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Original article

Prevalence of Otitis Media with Effusion in Children of Damietta Governorate (Egypt)

Mohamed Hussein Abdelazim^a; Ahmed Ibrahim Zaghoul^a; Mohamed Elbakly^b

Department of Otorhinolaryngology, Damietta Faculty of Medicine, Al-Azhar University, Egypt^[a].

Audiolvestibular unit, ENT department, Assuit Faculty of Medicine, Al-Azhar University, Egypt^[b].

Corresponding author: **Mohamed Hussein Abdelazim**

Email: mohammedabdelazeem35@yahoo.com

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ABSTRACT

Background: Otitis media with effusion is a prevalent disease of pediatrics. It is usually a self-limiting disease. However, it may be complicated by serious consequences. The early detection and the determination of actual prevalence could help in planning for preventive interventions.

Aim of the work: To determine prevalence of otitis media with effusion and the risk factors associated with this disease.

Patients and methods: The study included all patients younger than 16 years of age, who attended the outpatient clinic of otorhinolaryngology department (Al-Azhar Faculty of Medicine, New Dameitta), during the period from August 2016 to August 2018. In this work, 2338 patients were included (1351 males and 987 females). For each child, the demographic data were collected and documented. All attended children were submitted to an ear, nose and throat examination; both ears were examined by an otoscope (pneumatic) and tested with tympanometry by the same investigator.

Results: The disease was diagnosed in 124 children (5.3%). The mean age of studied children was 9.13 ± 2.83 years (range 4-15). The most common affected age was 4 years (15%) followed by 6 years (13.1%), then 15 years (6.3%). The condition was significantly associated with low socioeconomic class, smoking exposure and past frequent upper respiratory tract infection.

Conclusion: The prevalence of OME in 4-15 years old children in Damietta Governorate was 5.3%, elevated to 15% at the age of 4 years. The low social state, exposure to smoking and frequent infections of upper airway were the most common associated risk factors.

Keywords: Otitis media; Effusion; Tympanometry; Dameitta; Ventilation Tube.

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INTRODUCTION

Otitis media with effusion (OME) is an inflammatory condition with fluid (secretion) of middle ear behind intact tympanic membrane with no clinical manifestations (signs or symptoms) of acute ear infection, which is prevalent in pediatric age groups. OME is also identified as secretory otitis media and it was thought to run a benign course. However, it was found to exert both direct and indirect consequences on language/ cognition and audition development^[1,2].

The absence of acute symptoms leads to a difficulty in estimating the frequency of OME. However, data of epidemiological trials reported that about 80% of children younger than 6 years of age complained of one or more incidents of secretory otitis media, and that the estimated point prevalence of secretory otitis media is up to 20%^[3].

OME had a high prevalence of recurrent episodes. The disease is a significant public health condition as it had potential comorbid consequences (e.g., adhesive otitis media, tympanosclerosis, retracted pockets and speech or hearing impairment^[4,5]).

In Damietta governorate, no epidemiological studies about OME have been carried out.

AIM OF THE WORK

The aim of the current study is to estimate the prevalence of OME in pediatrics and to determine associated risk factors.

PATIENTS AND METHODS

The study included all patients younger than 16 years, who attended the outpatient clinic of the Ear, Nose and Throat Disease department (Al-Azhar Faculty of Medicine), during the period extended from August 2016 to August 2018. In this work, 2338 patients were included (1351 males and 987 females; mean age 9.13 ± 2.83 years). Patients who had chronic suppurative otitis media or allergic rhinitis were excluded. The study protocol was revised and approved by the Institutional Review Board (IRB), Damietta Faculty of Medicine, Al-Azhar University.

For each child, the demographic data were

collected and recorded in a data collection sheet. All attended children were submitted to complete ear nose and throat (ENT) examination; both ears were investigated by a pneumatic otoscope and subjected to tympanometry by the same investigator. If ear wax was discovered, it was cleaned. The character of tympanic membrane was specified by its appearance (retracted, dull, or normal). In addition, the existence of middle ear liquid was defined as air bubbles or fluid level and the different colors (yellow, grey, blue or amber) of the tympanic membrane. The modified Jerger's classification was used to classify tympanometric curves into types A, B or C^[6]. Type A curve denotes no effusion in middle ear, while types B and C were predictive of middle ear effusion.

OME was diagnosed according to symptoms, otoscopic study and results of tympanometry. The prevalence was estimated by dividing OME children by the total number of children.

Statistical analysis of the data was carried out by the statistical package for social science (SPSS) version 18, running on IBM-compatible computer with Microsoft windows® (SPSS Inc., Chicago, IL, USA). Data were categorical (represented as frequency and percentages). *Chi* square test used for comparison and *p* value <0.05 were considered significant.

RESULTS

In the present work, 2338 children were screened for OME; the disease was diagnosed in 124 children (5.3%). The mean age of studied children was 9.13 ± 2.83 years (range 4-15). The incidence of OME in different ages revealed that, the most common affected age was 4 years (15%) followed by 6 years (13.1%), then 15 years (6.3%). When considered the total preschool age children, the incidence was 8.3%, while at all primary school children, the incidence was 4.9% and the incidence was 4.6% for prep school children (Table 1).

The incidence of OME in males was 5.9% and in females was 4.5%; the incidence was increased in males in all age groups except at the age of 11 and 12 years, where it was lower in males than females (3.8%, 3.4% vs 4.5% and 4.3% respectively) (Table 2).

As regard to possible risk factors among studied

populations, OME was significantly associated with low socioeconomic class, smoking exposure and past frequent upper respiratory tract infection (URTI). On the other side, there was no significant difference between patients with OME and those without OME as regard to consanguinity between parents (2.4% vs 2.0% respectively) (Table 3).

In addition, 24.2% were asymptomatic, while otalgia was reported in 16.9%, ear block in 14.5%, tinnitus in 8.9% and hearing impairment was

reported 35.5%. The tympanogram examination results revealed that, it was type A in 6.5%, type B in 55.6% and type C in 37.9% (Table 4). Regarding results of otoscopy in OME patients, it was retracted in 14.5%, fluid in middle ear in 46.0% and dull in 39.5%; while in group of children without OME, otoscopy revealed wax in 22.8%, otitis externa in 7.0% and normal in 70.2%, and there was significant difference between groups (Table 5).

Table (1): Distribution of OME in different ages

Age (year)	OME	
	n	% within age
4.00	15/100	15.0%
5.00	10/201	5.0%
Preschool age	25/301	8.3%
6.00	13/99	13.1%
7.00	22/451	4.9%
8.00	9/150	6.0%
9.00	12/250	4.8%
10.00	9/280	3.2%
11.00	9/220	4.1%
12.00	9/240	3.8%
Primary schools	83/1690	4.9%
13.00	10/249	4.0%
14.00	3/50	6.0%
15.00	3/48	6.3%
Prep school	16/347	4.6%

Table (2): Distribution of OME in different ages in relation to patient gender

Age (year)	Male		Female	
	n	% within age	n	% within age
4.00	10/59	16.9%	5/41	12.2%
5.00	7/108	6.5%	3/93	3.2%
Preschool age	17/150	10.2%	8/126	6.0%
6.00	9/64	14.1%	4/35	11.4%
7.00	14/264	5.3%	8/187	4.3%
8.00	6/83	7.2%	3/67	4.5%
9.00	7/141	5.0%	5/109	4.6%
10.00	7/160	4.4%	2/120	1.7%
11.00	5/132	3.8%	4/88	4.5%
12.00	5/146	3.4%	4/94	4.3%
Primary schools	53/937	5.4%	30/670	4.3%
13.00	6/141	4.3%	4/108	3.7%
14.00	2/26	7.7%	1/24	4.2%
15.00	2/27	7.4%	1/21	4.8%
Prep school	10/184	5.2%	6/147	3.9%
Total	80/1351	5.9%	44/987	4.5%

Table (3): Possible risk factors among studied populations

		OME		Negative		Total		P value
		n	%	n	%	n	%	
Socioeconomic class	High	22	17.7%	627	28.3%	649	27.8%	<0.001*
	Middle	56	45.2%	1175	53.1%	1231	52.7%	
	Low	46	37.1%	412	18.6%	458	19.6%	
Smoking exposure		64	51.6%	401	18.1%	465	19.9%	<0.001*
Consanguinity		3	2.4%	44	2.0%	47	2.0%	0.73
Past frequent URTI		27	21.8%	326	14.7%	353	15.1%	0.033*

Table (4): Symptoms and results of tympanometry among studied children

		N (124)		%	
Symptoms	Asymptomatic	30		24.2	
	Otalgia	21		16.9	
	Ear block	18		14.5	
	Tinnitus	11		8.9	
	Hearing impairment	44		35.5	
Tympanogram	Type A	8		6.5%	
	Type B	69		55.6%	
	Type C	47		37.9%	

Table (5): Results of otoscopy among studied children

		OME		Negative		Total		P value
		n	%	n	%	n	%	
Otoscopy	Retracted	18	14.5%	0	0.0%	18	.8%	<0.001*
	Fluid in middle ear	57	46.0%	0	0.0%	57	2.4%	
	Dull	49	39.5%	0	0.0%	49	2.1%	
	Wax	0	0.0%	504	22.8%	504	21.6%	
	Otitis Externa	0	0.0%	155	7.0%	155	6.6%	
	Normal	0	0.0%	1555	70.2%	1555	66.5%	

DISCUSSION

The importance of screening for OME could be ascertained to the fact that, early detection of the disease might help in reduction of the complications associated with the disease, specifically in countries with limited and infrequent access to healthcare^[7].

The incidence of OME in the current trial was diagnosed in 124 children (5.3%). This incidence lies within previous literature, which reported that, the prevalence of secretory otitis media was reported to be 5.3% - 9% in different nations^[8,9]. **Kocyigit et al.**^[10] reported that, OME prevalence was 15.9% (still higher than that the overall reported rate in the present work).

On the other side, the serous OME prevalence is greatly variable (1.3 to 31.3%), affected by the used screening methods, populations characters like race, residency and factors related to environment^[11]. In Caucasian children, the reported prevalence was 9.5%, while in Chinese children of primary schools, the prevalence was 5.3%^[8].

The high incidence was reported in the age of 4 years (15%), and this is comparable to those reported by **Erdivanli et al.**^[5] who reported that, the OME prevalence in children 4 to 6 years old was 14.7%; and this could be attributed to undeveloped immune system, shorter Eustachian tube which is also more horizontal in younger children, increased tendency to allergy; and the scanty support by cartilage to the Eustachian tube with subsequent ineffective active opening mechanism^[12]. Other study reported that, OME is highly prevalent in younger kids. Surveys screen for OME in children up to five years of age revealed a prevalence rate of 15% to 40%^[13].

In the present work, there was higher incidence of OME in males when compared to females in the same age group, except at 11 and 12 years where the disease was higher in females than males. This is in agreement with one study that reported male sex predominance^[14], but other trials have could not report the same effect of sex on OME^[15].

In the present work, OME was significantly associated with low socioeconomic class, smoking exposure and past frequent upper respiratory tract infection (URTI). These results are comparable to those reported by **Caylan et al.**^[4] who reported that, frequent upper airway infections such as common cold increase predisposition to development of secretory otitis media.

One study denies any link between passive smoking and OME^[16], however, other study proves a clear link between passive smoking and development of OME^[17].

In an interesting study, **Gultekin et al.**^[18] confirmed that father or mother smoking history was not a risk factor for OME development but mother smoking during pregnancy could be considered as one of the contributing factors. They explained their theory, by the intimate connection between the child and his/her mother, and the long time, children spend with their mothers.

Hearing impairment or even loss was the commonly presenting complaint in studied children (35.5%), and this is agreement with **Erdivanli et al.**^[5] who reported that, the earliest and the sole complaint of secretory otitis media is hearing loss. **Varsak et al.**^[7] reported that, the sole and first symptom of OME is the hearing loss. In their study 38.2% of the patients diagnosed with OME were asymptomatic and the most common presenting symptom was hearing impairment (33%). Other symptoms include ear block (16.3%), tinnitus (7.2%) and otalgia (4.5%).

Conclusion: The present work reported the prevalence of OME in 4-15 years old children in Damietta Governorate (Egypt). This data could provide a significant data to health care planners. Additional studies are needed to be conducted in all governorates of Egypt to plan a wide strategy for preventive care against OME and its potential complications.

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