

**ORIGINAL RESEARCH**

# Analysing clinicopathological and microbiological aspects of otitis media- An observational study

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**ABSTRACT**

**Background:** Otitis media (OM) is a term used to refer to a group of complicated infectious and inflammatory disorders that affect the middle ear. There are several subtypes of OM, each with a unique presentation, set of consequences, and course of therapy. The purpose of the current study was to evaluate the pathologic and clinical features of chronic otitis media. **Methods:** The present investigation included a total of 25 individuals with a confirmed diagnosis of otitis media. Each individual had their middle ear discharge collected, deposited on thioglycollate broth medium, and immediately submitted for pathogenic analysis. Swab samples were cultivated on chocolate agar and 5% sheep blood agar to isolate aerobic bacteria, and they were then incubated aerobically at 37 °C for 24-48 hours. Different microbiological techniques were used to identify the isolated that were grown. SPSS software was used to analyze all of the findings. **Results:** The most noticeable clinical manifestation was observed to be ear pain and discharge. The additional symptoms that were discovered to be present were discomfort and deafness. When evaluating the pathogenic profile, it was found that 80%, 60%, 64%, 48%, and 40% of the patients, respectively, included coagulase-negative staphylococci, *S aureus*, *P aeruginosa*, *Klebsiella* spp., and *Proteus* spp. The most prevalent microorganisms causing chronic otitis media are coagulase-negative staphylococci and *S aureus*, and the symptoms they present with include earache and ear discharge.

**Key words:** Culture, Deafness, Otitis media, Swab.

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**INTRODUCTION**

Otitis media (OM) is a collective term for a number of intricate infectious and inflammatory disorders that affect the middle ear. Each subtype of OM has a unique presentation, set of accompanying consequences, and course of therapy. OM is a major reason people seek medical attention globally, and its repercussions are significant contributors to avoidable hearing loss, particularly in underdeveloped nations.<sup>1,2</sup> Otitis media, which includes acute, recurring, effusion-associated, chronic suppurative, and chronic otitis media epitympanalis (= cholesteatoma) otitis media is a general term for a multitude of middle ear conditions. One of the most prevalent pediatric

disorders, acute otitis media is frequently brought on by a bacterial infection.<sup>3</sup>

The amount of AOM brought on by pneumococci has decreased with the invention of pneumococcal vaccinations; vaccines against NTHi and *Moraxella catarrhalis* are now being developed. OM often results from Eustachian tube dysfunction. It may be helpful to utilize manometric measurements of Eustachian tube function to determine when a balloon Eustachian tuboplasty is necessary.<sup>4</sup> Cholesteatoma's pathophysiology is explained by a number of ideas, and the disease's development is aided by a number of pro-inflammatory mechanisms.<sup>5</sup>

The most frequent cause of OM is a bacterial infection of the middle ear. The primary contributors to AOM include *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Moraxella catarrhalis*. Although the most frequent aerobic microbial isolates in CSOM patients are *Proteus vulgaris*, *Klebsiella pneumoniae*, *Staphylococcus aureus*, and *Pseudomonas aeruginosa*.<sup>6</sup>

According to several researches from various nations, including India, Nepal, Singapore, and Nigeria, *P. aeruginosa* is the bacteria that causes CSOM the most frequently, followed by *S. aureus*. *S. aureus* was identified as the most prevalent pathogen, followed by *P. aeruginosa*, according to studies from gulf nations. The variations in the patient populations investigated and regional variance may be the cause of the discrepancies in the various research.<sup>7</sup>

Hence; under the light of above mentioned data, the present study was undertaken for assessing the clinical and pathogenic aspects of chronic otitis media.

### MATERIALS & METHODS

The objective of the current study, which was carried out at the ENT department, was to evaluate the clinical and pathogenic characteristics of otitis media patients. After thoroughly outlining the full research methodology, the institutional ethics committee granted ethical approval, and all patients provided written permission. The present investigation included a total of 25 individuals with a verified diagnosis of otitis media. The following were among the study's exclusion criteria:

- Patients with history of any other systemic illness,
- Patients with any known drug allergy,

- Diabetic and hypertensive patients,
- Patients who refused to give informed consent

The patients were evaluated clinically using a pretested questionnaire with open-ended questions. Each individual had their middle ear discharge collected, deposited on thioglycollate broth medium, and immediately submitted for pathogenic analysis. Swab samples were cultivated on chocolate agar and 5% sheep blood agar to isolate aerobic bacteria, and they were then incubated aerobically at 37 °C for 24-48 hours. Different microbiological techniques were used to identify the isolated that were grown. SPSS software was used to analyze all of the findings. The degree of significance was evaluated using the chi-square test. P-values lower than 0.05 were considered significant.

### RESULTS

A total of 25 individuals with chronic otitis media were included in the research. The patients' average age was determined to be 20.8 years. Patients under the age of 30 made up 48% of the patient population. 60 percent of the patients were men and the remaining 40 percent were women. 72% of the patients lived in rural areas, whereas the remaining patients lived in cities. Ear pain and discharge were discovered to be the main clinical manifestations in the current investigation. The additional symptoms that were discovered to be present were discomfort and deafness. Coagulase-negative staphylococci, *S aureus*, *P aeruginosa*, *Klebsiella spp.*, and *Proteus spp.* were found to be present in 80%, 60%, 64%, 48%, and 40% of the cases, respectively, when the pathogenic profile was evaluated.

**Table 1: Demographic data**

Parameter	Number	Percentage	
Age group (years)	Less than 30	12	48
	30 to 50	8	32
	More than 50	5	20
Gender	Male	15	60
	Female	10	40
Residence	Rural	18	72
	Urban	7	28

**Table 2: Clinical profile**

Clinical profile	Number	Percentage
Earache	23	90
Ear discharge	25	100
Deafness	15	60
Pain	10	40
Others	5	20

**Table 3: Pathogenic profile**

Pathogenic profile	Number	Percentage
Coagulase-negative staphylococci	20	80
<i>S aureus</i>	15	60
<i>P aeruginosa</i>	16	64

Klebsiella spp.	12	48
Proteus spp.	10	40
No growth	1	4

## DISCUSSION

Behind the eardrum (tympanic membrane), the middle ear and middle ear mucosa are pathological in OM. The middle ear is a chamber that houses the ear ossicles (malleus, incus, and stapes), as well as the mastoid air cells, tympanic membrane, anterior eustachian tube (which leads to the nasopharynx), posterior mastoid air cells, and medial inner ear. Any infection of the middle ear can spread to neighbouring tissues with devastating consequences, including the brain and meninges superiorly, the sigmoid sinus posteriorly, and other significant nearby structures. The modified respiratory epithelium that lines the middle ear generates mucins that are typically carried down the eustachian tube and includes ciliated cells and goblet cells.<sup>5,6</sup>

Different types of OM present in different ways. Children under 2 years old are most frequently affected by acute OM (AOM), which manifests as fever, otalgia, and acute onset symptoms in a kid who is otherwise ill. It is an acute kind of inflammation, and viruses or bacteria may be to blame. AOM has several subtypes, including acute suppurative OM, which is distinguished by pus in the middle ear. There will be ear discharge if the ear drum perforates (this happens in around 5% of cases, though greater rates have been observed), but the perforation often heals on its own. One of the most prevalent infectious illnesses in children is AOM; while the disease is often self-limiting and has a low fatality rate; it does have a significant morbidity rate.<sup>7</sup>

The frequency of middle ear infections in children as well as the chronicity or recurrence of OM are both influenced by a variety of environmental, anatomical, and other variables.<sup>8</sup> These variables include, among others, the immaturity of the pediatric immune system, the presence of other ongoing infections, the anatomic positioning of the child's Eustachian tube, genetic predisposition, feeding practices, household smoking, the presence of allergies, and daycare attendance.<sup>9</sup> Additionally, because of the enormous variability of the bacteria that cause OM, while infants do establish an immune response both locally and systemically to the organism(s) present in their middle ears, this immune response does not provide protection against recurrent episodes of OM as mentioned by Kubba H et al.<sup>10</sup>

While the multifactorial nature of middle ear infections has long been recognized, it has only recently come to light that OM, both acute and chronic, is also a truly polymicrobial infection involving any number of URT viruses and one or more of the three main bacterial pathogens of the middle ear. The fact that many middle ear fluids (or effusions) collected, in particular from instances of chronic OM, were culture negative and that it was

challenging to collect successive middle ear samples for assay by culture contributed to this delayed knowledge as studied by Finkelstein Y et al.<sup>11</sup> Thus, in light of the aforementioned information, the current investigation was carried out to evaluate the clinical and pathologic features of chronic otitis media.

The patients in the current research had a mean age of 20.8 years. Patients under the age of 30 made up 48% of the patient population. Cases made up 60% men, with the remaining cases being women. The remaining patients lived in cities, whereas 72% of the patients lived in rural areas. In a tertiary care hospital, Neogi R et al<sup>12</sup> evaluated the clinico-epidemiological profile, attitudes, and clinical profile of the patients with chronic suppurative otitis media (CSOM). The patients were evaluated clinically using a pretested questionnaire with open-ended questions.

Most patients (31.2%) were from 0-10 year age group and were males (58.8%). The majority of them (96%) resided in "kuccha" homes or slums, 76.8% engaged in unsanitary ear pricking, 36.8% poured oil in their ears, 70.8% bathed in ponds or rivers, and 52.8% had ear discharge for longer than a year. 17.2% of the respondents were aware that CSOM is contagious, 24% believed that CSOM ran in families, and 20% were aware that CSOM is preventable. Long wait times before seeking care and low threat perception. Patients often suffered earaches, were deaf, and had discharge; the majority also had a safe form of CSOM. Over half of them had coexisting conditions. The majority of the results of earlier studies supported those of the current investigation. Due to ignorance and a low danger perception, there was a significant lag between the beginning and treatment seeking. Seeking medical attention was motivated by pain and consequences.<sup>12</sup>

Ear pain and discharge were discovered to be the main clinical manifestations in the current investigation. The additional symptoms that were discovered to be present were discomfort and deafness. Coagulase-negative staphylococci, *S aureus*, *P aeruginosa*, *Klebsiella spp.*, and *Proteus spp.* were found to be present in 80%, 60%, 64 %, 48 %, and 40% of the cases, respectively, when the pathogenic profile was evaluated. Based on their prognostic indicators, Vikram BK et al. evaluated the clinical and epidemiological characteristics of patients of complex and simple chronic suppurative otitis media. 187 ears made up the research group, 62 of which suffered difficulties while the remaining 125 did not.

Vikram BK et al<sup>13</sup> predicted nine causative factors, including age distribution, sex, patient's residence, literacy level, length of ear discharge at presentation, ear pathology, predisposing illness emphasis in the nose or throat, ear swab microbiology, and hearing loss, were compared between the two groups. Patients

with complex chronic suppurative otitis media were younger and more likely to be men. Patients from rural areas and those who were uneducated had a greater risk of problems. The difficult chronic suppurative otitis media group included possible risk factors for cholesteatoma and granulation tissue. Sensorineural hearing loss was more likely to develop in ears with difficulties. Age, sex, the length of ear discharge, the presence of a nose- or throat-specific predisposing illness, and ear swab microbiology were all less reliable predictors of problems.

## CONCLUSION

Based on the aforementioned findings, the authors draw the conclusion that ear pain and discharge are the most typical symptoms of chronic otitis media, with coagulase-negative staphylococci and *S aureus* being the most prevalent microorganisms to cause it.

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