

*Full Length Research Paper*

# Prevalence and patterns of chronic suppurative otitis media and hearing impairment in Basrah city

Ahmed M. Alabbasi\*\*, Ihsan E. Alsaimary\*, Jassim M Najim\*

\*Department Of Microbiology, College of Medicine, University of Basrah, Republic of Iraq.

\*\*Department of Surgery College of Medicine, University of Basrah, Republic of Iraq.

Accepted 10 January, 2011

One hundred twenty (120) patients with chronic suppurative otitis media (CSOM) in Basrah, 65 (54.2%) males and 55 (45.8%) females, with male: females ratio (1.2:1) and 60 individual without otological problems as control group were included in this study, which done during the period between March 2009 and January 2010 in Basrah governorate. The clinical study include: history, address of patients, tuning fork examination (Rinne,s and Weber,s) test, examination of the ear using otoscopy, audiological investigation including pure tone audiometry and tympanometry. The result of clinical study showed that CSOM cause various type of hearing loss. Most common type was conductive hearing loss (55.5%) followed by mixed hearing loss (27.7%) and senserineural hearing loss(16.6%).It was found that CSOM was most common among infants and children (60%). There was no significant variation in the prevalence of CSOM between patients according to sex . $P>0.05$ . There was significant variation in the prevalence of CSOM between urban area (84%) and rural (16%). $P<0.01$

**Keyword:** Otitis media, hearing impairment, chronic, Basrah

## INTRODUCTION

Otitis media is inflammation of the middle ear. This is most commonly caused by the buildup of fluid behind the ear drum, as a result of a blockage to the Eustachian tube (Probst et al., 2006). Otitis media is more common in children, as their Eustachian tube is shorter and more horizontal than adults and is made up of more flaccid cartilage, which can impair its opening (Vanderveen et al., 2006). Otitis media can cause a mild to moderate hearing loss, due to the fluid interfering with the trans-mission of sound through to the inner ear. It can often affect the tympanic membrane causing it to retract or become inflamed (Uhari et al.,1995)

The fluid can cause the tympanic membrane to bulge and become inflamed and occasionally the tympanic membrane will perforate .There are three common types of otitis media, acute purulent otitis media, otitis media with effusion and chronic suppurative otitis media (Berman, 1997). Chronic otitis media with effusion (persistent middle-ear effusion) occurs with continuing negative pressure within the middle ear: the effusion becomes" trapped" in middle ear due to the special anatomy, and impairment of both the mucociliary system and the

pumping action of tubal opening and closure (Kamajjit et al., 2003). Chronic perforation of the tympanic membrane may develop after an acute perforation fails to heal, resolution of active CSOM, or during the course of chronic otitis media with effusion, CSOM occurs when acute drainage through a non-intact tympanic membrane persists for 2 weeks to 3 months or longer( WHO 1996)

The present study aimed to study the prevalence of patients with CSOM in Basra city and study of essential clinical features of CSOM with evaluate the hearing ability these patients.

## MATERIALS AND METHODS

### Patients

A total of 120 patients with CSOM were included in this study .The clinical study include history-taking, otoscopic examination, tuning fork examination, audiological investigation pure tone audiometry and tympanometry . The study was carried out in Basrah General hospital out patients E.N.T. clinic under supervision of specialists of ENT,during the period from March 2009 January 2010.

\*Corresponding author E-mail: [ihsanalsaimary@yahoo.com](mailto:ihsanalsaimary@yahoo.com)

**Table 1. Distribution patients with CSOM according to age groups.**

Age groups	Male Patients No.(%)	Female Patients No.(%)	Total
Infantile group < 2 years.	*12(10)	8(6.66)	20
Childhood group from 2 to <11 years.	16(13.33)	15(12.5)	31
Adulthood group 11 to < 20 years	15(12.5)	11(9.16)	26
Group 20 to <30 years(adulthood)	11(9.16)	15(12.5)	26
Group over than 30 years	11(9.16)	6(5)	17
Total	65(54.16)	55(45.83)	120

P<0.01

**Table 2. Distribution of patients with CSOM according to sex.**

Age (years)	NO of patients (%)	Male (%)	Female (%)
1-04	20 (16.66)%*	12(10)%	8(6.66)%
05-09	29(24.16)%	14(11.66)%	15(12.5)%
10-14	22(18.33)%	13(10.83)%	9(7.5)%
15-19	8(06.66)%	5(04.16)%	3(02.50)%
20-24	10(08.33)%	3(02.50)%	07(05.83)%
25-29	8(06.66)%	3(02.50)%	5(04.16)%
30-34	4(03.33)%	3(02.50)%	1(00.83)%
35-39	4(03.33)	3(02.50)%	1(00.83)%
40-44	4(03.33)%	1(00.83)%	3(02.50)%
45-49	4(03.33)%	3(02.50)%	1(00.83)%
50-54	4(03.33)%	3(02.50)%	1(00.83)%
55-60	3(02.50)%	2(01.60)%	1(00.83)%
Total	120(100)%	65(54.16)%	55(45.83)%

<sup>2</sup>=0.64 , \*: p>0.05

### Clinical and epidemiological (demographical) studies

Various clinical and demographical parameters were evaluated in this study; these includes

1. Age.
2. Sex.
3. Family history
4. Degree of hearing loss (Conductive, Mixed, Senserineural ) (Probes , 2006)
5. Degree of severity: (mild, modrate,sever ) . (Probes, 2006)
6. Type of feeding (breast and bottle feeding)
7. Mode of smoking.
8. Living modes of patients.

Clinical examination techniques Includes

1. Otoscopic examination . is necessary to differentiate CSOM from another types(e.g acute otitis media ,otitis media with effusion,otitis external ) .(Uhari et al.,1995)
2. Tuning fork examination by using . ( Rinne,s test and Weber,s test) ( Finitzo et al.,199).
3. Audiological investigation by using, Pure tone audiometry and tympanometry ( Finitzo et al.,1992).

### RESULTS

A total number of (120) patients with chronic suppurative otitis media (C.S.O.M) were attended to the Basrah

General Hospital (out patients clinic of E.N.T), 120 aural swabs were taken from all patients. Patients were distributed according to age and sex, There were 65 (54.16%) males and 55 (45.83%) females, and males to females ratio was 1.2:1 ,the age of patients was between (1-60) years and 60 individuals regarded as control without otological problems were also studied.

### Prevalence of the patients with CSOM according to age

Table 1 shows that the majority of our patients belong to age group 2-11 years ( 25.38%) ,followed by age group 20-30 years 26 patients (21.2%) was a higher than adult patients over than 30 years ( 14.16%) P<0.01

### Prevalence of the patients with CSOM according to sex

Table 2 illustrates that the majority of patients with CSOM was 65(54.16%) males belong to age (1-9) years , and females was 55(45.83%) ,statistically there was no difference between patients with CSOM at same ages (P>0.05)

**Table 3.** Prevalence of patients with CSOM according to geographical area .

Geographical area		No. of patients	(%)
Urban	Peripheral area	30*	25
	Central area	70	59
Rural		20	16.7
Total		120	100

\*(P<0.01)

**Table 4.** Clinical features of patients with CSOM.

Clinical Feature	No. of patients %
-Otorrhea.	120(100 )*
-Otalgia	50(41.8 )
Odor from ear	30(25 )
Itchy Ear	45(38%).
- Tinnitus	60(50 )
- Vertigo	30(25 )

\*P<0.001

**Table 5.** Tuning fork examination results for patients with CSOM.

Rinne's test	NO. of patients (%)	Weber's test	NO. of patients (%)
Rt -ve test	22* (18.33)	Shifted + Lt	25*(20.83)
Lt -ve test.	38 (31.66)	Shifted + Rt	35 (29.16)
Rt+Lt +ve test	30 (25)	central	30(25)
Non applicable	30 (25)	Non applicable	30(25)
Total	120 (100)	Total	120 (100)

Non applicable =(Children under 5 years).

\* Rinne's test  $\chi^2=1.28$  P>0.05

\* Weber's test  $\chi^2=1.3$  P>0.05

### Geographical distribution of Patients with CSOM

The prevalence of patients with CSOM at peripheral area from Basra was 25% ,while at central area of Basra was 59% ,While in rural the prevalence of disease was 16.7% which less than peripheral and central area .Table 3 illustrates that frequency of CSOM patients in central area of urban was highly statistical differences from that of peripheral and rural area (P<0.01).

### Clinical features

Table 4 shows that the majority of clinical feature were otorrhoea (100)%, Otalgia 50(41.7%), odor from ear 30 (25%), itchy ear 45 (38%), ,tinnitus 60 (50%) , and vertigo 30 (25%).

### Tuning fork examination

Including Rinne's test and weber's test. Table 5 shows that the frequency of Rt ears was significantly higher than Lt ear and conductive hearing loss more than sensorineural and mixed hearing loss among CSOM patients

(25-31%) patients Rt ear+Ve, while (18.33-25%)of patients Lt ear +ve .

In Rinne test, 18.3% of left ear patients were normal hearing , 31.7% of right ear patients were normal hearing and 25% of both patients right and left ears normal hearing, while in Weber test, 20.9% of patients have sound (vibration) of tuning fork shifted to left side. It means effect in left ear, 25% of patients have central (sound of tuning fork don't shifted to right or left ear ). It means normal right and left ears, and 29.2% of patients have sound of tuning fork shifted to right side it means effect in right ear. In another way, Rinne test was useful to detect the type of hearing loss by evaluation of the difference between air and bone conduction in each ear, if patient still heard the sound, but bone conduction is better than air conduction (negative Rinne), the patient has conductive deafness. If no longer hears the sound (positive Rinne) so, has either normal hearing or asensory deafness. Also, Weber test is useful to detect the type of hearing loss. The sound immediately lateralizes to the blocked ear, the weber test tends to lateralize towards the side of a conductive loss and away from sensorineural loss.

Hearing loss either unilateral or Bilateral in our study 27 (22.5%) of patients with CSOM suffered from bilateral

**Table 6.** Unilateral and bilateral ear discharged

Age group	Bilateral Rt and Lt ear discharged No. of patients (%)		Unilateral ear discharged No. of patients (%)	
			Rt ear discharged	Lt ear discharged
01-04	10	(8.4)**	15 (18.9)*	10 (12.4)
05-14	8	(6.7)	7 (8.8)	8 (10.0)
15-24	8	(6.7)	6 (07.4)	4 (05.0)
25-34	6	(5.0)	8 (10.0)	2 (02.5)
35-44	4	(3.4)	4 (5.0)	4 (05.0)
45-54	2	(1.7)	4 (5.0)	2 (02.5)
55-65	2	(1.7)	3 (3.8)	3 (03.8)
Total	40	33.4	47 39.2	33 27.4

\*\* P<0.01

hearing loss and 13 (10.8%) no applicable, while 63 (52.5%) of patients with CSOM have unilateral hearing and 17 (14.1%) no applicable .

It means that right ear more affected than left ear in our study tuning fork and PTA use for diagnosis.

Table 6 above shows that the frequency of unilateral hearing loss was higher than bilateral hearing loss (P<0.01).

## DISCUSSION

It is found that 65 (54.16 %) males, while 55 (45.83%) females. This finding suggests that sex is not affecter in the development of CSOM in the ears. Our results approved with the results of (Vanderveen et al., 2006), while not agreed with the study of (Arnold, 1996). Vanderveen et al. (2006) stated that no difference between the sexes in the patients with CSOM in age . Arnold (1996) found that the middle ear disease is more common in boys than in girls. The majority of patients with CSOM were children (59.2%) from patients while (40.8%) were adults ,our result goes with studies done by (Verhoeff et al., 2006), he stated that the middle ear disease more common between children age group in poor and developed countries . Niskar et al. (1998), Canter (1997) and Bluestone et al. (1974) found that children are more prone due to a number of reasons such as susceptibility to upper respiratory tract infection ,more horizontal nature of Eustachian tube ,and immaturity of immune system.

The Tuning fork examination (TFE) included two type of test (Rinne and Weber) tests. In these tests, it is used to identified what kinds of hearing loss is present, a bone conduction hearing test is administered in this test ,a vibrating tuning fork is placed behind the ear, on the mastoid, when the patient can no longer feel (hear the vibration), the tuning is held in front of the ear; if the patient cannot able to hear sound, there is conductive hearing loss in that ear. Additionally, the tuning fork is placed on the fore head, the patient asked if the sound

localized in the center or shifted to right or left side. If the is sound louder to the effected ear, it means conductive hearing loss or if quieter on the affected ear it means sensorineural hearing loss (Yueh et al., 1985).

Results showed that Rinne test in Lt ear was positive in 22%, 30% right and left ear positive, 38% right ear positive and 30% non applicable (under 5 years old), while in Weber test, we show that 25% shifted to right side ,30% central,35% shifted to left side and 30% non applicable. Abdel- Hamid et al. (2007) found that the frequency of right ear hearing loss was 86.7% and left ear hearing loss was 89.2% out of the 641 subjects diagnosed with hearing loss .

In our result, we showed that the type of hearing loss proportional with age and severity of infection, conductive hearing loss (CHL) associated with mild and moderate infection in 50 patients, (55.5%) of patients that have (CHL) suffering from mild to moderate infection ,while mixed and senserineural proportional with sever, 25 patients, (27.7 %) of patients have mixed hearing loss and 15 patients (16.6 %) suffered from senserineural hearing loss . Audio logical assessment was done by the same investigator at Basra general hospital , department of audiology and consisted of pure tone audiometer for air and bone conduction by producing tones at specific frequencies and set volume levels to each ear independently, the graph have frequency on the x-axis and loudness on the y-axis = (hearing loss) [ -10 -120]decibel hearing loss, while x-axis =frequencies between 250 and 8000 Hz (air hearing) and between 250 and 4000 Hz (bone conduction) ( Probst et al. ,2006).

50 patients with CSOM, (55.5 %) have conductive hearing loss in mild and moderate infection were showed in the present study. The diagnosis done by pure tone audiogram ,

Howard (2007), found that (CHL) occur due to impairment of the transmission of sound impulses before they enter the inner ear. Hogan and Moore (2003), found that childhood middle ear disease contributes to a secondary condition problem with the processing of auditory

information. The persistent partial sensory deprivation that result from the conductive hearing loss associated with middle ear disease . Many studies stated that CSOM cause middle ear disease lead to conductive hearing loss (Morris et al., 2006; Bowd, 2005).

25 patients which comprises, (27.7%) of patients with CSOM suffered from mixed hearing loss. Mixed hearing loss occurs when both sensorineural and conductive hearing loss are evident .

15 patients which comprises, (16.6%) CSOM suffering from sensorineural hearing loss .Most of them were adult patients. Sensorineural hearing loss (SNHL) is caused by dysfunction in the cochlea or the cochlear nerve. Sometimes a cochlear loss is referred to as a sensorineural. Blakley and Kim (1998), Kaplan et al., (1996), studied 127 diseased ears in children and reported that CSOM has little effect on cochlear function. Kholmatov (2001) showed that when the duration of disease was compared with the incidence of SNHL, a progressively increase incidence of SNHL was found as the duration of disease increased .

In the Present study, it is found that 120 patients were presented with otorrhoea (100%), followed by otalgia, (40%), itchy ears (30%), tinnitus 60% and vertigo 30%. Our result agreed with study done by (Hwang et al., 2002), that otorrhoea was the most common symptom in patients with CSOM, while disagreed by result (Bardanis et al., 2003), who stated that otorrhoea commonly found in otitis externa. Otorrhea is a common symptom and sign of patients with CSOM, when discharge contain mucus ,it must have arisen from glands within the middle ear cleft, passing into the external ear through a tympanic membrane perforation. Bardanis et al. (2003), found that otitis externa form the common cause of purulent otorrhoea. There is no consensus on the duration of otorrhea to be termed chronic (WHO 1996).

## REFERENCES

- Abdel-Hamid O, Khatib OM, Ali A, Morad M, Kamel S (2007). Prevalence and patterns of hearing impairment in Egypt. *East. Mediterr. Health J.* 13(5): 1170-80.
- Arnold JE (1996). Otitis media and its complications. In R.E.Behrman, R. Kleigman, A.M. Arvin (Eds.) *Nelson textbook of pediatrics*. Philadelphia: W.B. Saunderspp. 15th ed Philadelphia:W.B.Saunders. pp. 1814-1826 .
- Bardanis J, Batzakkis D, Mamas S (2003). Types and causes of otorrhoea. *Auris Nasus larynx.*, 30:253-257.
- Berman S(1997). Classification and criteria of Otitis Media. *Clin. Microbiol. Infect. Suppl.* 3:1-4 .
- Blakley BW, Kim S(1998). Does Chronic Otitis Media cause SNHL. *J. Otolaryngol.* 27(4): 246.
- Bluestone CD, Beery QC, Andrus WS (1974): Mechanics of the Eustachian tube as it influences susceptibility to and persistence of middle ear effusions in children. *Ann. Otorhinolaryngol.* 83:1-34 .
- Bowd AD (2005). Otitis media: Health and social consequences for Aboriginal youth in Canada's north. *Int. J. Circumpolar Health.* 64(1):5-15.
- Canter RJ (1997). Acute suppurative otitis media. In: Booth JB (ed). *Scott-Brown's otolaryngology*. Butterworths, London. 3(9):1-7 .
- Finitzo T, Friel-Patti S, Chinn K, Brown O (1992). Tympanometry and Otoscopy prior to myringotomy :issues in diagnosis of otitis media. *Int. J. pediatr. Otorhinolaryngol.* 24:101-110.
- Hogan S, Moore D (2003). Impaired binaural hearing in children produced by a threshold level of middle ear disease. *J. Assoc. Res. Otolaryngol.* 4:123-129.
- Howard D (2007). Intercultural communication and Conductive hearing loss. *J. First Peoples Child Fam. Rev.* 3 (4): 97.
- Hwang JH, Chu CK, Liu TC (2002) Changes in bacteriology of discharging ears. *J. Laryngol.Otol.*116:686-689.
- Kamajit k, Nishi S, ??? AS (2003),Bapna CSOM and SNHL, *Indian J. otolaryngol. Head Neck surg.* 55(1): 22-24 World Health Organisation (WHO). (1996). Prevention of hearing impairment from chronic otitis media. Report of a WHO/CIBA Foundation workshop, London, 19-21 Novem-ber 1996. Available online: pp:8-21.
- Kaplan DM, Kraus M et al provide names of other authors (1996).Audiometric Findings in Children with CSOM without Cholestatoma. *Int. J. pediatr. Otorhinolaryngol.* 35(2):89-96.
- Kholmatov DI (2001). Early detection of a sensorineural aspect of hypoacusis in patients with chronic purulent otitis media vestri. *Otorinolamgol.* 3:26-28.
- Morris PS, Leach AJ, Halpin S, Mellon G, Gadil G, Wig-ger C, Mackenzie G, Wilson C, Gadil E, Torzillo P (2007). An overview of acute otitis media in Australian Aboriginal children living in remote communities. *Vaccine* 24(13): 2389-2393
- Niskar AS et al provide other names of authors. (1998). prevalence of hearing loss among children 6-19 years of age :the 3rd national health and nutrition examination survey .*J. Am. Med. Assoc.* 279(14):1071-1075.
- Probst R, Grevers G, Iro H (2006).Basic Otorhinolaryngology. Pp.166-197 .
- Uhari M, Hietala J, Tuokko H (1995).Risk of acute otitis media in relation to viral etiology of infections in children. *Clin. Infect .Dis.* 20:521-524.
- Vanderveen EL, Schilder AG, VanHeerbeek N, Verhoeff M, Zielhuis GA, Rovers MM, (2006).Predictors of chronic suppurative otitis media in children. *Arch. Otolaryngol. Head Neck Surg.* 132(10):1115-1118.
- Verhoeff ,M, Vander V, Rovers MM, (2006).Chronic suppurative otitis media: A review. *Int. J. Pediatr. Otorhinolaryngol.* 70(1):1-12.
- Yueh B, Shapiro N, Maclean CH, Shekelle PG (2003). *J. Am. Med. Assoc.* 289(15):1976-1985.