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RESEARCH ARTICLE
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FREQUENCY OF OTITIS MEDIA WITH EFFUSION IN RECURRENT UPPER RESPIRATORY TRACT INFECTION IN CHILDREN

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ABSTRACT

Background: worldwide it is estimated that 330 million individuals suffer from ear infections, of which around 60% have hearing loss capability. Its terrific prevalence has led to challenges with public health in both developed and developing countries.

Objective: The aim of the current study was to explore the Frequency of Otitis Media with Effusion in Recurrent Upper Respiratory Tract Infection in Children.

Methodology: The current study was conducted at the ENT unit MTI HMC from July 2020 to January 2021 after taking approval from the ethical committee of the institute. Children of both gender age range from 3-12 years who visited the OPD were enrolled. Children who had experienced two or more infections of the upper respiratory tract symptoms within the previous 12 weeks were included. Children with a history of neurological issues or otological issues were excluded. Individuals who were thought to have Otitis Media with Effusion have been referred to an otolaryngologist for further screening. To determine whether there was fluid in the middle ear, tympanometry was used. To determine the degree of deafness, (PTA) and tuning-fork tests were performed. The history, clinical assessment, pneumatic otoscopic examination, and tympanometry were used to make the diagnosis. SPSS (version 12.0) was used to gather and analyze the data.

Results: A total of 354 children of different age groups and both gender were included in the current study. Of these 195 (55.0%) were boys and 159(44.9%) were girls. The age range was 3 to 12 years, with a mean of 56.4 months. Pneumatic otoscopy was carried out. Of the 354 individuals, 150 (42.37 %,) had a dulled tympanic membrane and a lost light cone. Of the 150 instances, 113(75.3%) had a tympanic membrane that had retracted. In 26(17.3%) individuals there was tympanic membrane bulging. The tympanic membrane was dull in just 11(7.33%) of the cases, The 115 individuals with retracted tympanic membranes displayed bubbles in 23(9.5%) of the cases, fluid level behind the membrane in 31(26.9%) of the scenarios, bluish as well as black discoloration in 3(2.6%) of the cases, and retraction with a prominent lateral process in 58(50.4%) individuals**.** In 146(97.3%) individuals, tympanometry revealed a flat type-B curve, indicating the presence of fluid behind the tympanic

membrane. Tests using a 512-Hz tuning fork with a foot plate were conducted. Out of 150 participants, 123(82.0%) had negative results on Rinnie's test. 45 (30%) individuals were lost to follow-up. Out of the rest 103 cases, 92 (87.6%) cases revealed spontaneous resolution within 3 months.
Conclusion: The current study explored that Children with repeated upper respiratory tract infections develop otitis media with effusion most frequently (42.3%).

Keywords: Frequency of Otitis Media, Effusion, Recurrent Upper Respiratory Tract Infection and Children

Introduction

Otitis medium (OM) is the name for the middle ear infection, which is characterized by ear pain or oozing out of fluid (otorrhae).[1] it may be chronic or acute infection[2]. Worldwide it is estimated that 330 million individuals suffer from ear infections, of which around 60% have hearing loss capability.[3]It's terrific prevalence has led to challenges with public health in both developed and developing countries.[4]Ear infections primarily affect young children and babies, although they may also affect adults.[5] Unnoticed care during childhood may cause the infection to develop.[4] Children are more susceptible to ear infections than adults are because they have a developing Eustachian tube, which makes it easier for microbes to enter the nasal cavity. In addition, men have a greater infection ratio than women have.6Children are more susceptible to ear infections than adults are because they have a developing Eustachian tube, which makes it easier for microbes to enter the nasal cavity. In addition, men have a greater infection ratio than women have.[6] There are geographic differences in the prevalence of otitis media. Because of increased wakefulness, it is dropping in developed nations but surging in nations that are developing.[7] Otitis media with effusion (OME) is characterized by a non-suppurative effusion that can be either contain mucous. The majority of OME's clinical episodes resolve on their own within a few months, but 40% of affected children experience recurrence and it is one of the major causes of hearing loss in children.[8] Although the particular etiopathogenesis of middle ear infections and effusions is still recognized researchers suggest that a number of virulence factors are involved. These factors include upper respiratory tract infections like as asthma, cleft palate, adenoid hypertrophy, and allergic problems.[9] Studying the OME risk factors is crucial because it provides insight into the etiopathogenesis and nature of the diseases, which is a crucial stage for the early identification of children who are at high risk and who ought to be given attention in the initial prevention and appropriate treatment policies.[8] Family physicians and children's doctors, who are the main healthcare professionals, sometimes fail to do the appropriate otological test due to the ambiguity of the symptoms. It results in repeated hospital visits, which cause children to miss school, puts more strain on hospital resources because of misdirected investigations, and causes the parents to become anxious as well. Therefore the current study was carried out to find out frequency of otitis media with effusion in recurrent upper respiratory tract infection in children.

Material and Method

The current study was conducted at the ENT unit MTI HMC from July 2020 to January 2021 after taking the approval from the ethical committee of the institute. Children of both gender age range from 3-12 years who visited the OPD were enrolled. Children who had experienced two or more infections of the upper respiratory tract symptoms within the previous 12 weeks were included. These symptoms included cough, rhinorrhea, ear pain and pyrexia. The following conditions were met for the referral to the otolaryngologist: mild intermittent ear pain, fullness or "popping" of the eardrum; children not responding appropriately to a common speaking level of conversation or the need for an excessively loud volume when using audio equipment or watching TV; non-specific hearing loss indicated by behavioral changes and lack of attention; excessive irritability, insularity, and sleep disturbances of the child identified by parents or others; balance issues, inexplicable clumsiness, and poor academic achievement. Children with a history of neurological issues such as cerebral palsy, mental retardation, or attention deficit disorder, or otological issues such as sensor neural deafness, congenital deafness, or congenital deformities were excluded. Every case in the pediatric outpatient

department (OPD) had a comprehensive physical examination and a complete history after the parents gave their informed permission. The age, gender, period of the disease, and any comparable symptoms like hearing loss, extreme irritability, insularity, and poor academic performance were all reported by the clinical history. Individuals who were thought to have Otitis Media with Effusion (OME) have been referred to an otolaryngologist for further screening. The otolaryngological examination involved a thorough examination of the ear, nose, and throat as well as a reevaluation of the history with a focus on the otolaryngological aspect. A halogen bulb and a pneumatic attachment were used for otoscopy in order to record the following: dullness, retracting or bulge, loss of cone of illumination, change from the normal greyish coloring of the ear drum to blue as well as black, retracted malleus handle and prominent lateral process, and fluid as well as bubbles behind the membrane of the tympanic cavity. In order to validate the results of pneumatic otoscopy, all patients who were suspected of having OME based on that examination received further otolaryngological testing. To determine whether there was fluid in the middle ear, tympanometry was used. To determine the degree of deafness, Pure Tone Audiometry (PTA) and tuning-fork tests were performed. The history, clinical assessment, pneumatic otoscopic examination, and tympanometry were used to make the diagnosis of OME.

Analysis of data

SPSS (version 12.0) was used to gather and analyze the data for windows, and a confidence interval of 95% was determined for the incidence of OME instances.

Results

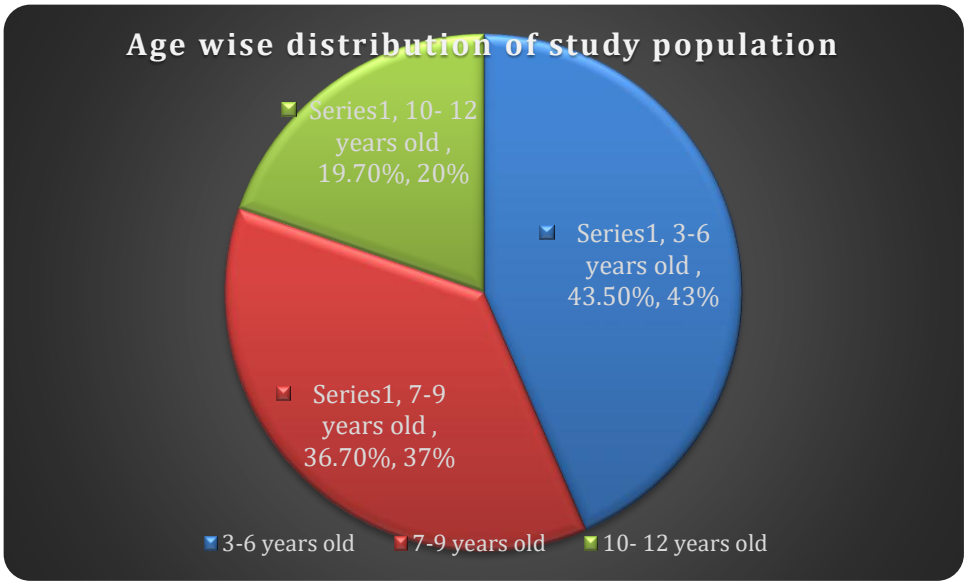
A total of 354 children of different age groups and both gender were included in the current study. Of these 195 (55.0%) were boys and 159(44.9%) were girls. The age range was 3 to 12 years, with a mean of 56.4 months. Out of the total individuals majority of them 154(43.5%) were in the age of 3-6 years old .Age wise distribution of the study population displayed in **figure 1.** These were sent to the department of otolaryngology, where the following further assessment was carried out:

In all cases, pneumatic otoscopy was carried out. Of the 354 individuals, 150 (42.37 %,) had a dulled tympanic membrane and a lost light cone. Of the 150 instances, 113(75.3%) had a tympanic membrane that had retracted. In 26(17.3%) individuals there was tympanic membrane bulging. The tympanic membrane was dull in just 11(7.33%) of the cases, with no extra characteristics and a loss of the light cone as described in **table 1.** In addition, the 115 situations with retracted tympanic membranes displayed bubbles in 23(9.5%) of the cases, fluid level behind the membrane in 31(26.9%) of the scenarios, bluish as well as black discoloration in 3(2.6%) of the cases, and retraction with a prominent lateral process in 58(50.4%) individuals as shown in **table 2.** In 146(97.3%) individuals, tympanometry revealed a flat type-B curve, indicating the presence of fluid behind the tympanic membrane. Tests using a 512-Hz tuning fork with a foot plate were conducted. Out of 150 participants, 123(82.0%) had negative results on Rinnie's test, indicating conductive loss of hearing of greater than 15-20 dB. In 140/150 (93.3%) individuals, pure tone audiometry revealed deafness which was of the conductive type. Three frequencies were used to measure the mean pure tone loss of hearing (500, 1,000, and 2000). Between 25 and 55 dB, there was a mild to severe hearing loss. Over 50% of patients had hearing loss of around 35 dB, while 10% of ears had hearing loss more than 45 dB. Ten (6.6%) of the kids weren't cooperative enough to help us understand the findings**.(table 3)** After doing the aforementioned clinical evaluations and investigations, it was determined that 150 (42.3%) of the 354 individuals had otitis media with effusion. 45 (30%) cases were lost to follow-up. Out of the rest 103 cases, 92 (87.6%) cases revealed spontaneous resolution within 3 months.

Table I: Pneumatic otoscopy outcomes in Otitis media with effusion of the study participants N=150	
Medical investigations	N(%)
Loss of the light cone and retraction of the tympanic membrane, together with dullness of the membrane	113(75.3%)
Tympanic membrane dullness accompanied with a bulging membrane and a loss of the light cone	26(17.3%)
Just a dullness and absence of the tympanic membrane'5s light cone	11(7.33%)
Total	**150(100%)**

Table 2.Aspects of the tympanic membrane retracting n= 115		
	Clinical results	N (%)
	Bubbles	23(9.5%)
	Level of Fluid	31(26.9%)
	Black or bluish color	3(2.6%)
	Only retraction with no other characteristics	58(50.4%)

Table 3.The percentage of diagnostic accuracy for various supplementary tests in individuals with suspected OME identified by pneumatic otoscopy.N= 150		
Tests		Remarks
Tuning fork tests	123(82.0%)	Negative Rinne's
Tympanometry	146(97.3%)	Flat type B curve
PTA	138(92.0%)	Conductive deafness (25-55 dB



Discussion

Otitis media accompanied effusion is an incredibly common otological disorder in children, however it often goes undetected due to ignorance and a failure to seek prompt medical assistance for unimportant illnesses. If left untreated, OME can have major side effects such as delayed speech and cerebral development as well as irreversible physical deformities in the middle ear clef.[10] In the current study we evaluated the prevalence of otitis media with effusion in recurrent upper respiratory tract infection in children. The frequency of OME with upper respiratory tract infection was 42.3% .These findings are not similar with the study conducted in Egypt on frequency and associated risk factors on otitis media with effusion in children by Saad et.al.[11] they reported over all prevalence

15.5%.But the outcomes of the current study are similar with the study conducted by Maqbool et al in Pakistan in which the prevalence rata was 42%.[12]

Poor Eustachian tube efficiency or an inflammatory reaction after acute otitis media can also cause OME to arise on its own. Ninety percent of individuals have OME before they reach school age, with the majority of them experiencing it between the ages of six months and four years.[13] Our study support these statements as major 154(43.5%) of the children with otitis media were in the age of 3-6 years old. While many episodes resolve on their own in three months or less, 30–40% of individuals experience recurrent OME, and 5–10% of episodes persist a year or more.[14] Between 40 and 50 percent of OME patients do not have any substantial symptoms that may be linked to a middle ear effusion reported by the affected children, their parents, or other careers.[15] Similarly in our study 87.6%) cases revealed spontaneous resolution within 3 months. Otitis media is an essential for using the most recent evidence-based practice guidelines because of its high prevalence, challenges with diagnosis and assessment, length, higher likelihood of conductive hearing loss, potential effects on language and cognition, and notable management practice variations.[15].Appropriate therapy of middle ear infection requires accurate diagnosis. The current investigation was carried out based on the clinical observations of otolaryngologists, who found that the majority of OME cases remain unreported in children practice because infections of the upper respiratory tract are given top priority due to the severity of the condition and the pediatricians' lack of experience with this exclusively otological issue. Since parents do not prioritize a child's deafness over fever, they can ignore this complaint when their child is in a serious condition due to an upper respiratory tract infection. Unfortunately, pediatric training practice does not give this condition the proper attention, despite the fact that otolaryngologists are under a lot of pressure to become experts in both diagnosis and care. The majority of the time, otoscopy is left to the responsibility of the otolaryngologist compared to being a component of the pediatrician's clinical evaluation of the kid. Simultaneously, it has been noted that the pediatricians' occasional otoscopic exams make it challenging to detect tympanic membrane alterations in children, as ear examination is somewhat more challenging in children than in adults.Pneumatic otoscopy served as the primary diagnostic method in this investigation. It has a 93.2% diagnostic accuracy rate. Nine diagnostic techniques for OME were thoroughly examined for sensitivity, specificity, and value for prediction in the Agency for Healthcare Research (USA) evidence report.[16] Because pneumatic otoscopy is inexpensive, easily accessible in practice settings, and accurate in the hands of skilled practitioners, it ought to continue to be the principal means of diagnosing OME. It is not recommended to use non-pneumatic otoscopy for initial diagnosis. Given the diversity of training and experience among doctors, the efficacy using pneumatic otoscopy in normal clinical use may be lower than that indicated by published data.[17]

Tympanometry have to be taken into consideration as a supplement to pneumatic ophthalmology. Tympanometry, pure tone audiometry, and tuning-fork tests were used as adjunct tests in this investigation and were indicative of an middle ear infection diagnosis in 97.%, 92.%, and 82% of instances, respectively, of patients who were suspected of having otitis media by pneumatic otoscopy. Given the high incidence of spontaneous resolution of otitis media with effusion, a three-month observation and waiting period is appropriate. Specific decisions for further therapy should be made based on the severity and duration of the symptoms.[18] In the current study, 92 patients (87.6%) had spontaneous resolution while 45 (30%) individuals were lost to follow-up. The reason for this high dropout rate was that the parents of those suffering who were government employees were posted elsewhere. The reality that the children's complaints were disregarded and that they were not receiving any treatment was another factor. Tympanometry and the remission of clinical symptoms served as indicators of the resolution.

Conclusion

The current study explored that Children with repeated upper respiratory tract infections frequently develop otitis media with effusion(42.3%).Despite the fact that this appears to be a benign disease with a high incidence of spontaneous resolution, it causes parental anxiety, several unnecessary assessments, and occasionally unnecessary medical treatment.

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