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Risk factors associated of ear infections

Gufran Kadhim Abdulkareem

Technique of pharmacy department, Basra Technical Institute, Southern Technical University, Basra, Iraq.
Corsponding auther: gufran.kadhim@stu.edu.iq

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ABSTRACT

The primary aim of this study was to ascertain the prevailing bacterial strains in patient ear secretions from probable cases of otitis media in the urban setting of Basrah, Iraq. The findings established a robust association between ear infections and age. Notably, the bacterial species most predominant Streptococcus pneumonia. While sex not significantly considered as a risk factor.

INTRODUCTION:

The most frequent clinical issue and the main factor in avoidable hearing loss in the poor world is ear infection [1, 2]. The ear canal, the tympanic and mastoid canals, the skin, cartilage, and the periosteum, as well as skin around the middle and exterior regions of the ear, are all susceptible to microbial infection [3]. 32 million children, or over 328 million individuals, or over 5% of the world's population, have a hearing loss that makes daily activities difficult or impossible [4]. Infectious diseases including rubella, meningitis, measles, or mumps that may be avoided by immunization can potentially cause hearing loss [2, 5]. Ear infections can come from bacteria, fungus, or viruses. However, germs The most typical causes of ear infections are bacterial infections with many strains, such as mixed bacterial infections or those with *Streptococcus pneumonia*. [6].Otitis media, which affects the mucosa in the middle ear, which is located below the eardrum (tympanic membrane). In addition to the tympanic membrane, anterior eustachian tube, posterior mastoid air cells, medial inner ear, and ear ossicles (malleus, incus, and stapes), the ear also contains posterior air cells.

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Any middle ear has potential to spread to surrounding tissues, including the sigmoid sinus posteriorly, the brain and meanings superiorly, and other important nearby structures, with disastrous results. The modified respiratory epithelium that lines the middle ear generates mucins that are typically transmitted down the Eustachian tube and includes ciliated cells and goblet cells [7]. Different OM subtypes manifest in various ways [8]. 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. Acute supportive OM, one of the subtypes of AOM, is defined by pus in the middle ear. There will be ear discharge present if the ear drum perforates (this happens in around 5% of cases, but greater rates have been observed) [9,10; the perforation often heals on its own [9]. One of the most prevalent infectious disorders in kids is AOM, which is often self-limiting [11], but has a significant morbidity and normally low fatality rates [12, 13].

The most commonly affected age group is children under two, with a frequency of 1.2 to 6.0 per 100,000[14].Along with the symptoms of AOM, patients frequently also experience mastoid pain and post-auricular edema. OM with effusion (OME) is a persistent inflammation, as opposed to AOM and acute mastoiditis. All age groups struggle with it severely in its chronic form, which has a lower chance of recovery. This illness can occasionally result in severe, life-threatening consequences, especially in youth and later in life [2, 5], such hearing loss, brain abscesses, or meningitis. Typically, kids between the ages of 3 and 7 are affected.

The prevailing symptom commonly reported in cases under consideration is hearing loss, which stems from the absence of acute inflammatory indicators and is attributable to the presence of an intact tympanic membrane accompanied by an effusion, denoted as a viscous fluid akin to glue [15]. This particular manifestation has the potential to give rise to speech delays or academic challenges. On a histological level, the condition manifests as a chronic inflammatory disorder characterized by pronounced swelling of the middle ear mucosa, excessive synthesis of mucin, and alterations in its viscosity. The principal constituent of the middle ear effusion is mucin, which imparts it with a notably thick and viscous consistency similar to glue. Furthermore, the middle ear effusion encompasses various supplementary components, including bacterial entities [16]. In instances where OME is incidentally detected during the screening of asymptomatic children, spontaneous resolution is observed in approximately 63% of cases after a three-month period, and in 88% of cases after a year-long duration. [11]. Usually, the middle ear effusion goes away on its own [15], especially if OME occurs after an episode of AOM. As a result, OME hearing loss typically passes quickly. It is advised to take a "watch and wait" approach and to only give therapy to patients who develop persistent effusions as a result. Chronic OME is likely to have a detrimental effect on speech development, academic performance, and behavior, particularly if it is bilateral and manifests in infancy.. Adults are less likely to experience OME, and it commonly coexists with other underlying conditions. The other 4.8% of cases were made up of head and neck tumors. According to [17], 66% of persons with OME had paranasal sinus illness as their main cause. Only 1.8% of patients lacked a diagnosis. Adult OME is more debatable for the reasons listed above, particularly when it is unilateral. Adults with OME should get the appropriate treatment after being screened for any further underlying conditions [7]. While hearing loss, tinnitus, otalgia, and a pressure-like sensation are other potential symptoms of CSOM, chronic otorrhea is commonly linked to this condition [18].Due to the chronic nature

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of the condition and recurrent perforation, therapy is frequently challenging and frequently requires both surgery and antibacterial drugs. The middle ear can be used to diagnose cholesteroleatoma since squamous epithelium and keratin can be found there. Surgery is the only kind of therapy that works [7].

Methods

Each patient had samples of their ear discharge collected aseptically using sterile cotton swabs. The samples were then inoculated on plates of agar, which were then kept in an aerobic incubator at 37°C for 24 hours. The procedure for bacterial isolation and identification was carried out in accordance with accepted microbiological practices as outlined in the renowned book by Monica Cheesbrough [19.20]. Each bacterial isolate's susceptibility pattern was evaluated using the Clinical and Laboratory Standards Institute's (CLSI, 2011) standard criteria [4].

Results

Distribution of age and sex for patients who were positive for bacterial infection. Out of 600,467 (77.8%) ear discharge culture samples from patients were determined to be positive for one or two bacterial species after examination. According to the results, there was a 50.4% and 49.6% risk for middle ear infections in men and women, respectively. Age groups 5 to 15 years had the highest rate of positive ear discharge cultures 160 (38.0%), followed by 16 to 35 years 99 (23.4%) (Table 1).

Table 1: Distribution age and sex of bacterial infection

Percentage and frequency of bacterial infection (%)	Variables
238 (50.4)	Men
229 (49.6)	Women
	Age group
74 (17.5)	<5
160 (38.0)	5-15
99 (23.4)	16-35
100 (12.3)	36-50
34 (8.8)	>50

Two distinct types of harmful bacteria were found in the 467 patient ear discharge specimens that tested positive for bacteria. *Streptococcus pneumonia* 267 (57.1%) predominated among these bacterial species (Table 2).

Table 2: Analysis of bacterial isolates from ear discharges

Bacteria isolated	Frequency	Percentage (%)

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Streptococcus pneumonia	267	57.1
Klebsiella pneumonia	200	42.9
Total	467	100

Discussion

Even though ear infections are a relatively common and manageable medical issue globally, they can have major consequences if left unattended to, including speech disorders, hearing loss, patient and family anguish, and financial strain on the healthcare system [2]. Thus, emphasizing the causes of ear infections and associated patterns of antibiotic sensitivity may assist to reduce the severity of infection complications and direct the empirical antibiotics that doctors will administer, especially in poor nations [21]. Both children and adults might suffer from otitis media. However, persons of age of 5-15, showed a peak-age prevalence [22, 23, 24]. Children's recurring upper respiratory tract infections, horizontal Eustachian tubes, underdeveloped immune systems, and malnutrition may all contribute to the high frequency of otitis media in children [21]. A serious disease, higher mortality rates, a higher likelihood of complications, inpatient admission, and a longer hospital stay can result from an infection with antibiotic-resistant bacteria [22, 23]. *Streptococcus pneumonia was* reported to be the pathogenic bacteria that were most commonly isolated from suspected patient ear discharges with otitis media [4]. *Klebsiella pneumonia*. was the next most common pathogenic bacteria associated with middle ear infection [24, 25]. Otitis media is one of the illnesses that affect kids the most frequently, making it one of the main reasons people go to the doctor. According to this study, which also shown a strong association between age and likelihood of acquiring infection of ear, the two greatest frequent bacteria isolates from patient ear discharges suspected of having middle ear infections were *Streptococcus pneumonia and Klebsiella pneumonia*. Sex was not significantly considered as a risk factor of infection.

Conclusion: In Current research, *Streptococcus pneumonia* was the most common bacterial species isolated in youngsters. There was association between age and the susceptibility to middle ear infections.

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