times per year to be an independent risk factor of CSOM. The association of Bathing in ponds with COM, which was considered to be a significant factor in some studies, was not found to be statistically significant in this study. And consumption of unprotected drinking water was also found to be not significant. This could also be a testament to better hygiene practice and good wash programs in the area^{18, 19}.

Active ear discharge is seen in 29 % of children and history of hard of hearing in 38.23% of children among those with COM. This indicates screening protocols based on symptoms alone, as used in school health programs may

not be sufficient for early identification. The most concerning issue was that majority of those who had COM (75.83%) fell in the category of 3 or above in the WHO classification for ear discharge. Those children who fell into categories of 2 or above might need access to tertiary care facilities with an ENT specialist for ideal treatment. But such patients are still in the primary care level and are not seeking for tertiary care, this could also be due to the COVID-19 pandemic situation. Hence appropriate referral mechanism should also be created.

CONCLUSION

The present study which is done in the post COVID-19 period is able to demonstrate a low prevalence of Chronic otitis media. Though it is low, C.O.M. continues to exist as a public health problem. This is because certain risk factors that were highlighted like recurrent respiratory infection, ear picking habits are still prevalent. Thus highlighting a need for better awareness on the issue among both teachers and parents in order to weed out the problem. By avoiding aforementioned risk factors, increasing public awareness of otological treatment for recurrent ear discharge, insisting on otoscopic examination in every school health camp, establishing pediatric otorhinolaryngology units in tertiary health care centres we shall attain higher standards in the treatment of Chronic Otitis Media.

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