

## The Prevalence of Middle Ear Disease in The Adult Population

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### ABSTRACT

**Background:** otitis media (OM) also known as middle ear disease is an inflammation of the middle ear cleft, where infection leads to the effusion of fluids into the middle ear. In developing countries, otitis media is the main cause of hearing impairment. There are several factors that enhance the presence of otitis media, including genetic, environmental and demographic.

**Aim of the study:** this study aimed to investigate the prevalence and risk factors of otitis media in adults.

**Methods:** this study included 117 participants and it based on an online survey, the survey was divided into two parts. The data were collected in excel sheet and analyzed by SPSS.

**Results:** the prevalence rate of OM was 40.2%, there were significance differences between health individuals and OM patients regarding chronic diseases (P value=0.01) and allergy (P value=0.001).

**Conclusion:** the prevalence of OM was low, chronic disease and allergy were risk factors for OM.

**Keywords:** OM, OM prevalence, OM in adults.

### INTRODUCTION

Otitis media (OM) or middle ear disease (MED) is a common ear condition of childhood if this condition still untreated the more severe and chronic MED condition will develop <sup>(1)</sup>. Otitis media is defined as inflammation in the middle ear cleft, the effusion of fluids into the middle ear occurs as a result of an infection which in turn may be associated with either absence or presence of tympanic membrane perforation <sup>(2,3)</sup>. Infections in the upper respiratory tract play an important role in the middle ear disease etiology <sup>(4)</sup>. Both children and adults have experience about long-term of morbidity with different degrees of hearing loss; this can result from the presence of fluid in the middle ear <sup>(5,6)</sup>. OM is the main cause of hearing impairment in developing countries <sup>(7)</sup>. The clinical spectrum of OM may extend from benign and self-limiting condition to prolonged condition. However, it may reach complicated disease <sup>(8)</sup>. The duration and etiology of OM lead to sequelae of several disorders such as chronic suppurative otitis media (CSOM), otitis media with effusion (OME) and acute suppurative otitis media (ASOM) <sup>(9,10)</sup>.

CSOM is a persistent otorrhea over three weeks with a permanent perforation of tympanic membrane leading to middle ear inflammation or hearing loss <sup>(11)</sup>. ASOM is the acute form of OM in which presence of fluid in the middle ear and inflammation involves irritability, fever or otalgia symptoms <sup>(11)</sup>. As OM is a common condition in children, its prevalence rate reaches 90% in children of less than two years old. However, it may occur in adults <sup>(8,12)</sup>. OM prevalence differs

between the different population, ethnic groups and countries <sup>(13)</sup>.

The prevalence of OM ranges from 1.3% to 31.3%, CSOM prevalence rate ranged from 4% to 33.3% and ASOM ranged from 2.3% to 20% <sup>(13,15)</sup>. In Indian study <sup>(7)</sup> it was found that the prevalence of OM was 35.8% for participants with age less than 15 years. Studies from US and Finland expected increase in the OM incidence <sup>(16,17)</sup> this may be attributed to the change in the environmental and host risk factors for developing OM <sup>(8)</sup>.

There are several factors that enhance the vulnerability of OM; these factors include environmental, demographic, genetic and other health-related factors such as allergy, asthma, cleft palate, adenoid hypertrophy, infections and eustachian tube dysfunction <sup>(18-20)</sup>.

The environmental risk factors include seasons of the year, day care, home care, exposure to other children, environmental pollution and socioeconomic status, whereas the host-related risk factors including age, gender, race, change in host defense and prenatal factors <sup>(8)</sup>. There is scarcity in the epidemiological studies for the middle ear inflammatory conditions in Saudi Arabia <sup>(21,13)</sup> so this study aimed to investigate the prevalence of middle ear disease in the adult population and its associated risk factors.

### MATERIALS AND METHODS

#### Study design

This study was conducted in the period between September 2017 to October 2017, it was

based on an online survey. The survey was divided into two parts, the first one to investigate demographics of participants and the second part of investigating ear disease.

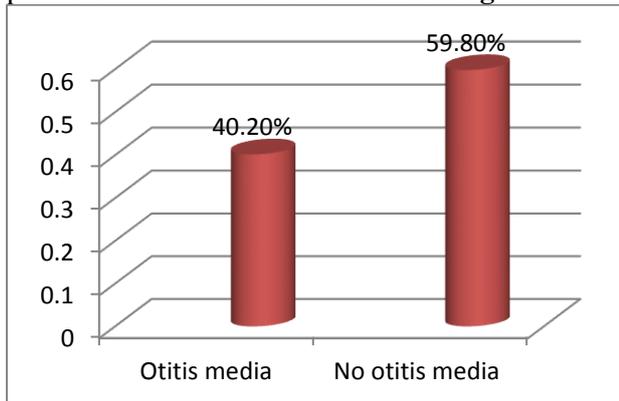
**The study was done after approval of ethical board of Imam Muhammad Ibn Saud Islamic university.**

**Statistical analysis**

Data were analyzed using SPSS software version 16, the simple descriptive analysis in the form of means and standard deviations were calculated for numerical data. Qualitative data were described using numbers and percent distribution and chi-square was used as a test of significance to detect association between association of otitis media and studied variables with a significant level of less than 0.05.

**RESULTS**

The present study included 117 participants, the mean± SD age of participants was 28.9±9.6 years. Most of individuals 81(69.2%) were in the age range of 20-39 years old, 23(19.7%) were less than 20 years, while 13 (11.1%) were ≥40 years old. There were 99(84.6%) females and 18(15.4%) males. 84 (71.8%) of participants were postgraduate, 6 (5.1%) had intermediate education, 24(20.5%) had secondary education and 3(2.6%) only were in primary education. The large majority of individuals were from urban area 109(93.2%), while 8(6.8%) only were from rural area. 49(41.9%) had income of 1000-3000 SR, 16(13.7%) had 3001-5000 SR, 27 (23.1%) had 5001-1000 SR and 25 (21.4%) had more than 10000 SR. There were 47(40.2%) suffering otitis media and 70(59.8%) had no otitis media, the prevalence of otitis media is shown in **figure1**.



**Fig1: prevalence of otitis media**

The characteristics of individuals with otitis media were assessed (**Table1**).

**Table1: characteristics of patients with otitis media**

Characteristics		N (47)	%
Having chronic disease	Yes	11	23.4
	No	30	63.8
	Don't know	6	12.8
Having allergy	Yes	22	46.8
	No	24	51.1
	Don't know	1	2.1
Living in Polluted environment	Yes	5	10.6
	No	34	72.3
	Don't know	8	17.0
Symptoms of diseases*	Ear pain	36	76.6
	Hearing defect	28	59.6
	Discharge	14	29.8
	Vertigo, drowsiness	4	8.5
When going to physician	Through week	13	27.7
	Through two week	8	10.6
	Through 1 month	26	55.3
Possible causes for otitis media	Influenza & common cold	27	57.4
	Other infections	10	21.3
	Other causes related to trauma, water	8	17.0
	Don't know	2	4.3
Suffering from complication	Yes	13	27.7
	No	27	57.4
	Don't know	7	14.9
Period consumed to recover	1-2 w	20	42.5
	2w-1 month	6	12.8
	1- 2 month	8	17.0
	>2months	13	27.7

Of the 47 patients with otitis media, there were 23.4% had a chronic disease, 46.8% had an allergy, while only 10.6% of them were living in the polluted environment. The most common symptoms of otitis experienced by patients were ear pain 76.6%, followed by hearing defect 59.6%, then discharge 29.8%, and vertigo and drowsiness 8.5%, 27.7% of patients suffered complications.

Most of the patients reported that they visited physicians through 1 month 55.3%, while 10.6% visit physician through two weeks and 27.7% visit physician through 1 week. There were 57.4% of patients thought that the possible cause of otitis was influenza and the common cold, 21.3% thought there are other infections, 17% thought of other caused related to trauma and water, while

4.3% did not know at all. The large majority of individuals 42.5% needed 1-2 weeks to recover, 27.7% needed more than two months, while 17% and 12.8% needed 1-2 months and two weeks, 1 month to recover respectively.

There was no correlation between suffering otitis and any of the demographics (**Table2**).

Whereas, there were significant differences regarding chronic diseases and allergy, while no significance regarding living in polluted areas. More patients with otitis (36 individuals) had chronic disease than those without chronic disease (11 individuals) (P value=0.01). However the large majority of healthy individuals had a chronic disease (65 individuals). Also, more patients with otitis (25) suffered from allergy than those without allergy (22) (P value=0.001). However most of the healthy patients had an allergy (60 individuals) (**Table2**).

**Table2: the correlation between otitis media and different variables**

Variables	Otitis media N (%)	Healthy individuals N (%)	P-value
<b>Sex</b>			
Female	38	61(61.6%)	<b>0.3</b>
Male	(38.4%) 9(50%)	9(50%)	
<b>Age</b>			<b>0.4</b>
<20years	10(43.5%)	13 (56.5%)	
20-39 years	30(37%)	51(63%)	
≥40 years	7(53.8%)	6(46.2%)	
<b>Residence</b>			<b>0.4</b>
Rural	2(25%)	6(75%)	
Urban	45(41.3%)	64(58.7%)	
<b>Income</b>			<b>0.3</b>
1000-3000	20(40.8%)	29(59.2%)	
3001-5000	7(43.8%)	9(56.2%)	
5001-10000	11(40.7%)	16(59.3%)	
>10000	9(36%)	16(64%)	
<b>Chronic disease</b>			<b>0.01*</b>
Yes	36(35.6%)	65(64.4%)	
No/ I do not know	11(68.8%)	5(31.2%)	
<b>Allergy</b>			<b>0.001*</b>
Yes	25(29.4%)	60(70.6%)	
No/ I do not know	22(68.8%)	10(31.2%)	
<b>Living in polluted area</b>			<b>0.2</b>
Yes	42(38.5%)	67(61.5%)	
No/ I do not know	5(62.5%)	3(37.5%)	

**DISCUSSION**

The present study was performed to investigate the prevalence of otitis media (OM) in adults as there were a limited number of these subjects. Also, we wanted to find out the risk factors of OM. The present study included 117 participants and the prevalence of OM was found to be 40.2%. In Indian study <sup>(7)</sup>, it was reported that the prevalence of OM between individuals of less than 15 years old was 35.8%. Other studies showed that OM prevalence was ranging from 1.3% to 31.3%, with ASOM prevalence rate of 2.3% to 20% and CSOM prevalence range of 4% to 33.3% <sup>(13-15)</sup>.

The prevalence rate in our study was higher than the previous studies and this may be attributed to the difference in the presence of risk factors and criteria of included patients. The large majority of patients with OM did not have chronic diseases (76.6%) or suffering allergy (53.2%). Also most of them were not living in a polluted environment (89.3%). The most common symptoms the patients experienced was ear pain, where 76.6% of OM patients were suffering from this symptom, hearing defect was in the second rank and represented 59.6% between patients, discharge was less common and it represented 29.8%, while vertigo and drowsiness were the least common symptoms and represented 8.5%. 27.7 % reported that they visited the physician through 1 week of the appearance of symptoms, while the large majority reported that they did that through 1 month, the least percent 10.6% visited the physicians through 2 weeks.

Most of the patients thought that OM may be caused by influenza and common cold (57.4%), while 21.3% thought that other infections could cause OM and 17% thought that other causes related to trauma and water are the cause of OM. Few percent of patients 27.7% suffered from complications, the duration of recovery from OM was 1-2 week, there were 42.5% of patients reported that they needed 1-2 weeks to recover from OM, while 27.7% needed more than 2 months, the difference in the duration of recovery between patients can be attributed to the difference in patient’s adherence to medication and their immune defense.

Regarding the demographics of patients that may affect the developing of OM, there was no significant difference between healthy individuals and patients with otitis media regarding sex, age and residence. Regarding gender, more females had OM than males. However no significance difference was found by comparing patients with

healthy persons (P-value=0.3). Also, regarding different age groups there was no significant difference between healthy and OM patients (P value=0.4).

Area of residence was not a significant factor between healthy persons and OM patients, most of the participants in both groups were living in the urban area (P value=0.4). Gender, age and resident area were not significant factors to develop OM, this suggesting presence of other risk factors. The only two factors that found to significantly differ between OM patients and healthy individuals were suffering from chronic disease and allergy. More patients with chronic disease tended to develop OM.

However there were 64.4% of healthy subjects suffered from chronic diseases, this can be attributed to the fact that most of the participants in this study were health and only 47 individuals were suffered from OM. Regarding suffering from allergy, there was significant difference between healthy subjects and patients of OM (P value=0.001). However, there were 25 individuals suffered from both OM and allergy, while 22 individuals were suffered from OM, but not an allergy. Also, most of the free subjects were suffered from allergy (60 individuals). However, this can be returned to few number of OM patients participated in this study.

Living in the polluted area was not a significant risk factor for developing OM (P-value=0.2). The present study is the first study to evaluate the prevalence of OM and its risk factors among adults. However, there were many limitations in this study should be avoided in the further studies; the sample size of this study was small, as there was no previous study on this subject we couldn't compare our results with any study. Further studies include larger sample size should be established.

## CONCLUSION

The prevalence of OM was low, the most common symptoms observed for OM patients were ear pain and hearing defect. Patients tended to visit physicians late, however, few percent suffered from complications and most of them needed 1-2 weeks for recovery. Chronic diseases and allergy were significant risk factors to develop OM.

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