

Demographic Predictors and Etiological Profiles in Recurrent Suppurative Otitis Media.

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Recurrent suppurative otitis media (rSOM) is common in both pediatric and adult patients. The demographic factors in Southeast Asia are more vulnerable than in other regions. The cause is largely predictable, stemming from limited education, poverty, rural living, and limited access to health care facilities. Methods: It is a cross-sectional study in the ENT outpatient department from July 01, 2020, to December 30, 2024, at Comilla Medical College (<https://www.comc.college.gob.bd>) and Comilla Medical Center (PVT) LTD (<https://www.comillamedicalcentre.com>), Cumilla, Bangladesh. Result: Males (55.4%) and adults (66.2%) are more susceptible. Com was 70%; right ear was 45.4%; rural (71.5%); poor (79.2%); maximum. Passive smoke exposure and day care of children were 26.2% and 22.3%, respectively. Staphylococcus aureus 32.3% (42) and Streptococcus pneumoniae 23.8% (31) were the most frequent bacteria, with bacterial resistance observed in 28.5% and multiple follow-ups in 63.8%. The mean age and SD were 25.56±16.225 years, and the follow-up time was 13.48±7.789 months. The risk of rSOM was estimated with an odds ratio: sex = 1.447; 95% CI (.691-3.032), children=1.279; 95% CI (.777-2.107), AOM=13.291; 95% CI (5.593-31.585), passive smoking=17.500; 95% CI (6.611-46.326), day care=20.222; 95% CI (6.502-62.895), sensitivity=1.111; 95% CI (.622-1.384), and

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multiple follow-up=2.002; 95% CI (1.509-2.522). A significant p-value in the linear logistic regression was age = 0.27, age category = <.001, types of otitis media = <.001, follow-up time = .012. Univariate assessment was significant for age category = .040, types of otitis media*laterality = .022, day care = .001, and follow-up category = < .001. Conclusion: The rSOM should take care in the primary health care system to prevent crucial damage to hearing.

Keywords: Recurrent suppurative otitis media (rSOM), Acute otitis media (AOM), Chronic otitis media (COM).

1. Introduction:

Suppurative otitis media (SOM) is a significant burden in developing countries. Rural and suburban people are the most affected. The rural people of Bangladesh call it the ripening of the ear. They depend on ponds and rivers for bathing and washing their food, clothes, and other utensils. Suppurative otitis media is divided into acute otitis media (AOM) and chronic otitis media (COM). AOM is the acute inflammation of the middle ear cleft, characterized by severe earache, hearing loss, tinnitus, and ear discharge before perforation of the tympanic membrane. The discharge is usually blood mixed with pus, like a bursting abscess. AOM is divided into four subgroups. The first is the sporadic type, characterized by a rare, isolated episode of AOM occurring with a cold or sore throat. Resistant types persist with the patient's ear problems for more than 5 days after antibiotic treatment. Persistent AOM does not resolve the difficulties after completing the antibiotic course. The last kind of AOM is recurrent, which is defined as three or more repetitive episodes within six months or a minimum of four to six attacks of AOM within one year. A study (n=3224) found that 84% of children under 15 years of age have AOM [1]. Another analysis concluded that the relative risk of AOM was 200 times higher in children than in adults [2]. Microbiological, anatomical, and environmental factors, combined with altered host defense mechanisms, predispose to infection. Genetic predisposition is another crucial factor for recurrent AOM. Both viruses and

bacteria are demonstrated in AOM. Viral activity among children with AOM was detected in 48-71% of subjects [3]. Bacterial strains involved in bacterial action include *Streptococcus pneumoniae* (18-55%), *Haemophilus influenzae* (16-37%), *Moraxella catarrhalis* (11-23%), *Streptococcus pyogenes* (13%), and *Staphylococcus aureus* (5%) [4]. There is growing evidence that genetic factors are a risk factor for recurrent otitis media, as shown by a comparison of monozygotic and dizygotic twins, in which AOM was more frequent in dizygotic twins [5]. Low levels of IgG2 subclasses have been reported to be associated with a higher risk of AOM. Faulty complement-dependent phagocytosis has been associated with recurrent AOM attacks in children [5]. The family bond is essential for preventing AOM. Day care outside the home increases the relative risk (RR) from 1.59 to 2.45 [6]. In the case of the pacifier carrier, children's exchange of breastfeeding increases the relative risk from 0.87 to 1.45 [7]. Low socioeconomic status is associated with poor housing, and overcrowding increases the relative risk to 5.55 [6]. Passive exposure to parents' smoking also raises the relative risk from 1.0 to 1.6 [6]. AOM is one of the most common illnesses of childhood. Incidence of first AOM: 22% in the 1st year of life, 15% in the 2nd year, 10% in the 3rd year, and 2% by age 8 years [8]. AOM is uncommon in adults; in the previously mentioned study (n=3224), 16% of patients were over 15 years old and adults [9]. Liederman et al. reported that culture of the discharge and polymerase chain reaction (PCR) detected *Streptococcus pneumoniae* and *Haemophilus*

influenzae in 15 of 19 cases, and other organisms included *Moraxella catarrhalis* and adenovirus [10]. Chronic otitis media (COM) is a chronic inflammation of the ear and air cells of the aural cavity with repeated aural discharge through a perforation of the tympanic membrane [1]. It may occur spontaneously or be precipitated by acute infection, with or without tympanic membrane perforation, or without any episodes of AOM [11]. COM implies a permanent abnormality of the tympanic membrane, differentiated as tympanic membrane perforation in the pars tensa, COM mucosal variety, and in the pars flaccida, COM squamous variety [12]. COM incidence is 31 million patients globally; the highest incidence of 15.4% per 1000 occurs in the 1st year of life; otitis media-related hearing loss has a prevalence of 30.8% per 10000; and 2100 people die annually from complications of otitis media [13].

The paper reviews the demographic interpretations and etiological outlines of rSOM, including AOM and COM, in both children and adults, to examine its declining prevalence and prevention.

2. Methods:

In this cross-sectional study, the participants were the outdoor population of the ear, nose, and throat. From July 01, 2020, to December 30, 2024, I surveyed patients at Comilla Medical College (<http://www.cumc.edu.bd>) and Comilla Medical Center (PVT) LTD (<http://www.comillamedicalcentre.com>), Bangladesh. First, I collected a sterile cotton bud from the Microbiology department at Comilla Medical College and Comilla Medical Center. Second, I collected aural discharge from the patient's external auditory canal after obtaining permission from the patient and the parent or guardian. Finally, I sent the accumulated pus to the laboratory for bacteriological and Culture sensitivity tests. Here, expressive variables are sex of the participant, different age categories, types of otitis media, involved ear, residential status, socioeconomic condition, passive smoke of the

children, working mother children, the bacteriological study of discharge, culture sensitivity test, and follow-up category, and assessable variables are age in years, and follow-up time in months. SPSS 31 was used to analyze the data. The significance level is $p < .05$.

In the detailed statistics, we reported qualitative variables as prevalence and fraction, and quantitative variables as mean, SD, minimum, and maximum. After assessing and exploring the normality of the variables, we conducted inferential statistics under the assumption that the null or alternative hypothesis was true. We executed a Chi-Square test, exploring the correspondences between two expressive variables of p-value and risk estimate with odds ratio for patients in the sex: age category, age category: types of otitis media, types of otitis: passive smoke of children, types of otitis media: working mother children, types of otitis media: culture sensitivity test to antibiotic, and age category: follow-up category. We conducted a linear logistic regression analysis of sex, age in years, age category, types of otitis media, follow-up category, and follow-up time in months, with children's passive smoke exposure as the dependent variable. We performed a linear logistic regression analysis, including both explanatory and assessable variables: sex, age, age category, types of otitis media, follow-up category, and follow-up time, with children's passive smoke exposure as the dependent variable. Univariate assessment of variables was done for age category, types of otitis media, types of otitis media*laterality, day care (working mothers' children), and follow-up category, with follow-up as the dependent variable.

3. Results:

In comprehensive statistics, we examine the graphic variables in rate and proportion; the sex of the patient was male 55.4%(72) and female 44.6%(68), the age category was children (0-17years) 33.8%(44) and adults (18 years and above) 66.2%(86), types of otitis media were AOM 30%(39) and COM 70%(91), involved ear was right ear 45.4%(59), left ear 37.7%(49), and bilateral

16.9%(22), residential status was rural 71.5%(93), suburban 17.7%(23), and urban 10.8%(14), socioeconomic status was poor 79.2%(103), lower middle 11.5%(15), and upper middle 9.2%(12), passive smoke of the children was yes 26.2%(34), and 73.8%(96), working mother children (day care) was yes 22.3%(29), no 77.7(101), bacteriological study of discharge was *Staphylococcus aureas* 32.3%(42), *Strptococcus pneumniae* 23.8% (31), *Streptococcus pyogenes* 17.7% (23), *Hemophilus influenza* 16.9% (22), *Pseudomonas aeruginosa* 9.2%(12), culture- sensitivity test was sensitive 71.6% (93) and resistant 28.5%(37), and follow-up category was one-time 36.2%(47) and multiple 63.8%(83) [Table 1]. For unremitting variables, we inspected the mean, Std. deviation, minimum, and maximum; age in years was 25.56 ± 16.225 , ranging from 1 to 55 years, and follow-up time in months was 13.48 ± 7.789 , ranging from 2 to 32 months [Table 2].

We estimate the risk of rSOM of the patient using odds ratios for participants with distinct variables in the Chi-Square test: sex with age category, $p=.330$; odds ratio for sex=1.447; 95% CI: .691-3.032; age category in children=1.279; 95% CI: .777-2.107; adult=.884; 95% CI: .693-1.128, age category with types of otitis media, $p<.001$; odds ratio for age category=55.080; 95% CI: 17.514-173.223, for AOM=13.291; 95% CI: 5.593-31.586; for COM=.241; 95% CI: .140-.417, types of otitis media with passive smoke of the children= $<.001$; odds ratio for types otitis media=72.500; 95% CI: 20.797-252.736, passive smoking=17.500; 95% CI: 6.611-46.326, no passive smoking=.241; 95% CI: .139-.429, types of otitis

media with working mother children (day care), $p<.001$, odds ratio for types of otitis media = 58.667; 95% CI: 15.525-221.695, day care = 20.222; 95% CI: 6.502-62.895, no day care = .348; 95% CI: .221-.538, types of otitis media with sensitivity test to antibiotics, $p=.337$; odds ratio for types of otitis media=1.481; 95% CI: .622-3.528, for sensitivity=1.111; 95% CI: .622-1.384, for resistant=.750; 95% CI: .391-1.438, age category with follow-up category, $p<.001$; odds ratio for age category=.043; 95% CI: .010-.191, one-time follow-up=.087; 95% CI: 0.022-0.342, multiple follow-up = 2.002; 95% CI: 1.509-2.522 [Table 3].

The linear logistic regression analysis for sex was $t=.572$, $p=.569$; age: $t=2.238$, $p=.027$; age category: $t=5.173$, $p<.001$; types of otitis media: $t=4.518$, $p<.001$; follow-up category: $t=.081$, $p=.935$; follow-up time in months: $t=-2.546$, $p=.012$, where passive smoking of the children was the dependent variable [Table 4].

Univariate assessment of variables showed significance in age category, $F=9.950$, $p=.002$, types of otitis media, $F=4.320$, $p=.040$, types of otitis media*laterality, $F=3.936$, $p=.022$, Age category*reside, $F=2.639$, $p=.075$, Age category*SES, $F=2.431$, $p=.092$, working mothers' children (day care), $F=11.171$, $p=.001$, Bacteria*sensitivity, $F=1.362$, $p=.251$, and follow-up category, $F=33.266$, $p<.001$, where follow-up time was the dependent variable [Table 5]. Figure 1 is the histogram of age in years. Figure 2 is the histogram of follow-up time in months. Figure 3 is the histogram of the regression analysis. Figure 4 is the P-P plot of the regression analysis.

Table 1: Frequency and percentage of categorical variables.

Factor	Type	Frequency	Percentage
Sex	Male	72	55.4%
	Female	58	44.6%
	Total	130	100
Age category	Children (0-17 years)	44	33.8%

	Adults (18 years and above)	86	66.2%
	Total	130	100
Types of otitis media	AOM (Acute otitis media)	39	30%
	COM (Chronic otitis media)	91	70%
	Total	130	100
Involved ear	Right ear	59	45.4%
	Left ear	49	37.7%
	Bilateral	22	16.9%
	Total	130	100
Residential status	Rural	93	71.5%
	Suburban	23	17.7%
	Urban	14	10.8%
	Total	130	100
Socioeconomic status	Poor	103	79.2%
	Lower middle	15	11.5%
	Upper middle	12	9.2%
	Total	130	100
Passive smoke of the children	Yes	34	26.2%
	No	96	73.8%
	Total	130	100
Working mother children	Yes	29	22.3%
	No	101	77.7%
	Total	130	100
Bacteriological study of discharge	Staphylococcus aureus	42	32.3%
	Streptococcus pneumoniae	31	23.8%
	Streptococcus pyogenes	23	17.7%
	Hemophilus influenzae	22	16.9
	Pseudomonas aeruginosa	12	9.2%
	Total	130	100

Culture sensitivity test to antibiotic	Sensitive	93	71.6%
	Resistant	37	28.5%
	Total	130	100
Follow-up category	One-time follow-up	47	36.2%
	Multiple follow-up	83	63.8%
	Total	130	100

Table 2: Mean, Std. Deviation, minimum, and maximum of continuous variables.

Statistics			
		Age in years	Follow up time in month after recurrent attack
N	Valid	130	130
	Missing	0	0
Mean		25.56	13.48
Std. Deviation		16.225	7.789
Minimum		1	2
Maximum		55	32

Figure 1: Histogram of age (years).

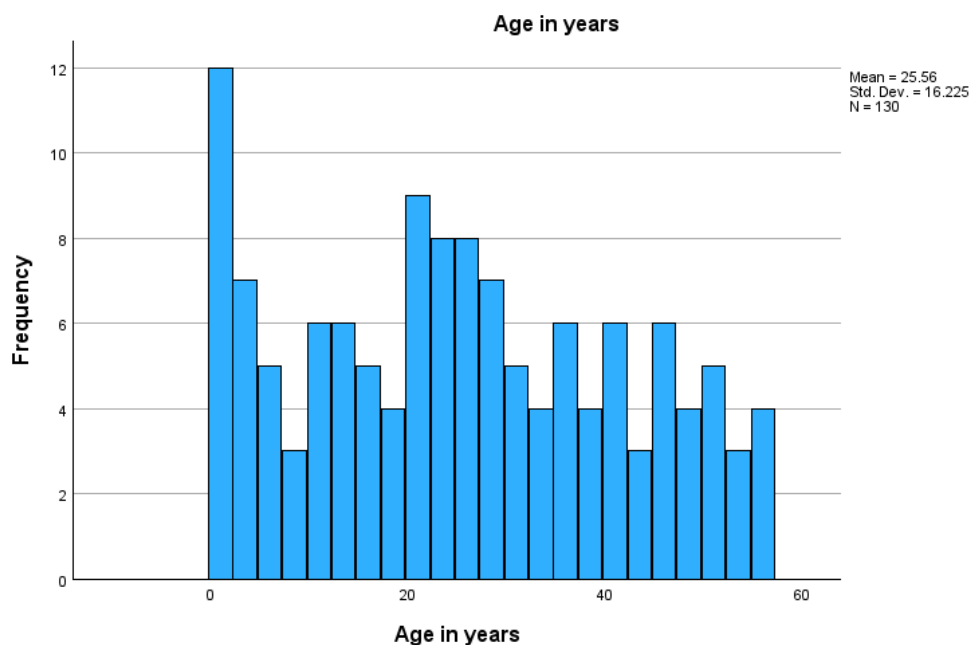


Figure 2: Histogram of follow-up time in months.

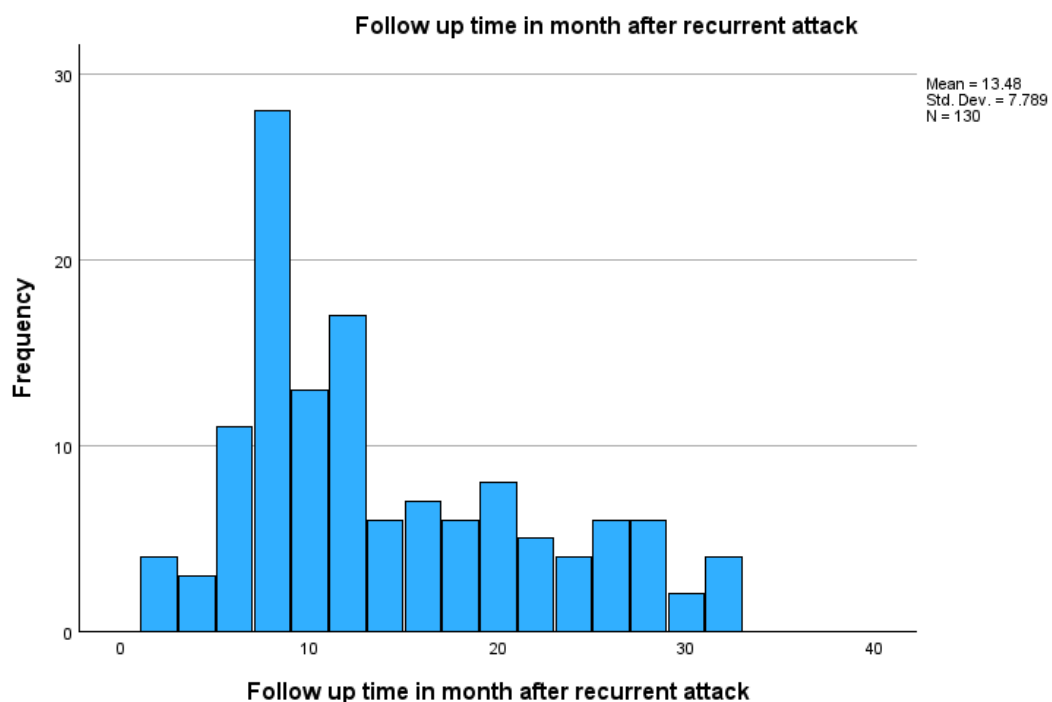


Table 3: Risk estimate with odds ratio for participants with distinct variables in the Chi-Square Test

Factors	P-Value	Odds Ratio	Value	95% interval	
				Confidence Upper	Lower
Sex*Age category	.330	Odds ratio for sex	1.447	.691	3.032
		For the age category-Children	1.279	.777	2.107
		For the age category-adult	.884	.693	1.128
Age category* Types of otitis media	<.001	Odds ratio for age category	55.080	17.514	173.223
		For the types of AOM	13.291	5.593	31.586
		For the types of COM	.241	.140	.417
Types of otitis media* Passive smoke of children	<.001	Odds ratio for types of otitis media	72.500	20.797	252.736
		For the passive smoke of the children-yes	17.500	6.611	46.326

		For the passive smoke of the children-No	.241	.139	.429
Types of otitis media* Working mother children	<.001	Odds ratio for types of otitis media	58.667	15.525	221.695
		For the working mother, children-yes	20.222	6.502	62.895
		For the working mother, children-no	.348	.221	.538
Types of otitis media* culture sensitivity test to antibiotics	.377	For the types of otitis media	1.481	.622	3.528
		For the sensitivity test of the antibiotic-sensitive	1.111	.622	1.384
		For the sensitivity test of the antibiotic-resistant	.750	.391	1.438
Age category* follow-up category	<.001	For the age category	.043	.010	.191
		One-time follow-up	.087	.022	.342
		Multiple follow-up	2.002	1.590	2.522

Table 4: Linear Logistic Regression analysis: Dependent variable, Passive smoking of the children.

Coefficients ^a								
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	.561	.148		3.778	<.001	.267	.855
	Sex of the Participant	-.022	.039	-.025	-.572	.569	-.100	.055
	Age in years	.005	.002	.167	2.238	.027	.001	.009
	Different age category	.424	.082	.457	5.173	<.001	.262	.587
	Types of Otitis Media	.283	.063	.295	4.518	<.001	.159	.407
	How many follow up	.004	.051	.005	.081	.935	-.097	.106
	Follow up time in month after recurrent attack	-.007	.003	-.129	-2.546	.012	-.013	-.002

a. Dependent Variable: Passive smoke of the children

Figure 3: Histogram of regression analysis.

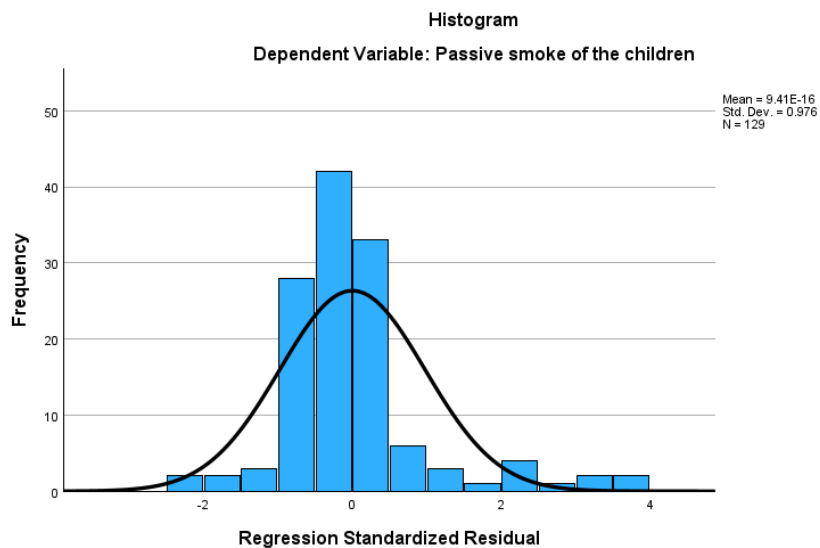


Figure 4: Normal P-P plot of Regression analysis.

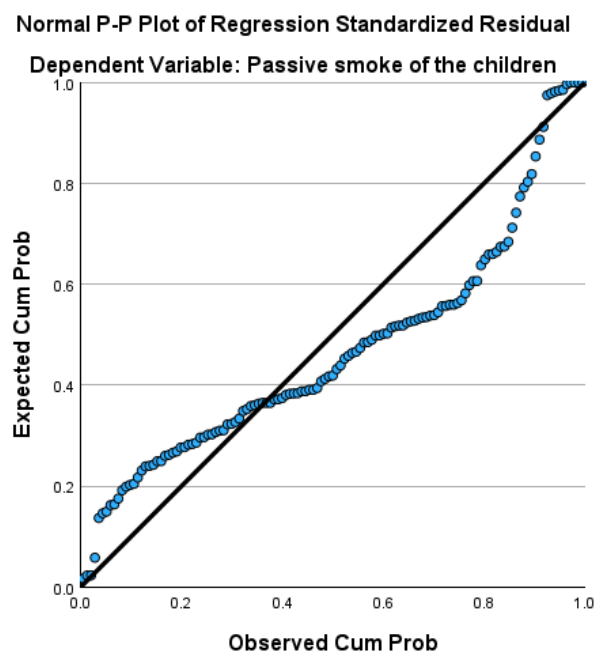


Table 5: Univariate assessment of factors; Dependent factor: Follow-up Time.

Factors	F	P-Value
Age category	9.950	.002
Types of Otitis Media	4.320	.040
Types of Otitis Media*Laterality	3.936	.022
Day care (Working mothers' children)	11.171	.001
Follow-up category	33.266	<.001
Age category*reside	2.639	.075
Age category*ses	2.431	.092
Bacteria*sensitivity	1.362	.251

4. Discussion:

Recurrent suppurative otitis media (rSOM) is a substantial clinical concern in pediatric otolaryngology, characterized by recurrent acute viral and bacterial infections of the middle ear cleft, accompanied by pus discharge. It poses a extensive problem for healthcare systems and meaningfully reduces the quality of life for affected patients and their families. Considering the multifactorial etiology, basic predispositions, and advanced nature of this illness is vigorous for stopping long-term sequelae, including enduring hearing loss and chronic rudimentary injury to the middle ear.

4.1. Gender:

In the present study, males were predominant (55.4%, 72) compared to females (44.6%, 68), and the sex risk for otitis media was estimated at an odds ratio of 1.447 (95% CI: 0.691-3.032). Lamphear et al. reported rSOM, noting an increase from 1981 to 1988; males led (19.8%; 2644 and 29.6%; 3153) over females (17.5%; 2545 and 24%; 3056) [14]. Sophia et al. conducted a cross-sectional study to see the prevalence of otitis media in eight hundred children; 69 (8.63%) were suffering, and males (59.4%;41) dominated females (40.6%;28), and without otitis media, out of 731, males were 370 (50.7%) and females 360(49.3%) [15]. Abraham et al. reported that, of 5591, 79 (1.4%) had COM, with males (43; 54.4%) predominant over females (36; 45.6%) [16]. Basavaraj et al.'s research showed that the majority of patients were male (85; 53.5%) and female (74; 46.5%) [17]. All papers were consistent with our study. Shrestha et al.'s article reported that females (127; 55.2%) were more prevalent than males (103; 49.6%) [18], which was inconsistent with our study.

4.2. Age:

Our research showed that the mean age and SD in years was 25.56 ± 16.225 , ranging from 1 to 55 years, and the age category was children (0-17years) 33.8% (44) and adults (18 years and above) 66.2% (86). In the linear logistic regression analysis for age, $t=2.238$, $p=.027$; age category: $t=5.173$,

$p<.001$, the risk of otitis media in the age category was estimated at an odds ratio of 55.080; 95% CI: 17.514-173.223, and in the univariate analysis by age category, $F=9.950$, $p=.002$. Lasisi et al. [19] reported that their research included 189 children, the ages ranging from 30 days to 14 years. Lamphear et al. [14] worked with children and adolescents from the NHIS (National Health Interview Survey) database, aged 0-17 years, with 15416 children in 1981 and 17110 in 1988. The paper by Sophia et al. [15] reported on children aged 11 months to 7 years; the mean age was 3 years 11 months and age category was <1 year, 1;1.45%, 1-2, 11;15.94%, 2-3, 14; 20.29%, 3-4, 13; 18.84%, 4-5, 15; 21.74%, >5, 15; 21.74%. The study by Abraham et al. [16] included ages ranging from 7 months to 82 years; the mean age and SD were 12.9 ± 7.9 years, and the age category was <5 years,1, 1468; 26.3%, 6-10, 416; 7.4%, 11-15, 332; 5.9%, 16-20, 274; 4.9%, 21-25, 445; 8%, 25-30, 391; 7%, 31-35, 348; 6.8%, 36-40, 342; 6.1%, >40, 1575; 28.1%. The research by Basavaraj et al. [17] only revealed that the age categories were: 1-20 years, 84; 52.8%; 21-40 years, 53; 33.3%; 41-60 years, 20; 12.6%; >60 years, 2; 1.3%. The investigation of Shrestha et al. [18] exhibited that the mean age was 33 years and ranged from 6-58 years; the age distribution was <10 years, 80; 34.6%, 11-20, 70; 30.4%, 21-30, 43; 18.7%, 31-40, 22; 9.6%, 41-50, 11; 4.8%, and >50, 4; 1.7%. Some works were compatible with our paper because their geographic distributions were near our location. A few papers differed from ours because they focused only on children.

4.3. Types of Otitis Media and Involved Ear:

The existing paper demonstrated that the types of otitis media were AOM 30% (39) and COM 70% (91); the involved ear was the right ear in 45.4% (59), the left ear in 37.7% (49), and bilateral in 16.9% (22). The risk estimate for otitis media by odds ratio is 72.500; 95% CI: 20.797-252.736; the linear logistic regression analysis for types of otitis media: $t=4.518$, $p<.001$; the univariate analysis revealed types of otitis media, $F=4.320$, $p=.040$;

types of otitis media*laterality, $F=3.936$, $p=.022$. Anna Granath [20] studied only recurrent acute otitis media, its prevention, treatment, antibiotics, vaccines, adenoidectomy, and genetics. Nwokoye et al. [21] grouped 378 patients into three categories: Otitis media with effusion (OME), AOM, and COM; the incidence of otitis media (OM) was highest in the rainy season 76%, unilateral ear (82) involvement, left ear (66.8%), right ear (33.2%), and bilateral involvement (18). Lasisi et al. [19] worked only with 189 children with COM. Lamphear et al. [14] reported that they scrutinized children ≤ 5 years associated with risk factors for recurrent attacks of otitis media, and the prevalence of increased otitis media rose from 5189 in 1981 (18.7%) to 6029 in 1988 (26.9%). Sophia et al. [15] documented a case-control study of 800 children, with normal 480 (60%), wax 228 (28.5%), AOM 12 (1.5%), OME 48 (6%), COM 11(1.4%), eustachian tube blockage 32 (4%), and otitis externa 1(0.1%). Abraham et al. [16] studied only COM; unilateral was 97.5%, bilateral 2.5%, left ear infection 58.3%, and right ear 41.7%. Shrestha et al. [18] documented the involved ear: right ear 114 (49.6%), left ear 102 (44.3%), and bilateral 7 (6.1%). The types of otitis media are important for diagnosis, therapeutic outcomes, and follow-up advice. Bilateral ear involvement was a risk factor for hearing loss. They need special care.

4.4. Residential and Socioeconomic Status:

The current study revealed that residential status was rural 71.5% (93), suburban 17.7% (23), and urban 10.8% (14); socioeconomic status was poor 79.2% (103), lower-middle 11.5% (15), and upper-middle 9.2% (12). Though residential and socioeconomic status were not statistically significant, univariate analysis showed age category*reside, $F=2.639$; $p=.075$, and age category*ses, $F=2.431$; $p=.092$, but important risk factors for rSOM. Anna Granath [20] reported that recurrent attacks of AOM were specifically related to poor socioeconomic status, underprivileged existence, deficient health services, and lack of parental education. Nwokoye et al. [21]

documented that the bad hygienic conditions (14.8%, 56 out of 378) were among the risk factors for different types of otitis media. Lasisi et al. [19] reported that low socioeconomic status was observed in 67.19% (127 out of 179) and malnutrition in 36.76% (68 out of 179). Lamphear et al. [14] recorded poverty status: poor was suffering from ROM (recurrent otitis media) 20.1% (4190 out of 5189 in 1981), rich was 13.8% in 1981, and 27.6% (5225 out of 6209 in 1988), and rich was 23.4% in 1988; residential status was nonurban, suffering from ROM, 19% (3810 out of 5189 in 1981) and urban was 17.9% in 1981, and 28% (4142 out of 6209 in 1988) and 24.4% in 1988. Sophia et al. [15] reported that 80% of the population were living in the rural area; the socioeconomic status, low in the otitis media group was 25; 36.2%, and control group 271; 37.1%, and high in otitis media group was 44; 63.8%, and control group 62.9%; 460. Residential and socioeconomic status are crucial factors for both children and adults. From our perspective, poor villagers were more susceptible than others, a finding supported by most studies except those by Sophia et al.

4.5. Passive smoke and Working Mothers' Children:

The ongoing study documented that the children's passive smoke exposure was yes: 26.2% (34) and no: 73.8% (96); for working-mother children (day care), it was yes: 22.3% (29) and no: 77.7% (101). The risk of passive smoking for children's rSOM was estimated at an odds ratio of 17.500; 95% CI: 6.611-46.326. The working mother children's (day care) risk for rSOM was estimated at an odds ratio of 20.222; 95% CI: 6.502-62.895. Univariate analysis showed working mothers' children (day care), $F=11.171$, $p=.001$. Anna Granath [20] showed that parental smoking was listed as a risk factor for the occurrence of recurrent AOM (RR 1.34), and day care attendance was another risk factor for the occurrence of recurrent AOM, mostly of viral origin. Lasisi et al. [19] reported 62% of day care attendance in the test group (otitis media) compared to 45% in the

control group, and 18% (34) of children whose fathers had a smoking history in the test group, whereas 22% (22) in the control group. Lamphear et al. [14] paper recorded that maternal employment was 20.6%; 2238 in 1981, and 29.6%; 3360 in 1988; day care attendance or nursery was 27.6%; 630 in 1981, and 37.1%; 1366 in 1988; parental smoking during pregnancy was 19.3%; 1200 in 1981, 27.9%; 1427 in 1988. They showed that day care and parental smoking significantly increased over time. Sophia et al. [15] reviewed that employed parents were 95.7%; 66 in the disease group, and 90.7%; 663 in the control group, which means their children needed day care attendance, and in the unadjusted and adjusted analysis of a case-control study, passive smoking was 31.6%; 18 in the disease group, and 23.5%; 16 in the control group. Nowadays, lifestyles change day by day. For a smooth life, both parents should be employed. Some parents grew up in a smoking family, as they were addicted to smoking. Both problems were responsible for the occurrence of otitis media in the children.

4.6. Bacteriological Study of Aural Discharge and Sensitivity Test:

The contemporary research demonstrated that bacteriological study of discharge was *Staphylococcus aureus* 32.3% (42), *Streptococcus pneumoniae* 23.8% (31), *Streptococcus pyogenes* 17.7% (23), *Haemophilus influenzae* 16.9% (22), *Pseudomonas aeruginosa* 9.2% (12); culture sensitivity test was sensitive 71.6% (93) and resistant 28.5% (37). The sensitivity of bacteria was important to the risk for rSOM, estimated at an odds ratio of sensitivity=1.111; 95% CI: .622-1.384. The univariate analysis for Bacteria*sensitivity was $F = 1.362$, $p = .251$. Anna Granath [20] showed that children with recurrent AOM were treated with prophylactic antibiotics, adenoidectomy, and grommet insertion, which were the most effective treatments for AOM. At the same time, probiotics were considered a preventive for recurrent AOM. Nwokoye et al. [21] reported that a bacteriological study identified *Streptococcus pneumoniae*

(38.1%), *Moraxella catarrhalis* (16.7%), *Staphylococcus aureus* (19.1%), *Pseudomonas aeruginosa* (14.1%), and *Peptostreptococcus magnus* (13.4%). The study by Abraham et al. [16] declared that among Gram-positive bacteria, *Staphylococcus* spp. had the highest prevalence (54.5%), followed by *Escherichia coli* (21.1%), *Klebsiella pneumoniae* (20.2%), and *Proteus mirabilis* (17.8%); the sensitivity test was gentamycin 80.8%, ceftriaxone 73.1%, and ciprofloxacin 61.5% were sensitive, and ampicillin; amoxycillin/clavulanic acid were resistant. The research of Basavaraj et al. [17] displayed that *Pseudomonas* spp. was 33.3%, *Staphylococcus aureus* 28.9%, *Klebsiella pneumoniae* 8.2%, CoNS (Coagulase-Negative *Staphylococci*) 7.6%, and *Proteus mirabilis* 6.9%; the sensitivity test was *Pseudomonas* was sensitive to piperacillin-tazobactam (91%), amikacin (80%), and resistant to amoxicillin-clavulanic acid (90%), and ciprofloxacin (55%); *Staphylococcus* sensitive to linezolid (93%), and piperacillin-tazobactam (88%), and resistant to cloxacillin (79%), and cephalexin (64%); Gram negative bacteria sensitive to amikacin (73%), gentamycin (67%), netilmicin (63%), and resistant to cephalexin (90%), cloxacillin (87%), and amoxiclav (85%). The investigation by Shrestha et al. [18] exhibited a bacteriological profile in which *Staphylococcus aureus* was 74 (32.2%), *Pseudomonas aeruginosa* 62 (26.9%), *Klebsiella pneumoniae* 24 (10.4%), *Proteus mirabilis* 16 (6.9%), *E. coli* 16 (6.9%), *Aspergillus* spp. 16 (6.9%), *Streptococcus pneumoniae* 14 (6.1%), *Candida* spp. 6 (2.6%), and others 2 (0.8%). Antibiotic overuse and other risk factors contribute to resistance in the microbiome in rSOM. So, reducing risk factors is essential to decrease prevalence and stop the inappropriate use of antibiotics, which is important for both physicians and patients.

4.7. Follow-up Category and Time:

The contemporary research revealed that the follow-up category was one-time 36.2% (47) and multiple 63.8% (83), and the follow-up time in

months was 13.48 ± 7.789 , ranging from 2 to 32 months. The risk of rSOM decreases with multiple follow-ups, with an estimated odds ratio of 2.002 (95% CI: 1.509-2.522). The regression analysis for follow-up time in months: $t = -2.546$, $p = .012$. Univariate assessment of factors exhibited a significant effect in the follow-up category ($F = 33.266$, $p < .001$). Nwokoye et al. [21] reported that the period of disease before presentation was 35.6%, the first 3 months of contamination 35.6%, between 3 and 6 months 23.7%, and greater than 6 months 40.7% in the follow-up. The study by Lasisi et al. [19] showed that the follow-up included the age at the first episode of aural infection, the number of occurrences of ear infection within 18 months, and the presence of recurrent otitis media, defined as more than three episodes within one year. Sophia et al. [15] reviewed a cohort study conducted from July 2006 to April 2007 in the service area of RUHSA (rural unit for health and social affairs), with a sample of 800 children over 5 years, of whom 69 had different types of otitis media, and followed them for this duration. The

Follow-up category is important to review the therapeutic outcome. The time indicates the disease propensity, and treatment quality shows how to overcome the rSOM.

Conclusion:

The rSOM is characterized by repeated episodes of viral or bacterial infection with ear discharge. Recurrent AOM and acute exacerbations of COM destroy the structure of the middle ear and affect the valuable special sense of hearing. We found demographic data on underprivileged people and identified etiological factors to reduce the rSOM. To prevent it, health education is essential for parents of children and for most of the village's general population. The government and non-governmental health organizations take the initiative to provide health education services to all deprived people.

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