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## The relationship between chronic supportive otitis media and *Enterobacteriaceae* in Wasit province, Iraq

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### ABSTRACT

CSOM is a group of inflammatory disease of the middle ear and it is a worldwide disease, it is caused by bacterial, fungal and viral infection, the study aim to determine the relationship between *Escherichia coli* as *Enterobacteriaceae* group and CSOM patients, one hundred patients were included in this study with case history of CSOM, details that captured of case history about CSOM patients involve the following information: age, sex, education status and geographical distribution, among those 100 CSOM patients 10 of them appeared infected with *E. coli* bacteria, 6 male had a positive result of *E. coli* infection and the other 4 positive result patients were female, according to the age the positive *E. coli* infected male was ranging between (19 – 49 years old) while the age of positive *E. coli* infected female was ranging between (30 – 50 years old), most of the positive infected patients finished primary school and half of them are living in the city while others in the suburb, this study shows that all patients are prudent and not involve children or teenagers.



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### INTRODUCTION

Chronic supportive otitis media (CSOM) is middle ear infection develop at least within six weeks it may be as a complication to acute otitis media and otitis media with effusion characterize by painless and if there is any pain it is due to otitis externa (Minovi and Dazert, 2014), perforation of ear drum should be present, pus discharge and hearing loss may develop by time without immediate diagnosis and accurate treatment (Qureishi *et al.*, 2014), Common causative agents are bacteria and sometimes virus and fungi, The most common bacterial

causative agent are *Pseudomonas. aeruginosa*, *Proteus spp*, *E. coli*, *Staphylococcus. Aureus*, *Streptococcus. spp*, *Haemophilis. Influenza*, *Moraxella. catarhalis* and common aerobes include *Peptostreptococcus*, *Prevotella. melaninogenica* and *B. fragilis* (Somia *et al.*, 2014), Typical pathogens reach the middle ear following insufflation of respiratory pathogens through the Eustachian tubes from the nasopharynx or may spread from the external ear canal inwards through a non-intact tympanic membrane (Roland, 2002; Verhoeff *et al.*, 2006), Lack of adequate sanitation results in fecal contamination of the environment and poses a risk of disease transmission via multiple exposure pathways, Hands played a major role in fecal microbe transfer through oral pathway, The faecal microbe transfer network provides a systematic approach to study the complex interaction between the contaminated environment and human behaviour on exposure to faecal contamination (Wang *et al.*, 2017) .

### MATERIAL AND METHODS

One hundred samples related to patients are suffering from CSOM collected at ENT clinic, AL-Karama teaching hospital, by using specific transport media (tube with nutrient agar and sterile swab use for collection and storage of bacteria

for 72 a hours in 0 to 30°C), then specimens were transported to laboratory for diagnosis by culturing on Macconky and blood agar, for aerobic bacterial group incubation at 37°C overnight then observe the bacterial colonies that involve *Pseudomonas spp*, *Staphylococcus spp*, *Proteus spp*, *Klilsella spp* and *E. coli* while for anaerobic bacteria incubation may take three days in anaerobic jar (Filde's jar) to permit recovery of anaerobic pathogens, this study took *E. coli* as a caustive agent from enterobacteraceae and their relationship with CSOM patients, *E. coli* was differentiated from other bacteria by observing the colonies on Macconky agar and their appearance as a rod-shaped gram negative bacteria (red colour) when stained with gram stain, then confirm the diagnosis by biochemical test (catalase, kleglar, simmon citrate, urease, indol, manitol semisold) and API 20 E system. Figure 1 and figure 2.



**Figure 1: Transport media tube with nutrient agar and a sterile swab**



**Figure 2: *E. coli* growth on the left on blood agar and the right on McConkey agar colonies appear pink in colour due to lactose fermentation**

**RESULTS AND DISCUSSION**

CSOM cause by many bacterial causative agents, this study shows that 10 was positive for *E. coli* infection from 100 patients and observed that 6 from 10 positive *E. coli* infected patients are male while the other 4 positive infected patients are female that described in Table 1.

**Table 1: Distribution of CSOM depending on sex**

Gender	Positive <i>E.coli</i>	Negative
Male	6	43
Female	4	47
Total number	10	100

The percent of *E. coli* infected patients from all 100 patients was 10 (10%) that agreed with the study done in (2002) in Singapore by loy. *et al.*, among 90 patients the results were 3 isolates of *E.coli* (Wang *et al.*, 2017), another study in (2014) in Pakistan done by Gul *et al.*, (2014) showed the percentage of *E. coli* was 2% from 100 patients (Loy *et al.*, 2018), and this result was near to study done in India by Poory and Arati (2002) that showed *E. coli* infected patients was 6 (5.88) from 100 patients (Gul *et al.*, 2014), that may be due to poor socio-economic status, In table 2: show that the positive infected male age was ranging between (19- 49 years old) and positive infected women age was ranging between (30- 50 years old), this study observed there are no children between those 10 positive infected patients unlike study was done in (2014) in Pakistan by Somia *et al.*, which applied between 100 patients showed that the patients age group (1- 10) was more susceptible to infection than others, It was thought to be due to habit life daily when people used to hurry up specially in days accompanied with hard works so forgets to wash their hands specially after using a toilet.

**Table 2: Distribution of CSOM due to *E.coli* depending on age**

Age of patients	Positive male	Positive female
0 – 10	0	0
11- 20	1	0
21 – 30	1	1
31 – 40	1	1
41 – 75	3	2
Total number	6	4 patients

In Table 3 shows there was no significant difference between disease and people living site, this may depend on the sanitation network type.

**Table 3: Distribution of CSO depending on distribution area in Wasit province**

Distribution	<i>E.coli</i> Infected	Non-infected
City	5	41 patients
Rural or suburb	5	49 patients
Total number	10	90 patients

Table 4 shows that the highest level of infection associated with patients finished primary school this is explain that the infection associated with those of little realization to self- hygiene manners, revealed to that the health organization and ministry of education have to pay more attention about this

subject at this stage of education by more lectures and posters and experience practical to avoid such as bad behaviours that lead to distribution of the disease.

**Table 4: Distribution of CSOM depending on education status**

Education stage	positive	Negative	Total Number of patient
Non-Educated patient	2	28	30
Primary school	4	33	37
Secondary school	1	13	14
High school	1	2	3
Collage	2	14	16
Total number	10	90	100

Details in table 5 shows that 7 cases from those 10 positive *E. coli* infected patient associated with left ears this is indicating patients who are at risk from infection those of poor hygiene and sanitary conditions who use toilet and forget or attend to don not wash their hands with abuse their hands by putting contemn fingers within ear's.

**Table 5: Distribution of CSOM depending on which ear's side involved**

Gender	L ear	R ear	Numbers of patients
Male	4	2	6
Female	3	1	4
Total number	7	3	10

## CONCLUSION

The age group of (0-10 years old) was the highest among others in developing of CSOM disease. According to gender it was showed that the number of infected male more than infected female. This study concluded that there was no significant different to infection according to geographical distribution in Wasit province, Iraq. The highest percentage of infection associated with patients finished primary school and how are not educated.

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