

# Microbial Profile from Patients with Otitis Media

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## ABSTRACT

Otitis media (OM) an inflammation of the middle ear , is a common illness in childhood and also occurs in adults due to several factors , microbiological , environmental and social. This study aimed to investigate the microorganisms aerobic , anaerobic and fungal associated with otitis media. This study was carried out from November 2017 to April 2018 at ENT Department of AL-Hilla Teaching Hospital in Babylon city .In this study collect 90 pus samples from patients with otitis media were collected from the discharging ears by a sterile transport medium swab from aged between (1-80 years), (86) cases were positive (95.6%) and (4)cases were unknown agent (4.4%).Number and percentage of infected males 57 (63.3%) , while number and percentage of infected females 33 (36.7%).Then take samples to the microbiological laboratory to investigate the bacterial species causing otitis media and the results were analyzed using percentages. The main results showed high percentages of infection were in age between (1-20 years) and (41-60 years) (34.4% and 32.2%) respectively .The results from 86 specimens there were Gram positive bacteria isolates (*Staphylococcus aureus* ,*Staphylococcus epidermidis* ,*S. haemolyticus* , *S. carnosus* , *Bacillus* spp. , *S. xylosus* , *S. sciuri* , *S. lentus* , *S. capitis* , *Aerococcus viridians* , *Kocuriavarians* , *Gardnellavaginalis* , *Leuconostocmesenteroides* spp. *cremoris*) while Gram negative bacteria isolates(*Pseudomonas aeruginosa* ,*Klebsiellapneumoniae* , *Proteus mirabilis*,*E. coli* , *Pseudomonas fluorescens* , *Providenciastuartii* , *Citrobacterfreundii* and *Acintobacterursingii*) and fungi ( *Aspergillusniger* , *Aspergillusflavus* , *Aspergillussterreus*and yeast) .

**Key words:** Otitis Media (OM) , Ear Nose and Throat (ENT) , Microbial Isolates (Bacterial and Fungal)

## INTRODUCTION

Otitis media (OM) is an inflammation of the middle ear with acute otitis media (AOM) being an acute inflammation of the middle ear. The diagnosis of AOM should be based on acute symptoms, presence of middle ear effusion (MEE), and signs of acute middle ear inflammation with a bulging of the tympanic membrane (TM) [1].It's a multifactorial disease; environmental, bacteriological, host, immunological, and genetic factors affect its development [2].OM is a common disease in people all over the world, which may be caused by bacterial , viral , fungal and allergic ,the most common bacterial pathogens as *Staphylococcus aureus* , *Pseudomonas aeruginosa* *Proteus* spp. , *Klebsiella*spp. and *E.coli*[3] . This disease is an inflammation of middle ear which is related anatomically and pathologically with upper respiratory tract , therefore the nasopharynx is a natural reservoir for several bacterial species including avirulent bacteria and middle ear pathogens of healthy persons , 20- 40 % accompanied infection together [4].Otitis media (OM) is the inflammation of the middle ear, which may be caused by bacteria, fungi or viruses. There are two main types of otitis media, acute purulent otitis media and chronic suppurative otitis media [3]. AOM is a bacterial infection of the middle ear that causes fever and pain, has a risk of acute complications and manifests itself as an erythematous, bulging tympanic membrane. If the membrane is perforated, a bloodstained discharge

may be present. This picture differs from that of otitis media with effusion (OME). OME causes temporary hearing loss; in the long run, it is said to cause bone resorption and retraction pockets. However, the patient shows no signs of illness like pain or fever. In general, it is self-limiting and most often it does not leave the patient with a functional hearing impairment [5] .

## Materials and Methods

Sterile cotton swabs were used for collection samples from ear exudate (90) patients suffered OM attended to private surgery for diagnosis and treatment during 5 months from the November 2017 till the end of April 2018at ENT Department of AL-Hilla Teaching Hospital in Babylon city .Culturing : All collected samples were cultured directly in following media :Blood Agar , Mac Conkey agar , Chocolate Agar and Mannitol Salt Agar ( inoculated at 37C° for 24-48 hr) while Potato Dextrose Agar ( inoculated at 25C° for 5-7 days) , overnight incubation the colonies were examined and diagnosed , then classified depend on shape , color , margin , diameter and zone of hemolysis[6] . Diagnosis of Isolated Microbial : Direct smear were done directly from the samples before and after culturing with using Gram stain to identify Gram positive and Gram negative bacteria .In case of fungal growth , lactophenol cotton blue was used for final identification .Biochemical Tests :Some of tests was used such asCatalase test ,Oxidase test ,

Coagulase test , IMVIC test and VITEK-2-Compact (Biomerieux) .

**Results**

From 90 samples (86) were gave positive microbes culture , whereas (4) cases showed no growth even after 48 hours which may be presence another types of causative agents , that might need special technique for their detection such as virus , parasite , *Chlamydia* and *Mycoplasma*[7;8].Number of total positive isolates (150) consist of (120/150) bacterial isolates were obtained from the (56) samples collected , (4) fungi isolates were obtained from (4) samples collected and (26) mixed isolates were obtained from (26) samples collected (fungi with bacteria and yeast with bacteria) Figure (1) .From the results , it was as shown in Table (1) that Gram positive bacteria constitutes (46%) (69/120) from the total isolates and were considered the predominant

aetiological agent of OM compared to Gram negative bacteria which constitute (34%) (51/120) as shown in Table (2) while fungi and yeast constitute (20%) (30/150) as show in Table (3) , and all shown inFigure (2). Most of positive cases were males (57) (63.3%) while females were (33) (36.7%) Figure (3). The ages in between (1-20 years) and (41-60 years) recorded the highest percentage of infection (34.4% and 32.2%) respectively , while the ages in between (61-80 years) recorded the lowest percentage of infection (10%) , Figure (4) .Types of Isolates :The highest percentage in Gram positive bacteria was *Staphalococcus aureus* (31) (20.7%) , while the highest percentage in Gram negative bacteria was *Pseudomonas aeruginosa* (20) (13.3%) , while the highest percentage in fungal was *Aspergillusniger* (14) (9.3%) Table (1 , 2 and 3) .

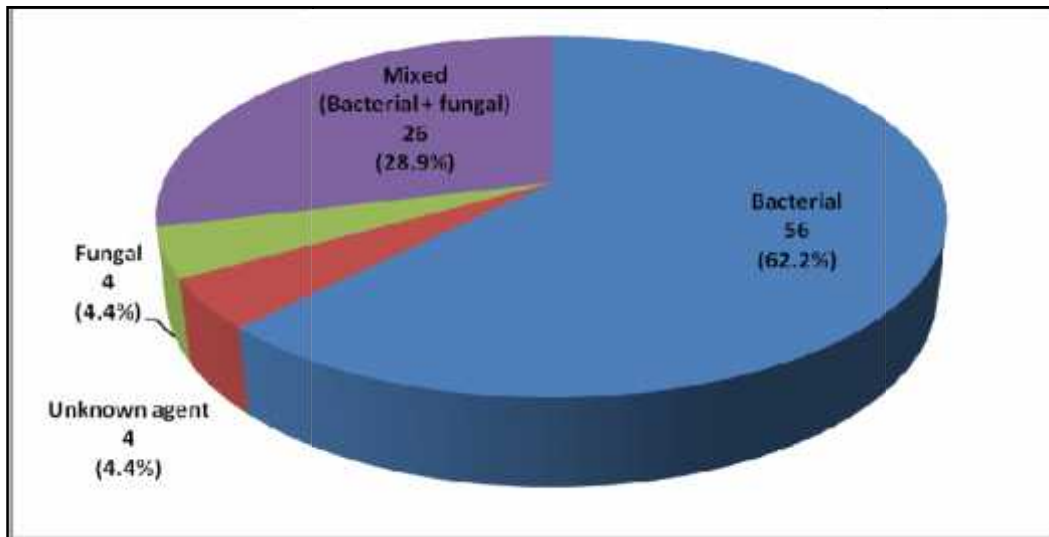


Figure (1): The percentage of type causative agents within otitis media

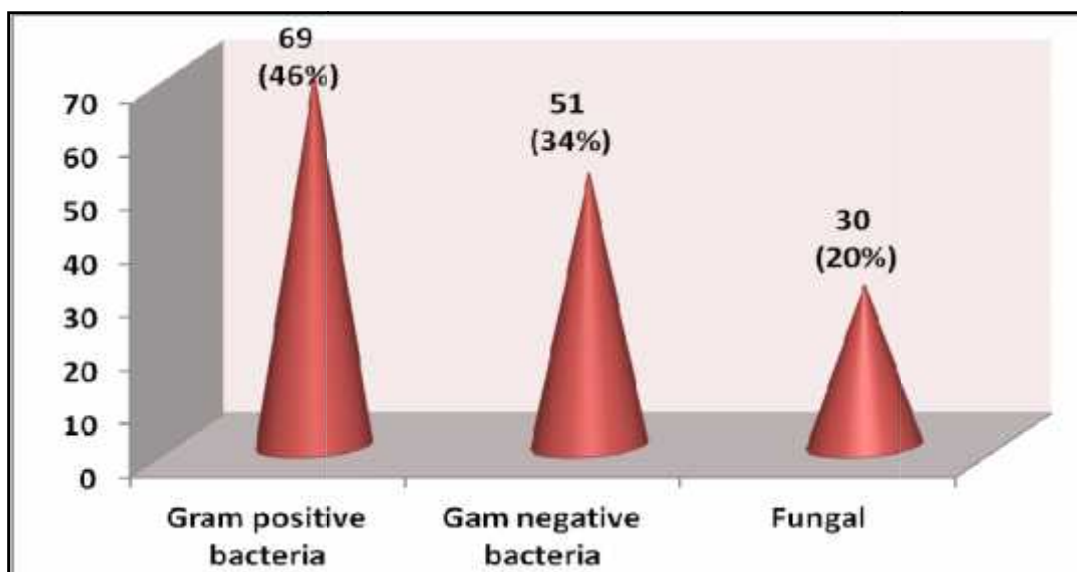


Figure (2): Number and percentage of microorganisms isolates from otitis media patients

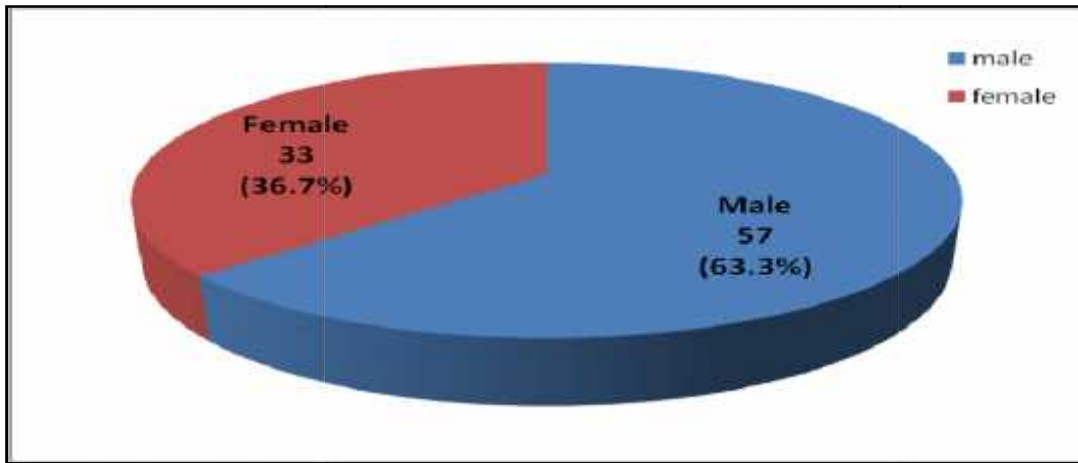


Figure (3): Gender distribution of otitis media

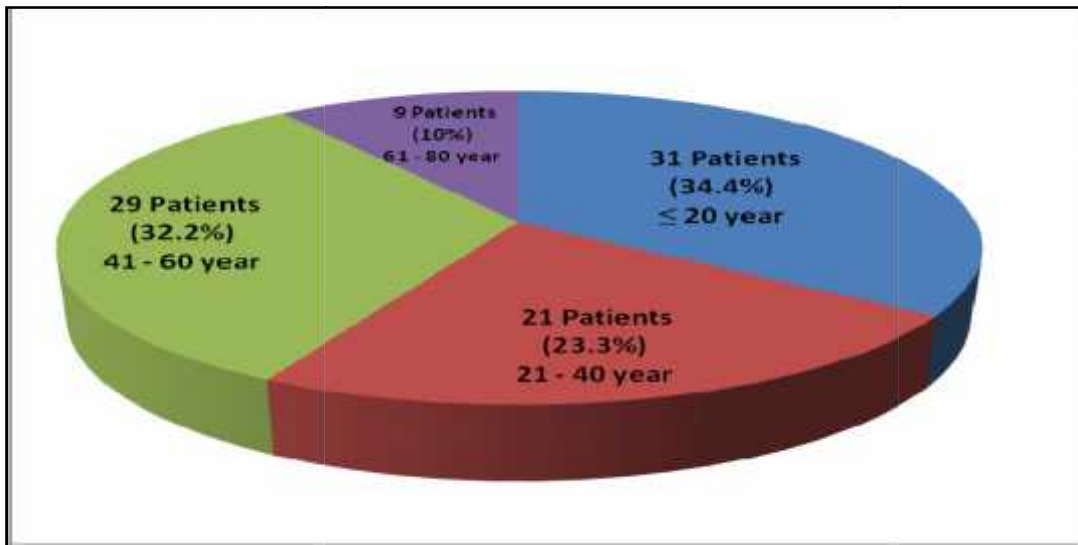


Figure (4): Age groups distribution of otitis media

Table (1): Number and percentage of Gram positive bacteria

Type causes	Microbial	Total isolate	%
G +ve	<i>Staphalococcus aureus</i>	31	20.7
	<i>Staphalococcusepidermidis</i>	18	12.0
	<i>Staphalococcus haemolyticus</i>	5	3.3
	<i>Staphalococcus carnosus</i>	5	3.3
	<i>Bacillus spp.</i>	2	1.3
	<i>Staphalococcus xylosum</i>	1	0.7
	<i>Staphalococcus sciuri</i>	1	0.7
	<i>Staphalococcus lentus</i>	1	0.7
	<i>Staphalococcus capitis</i>	1	0.7
	<i>Aerococcus viridans</i>	1	0.7
	<i>Kocuriavarians</i>	1	0.7
	<i>Gardnellavaginalis</i>	1	0.7
	<i>Leuconostoc mesenteroides spp. cremoris</i>	1	0.7
	Total	69	46%

**Table (2): Number and percentage of Gram negative bacteria**

Type causes	Microbial	Total isolate	%
G -ve	<i>Pseudomonas aeruginosa</i>	20	13.3
	<i>Escherichia coli</i>	8	5.3
	<i>Proteus mirabilis</i>	8	5.3
	<i>Klebsiellapneumoniae</i>	6	4.0
	<i>Pseudomonas fluorescens</i>	5	3.3
	<i>Providenciastuartii</i>	2	1.3
	<i>Citrobacterfreundii</i>	1	0.7
	<i>Acinetobacterursingii</i>	1	0.7
	<b>Total</b>	<b>51</b>	<b>34%</b>

**Table (3): Number and percentage of fungal and yeast**

Type causes	Microbial	Total isolate	%
Fungi + yeast	<i>Aspergillusniger</i>	14	9.3
	Yeast	10	6.7
	<i>Aspergillusflavus</i>	4	2.7
	<i>Aspergillusterreus</i>	2	1.3
	<b>Total</b>	<b>30</b>	<b>20%</b>

## Discussion

There were wide variations in incidence of otitis media that occur in different ages in present research high percentages were in between (1-20) and (41-60) years (34.4% and 32.2%) respectively due to these ages exposed to several predisposing factors for occurrence otitis media , these factors include smoking , different sources of diet and environmental factors, incomplete immune system, especially in children and weak physical structure [9] . As for the lowest rate of infection was in the fourth age group (10%), due to the lack of auditors from this category to the advisory clinic because of age, and the results of this study are compatible with [10].In comparison with results of [11] who found the highest percentage was in age between 6-12 months old , these results among the children were studied , as well as the differences depend on the risk factors that patients exposed to .Most research work for otitis media not presented any significant differences between male and female due to most these researches were done on children . In present study there was significant difference recorded between males and females (63.3% and 36.7%) respectively , show the male more prone than female to otitis media .This is due to the fact that males are more susceptible to environmental conditions in their lives than females, and this result is agree with the results [10].Hence social relations and social factors play an important causes in is distribution of infection between sex .Differences in types of isolated bacteria depended on different types of environmental factors , geographical regions , health of people and

swimming in contaminated water . *Staphylococcus aureus* has been isolated asa pathogen for this type of inflammation in many studies[12; 13].*Staphylococcus aureus* infection is an expected result because these bacteria are widespread in nature in addition to being present in the nasal cavity and on the skin of the sick people and that any hole in the drum allows these bacteria to reach the middle ear through the external hearing canal or through the middle ear infection .To the possession of antibiotic-resistant bacteria, as well as its production of beta-lactamase enzymes[14] .As for *Staphalococcusepidermidis* the results of the study matched the findings[15] , it is a non-pathogenic microorganism, but a common bacteria on the skin of the membrane of the ear drum and middle ear. These bacteria become opportunistic, causing injury at lower middle ear resistance due to the entry of other microbes or as a result of the use of antibiotics in abundance. While *Pseudomonas aeruginosa* it may be due to the fact that these bacteria are very widespread in nature and are found in water and soil as well as in the hospital environment, the family of patients and various medical devices, and their resistance to antibiotics is important in spreading and causing injuries, especially acquired from the hospital.Where swimmingin the rivers and marshes is one of the important sources of infection of these bacteria, as these water sources are vulnerable to pollution waste man and animal, which is an important source of environmental pollution, in addition to the secretion of enzymes are considered important factors of them protease and elastase[16].Some strains of intestinal bacteria, such

as *Klebsiellapneumoniae*, *Proteus mirabilis*, *Citrobacterfreundii*, *E. coli*, *Aspergillus* spp. and yeast, were isolated in a few numbers where these results coincided with [17].

### Conclusion

The highest percentage of Gram positive bacteria was *Staphylococcus aureus* (20.7%), while the highest percentage of Gram negative bacteria was *Pseudomonas aeruginosa* (13.3%) from specimens otitis media, and the highest percentage of fungal *Aspergillus niger* (9.3%).

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