

Awareness of Otitis Media Risk Factors in Children among Saudi Population in Al-Ahsa

Amnah E. Al-Hammar¹, Nadiyah M. Albrahim¹, Fatimah B. AlAli¹, Zainab A. AlHabeeb¹,
LolowahE.. Al-Hammar¹, Khalid A. AlYahya², Saleh H. AlJarudi³.

1-College of Medicine, King Faisal University, 2- Head & Neck Surgery Department,
King Faisal University, 3- Dhahran Eye Specialist Hospital

Corresponding Author: Amnah Ebraheem AlHammar, mathematical1162@hotmail.com.

ABSTRACT

Background: Otitis media (OM) is a common childhood disease where 75% of all children have had one episode of OM by the age of five and for some it may continue throughout school life. Several risk factors for AOM have been identified such as anatomic abnormality, infant feeding methods, passive smoke exposure, group daycare attendance...etc. The persistence of the disease and its long-term effects is due partly to lack of awareness of the disease among parents.

Objective: This study was designed to assess the knowledge of risk factor of otitis media among Saudi population who live in AlAhsa province.

Subjects and Methods: After ethical approval, data information was collected through a cross-sectional survey which performed among Saudi population. Statistical analysis computed using (SPSS).

Result: The study comprised 924 participants, females were the majority 639 (69.2%), age groups 18 and older. Inadequate level knowledge was 85.39%. Winter and young babies are the most frequent risk factors 50% and 73.1% respectively.

There were no statistical significant associated of demographic characteristics (age, job, number of children, and income) and knowledge and awareness of otitis media. But there is with educational level $p=0.006$.

Conclusion: Knowledge and awareness of OM risk factors are inadequate, extensive health education, encouraging and training of parents are recommended.

Keywords: otitis media, acute, children, risk factors, breast feeding, upper respiratory tract.

INTRODUCTION

Otitis media means inflammation or infection of the middle ear, this term covers a wide range of middle-ear problems. Otitis media (OM) is a common childhood disease seventy five percent (75%) of all children has had one episode of OM by the age of five¹⁻³. Worldwide systematic review estimated that there are 709 million new cases of AOM annually, with greater than half in children less than five years of age⁴.

However, most children have only occasional episodes of AOM, or none at all, but some are susceptible to recurrent or severe ear infections; those children having had three or more episodes of AOM before their third year and named 'otitis prone'⁵. Acute OM (AOM) usually affects children aged under two years, and presents with acute onset signs and symptoms of otalgia and fever, in a child that is systemically unwell. It is acute inflammation, and may be caused by bacteria or viruses.

Acute otitis media is usually a result of obstruction of the Eustachian tube. Because of obstruction, fluid buildup behind eardrum and inflammation occur,

which, in turn, alter the pressure within the middle ear. When fluid cannot drain, this permits pathogenic virus and bacteria to colonize the normally sterile middle ear space, this lead to otitis media, and any infection of the middle ear can spread to surrounding structures with serious results, a relatively common complication of AOM is acute mastoiditis, defined as acute inflammation of the mastoid periosteum and air cells, The incidence is 1.2–6.0 in 100,000 and usually occurs in children under 2 years of age⁶.

It can be unnoticed and in some cases may remain underestimated since it has a high rate of spontaneous healing. Irregular response to antimicrobial treatment can be produced due to its different etiology (viral, bacterial or both combined); this fact sometimes makes it difficult to determine whether we are dealing with a new episode of infection or whether it is the same still unresolved (most of all infants who present continuous infections of the adenoids, pharynx, tonsils or upper respiratory tract)⁵.

Episodes of AOM and the number of recurrent otitis media are higher in male. Teele reported that 66% and 86% of males versus 53% and 77% of females had had an episode of otitis within their first

year and third year respectively⁷. Frequency of AOM is related to ethnic differences.

Afro-American black children have less episodes of AOM, due to anatomic differences in the Eustachian tube. According to Wright's data, birth order seem to have certain effects on rates of otitis in children less than 2 years old, second-born children seem to be more prone to otitis. The most reliable predictors for recurrent AOM is child's age when the first episode occurs⁷. In the Boston study, a sibling history of recurrent AOM has a greater probability of having younger siblings with otitis⁷.

According to some authors, there is greater incidence of AOM during winter season⁸. In the lower social classes there can be a greater incidence of chronic or relapsing infections, in Teele's study⁷, the socio-economic status was not significantly associated with increased incidence or recurrences of AOM, but it was in Sassen's and in Kero's study^{9,10}. Smoke and air pollutants are related to acute respiratory infections, especially during the first two years of age^{9,10}.

According to Aniansson study¹¹ the frequency of viral upper respiratory tract infections was significantly lower in breast-fed infants than in weaned ones in all age groups (1-3, 4-7, 8-12 months). Infants who are in day-care groups increase the incidence of respiratory infections including otitis media, in comparison with those at home¹².

Antibiotic therapy is considered the treatment of choice for acute otitis media. In children, most pathogens cause acute otitis media are organisms producing beta-lactamase, thus a high dose amoxicillin is the treatment of choice¹³.

The evidence of antibiotic therapy was confirmed by many published trials. A randomized placebo-controlled double-blind study of 84 children between 6 months and 15 years of age revealed that children who received antibiotic treatment amoxicillin clavulanic acid in a dosage of 40 mg/kg experienced faster healing of otitis media than without this therapy¹⁴.

Studies revealed that administration of combination of an analgesic with antibiotic led to optimized pain management. A placebo-controlled trial in 1991 reported that administration of amoxicillin 125 mg 3x per day for 7 days with 100 ml paracetamol 120 mg/5 ml led to improve pain symptoms in children within a short period in comparison to administration paracetamol alone¹⁵. Myringotomy is a surgical treatment of acute otitis media, it is indicated in case

of fever, pains, and protrusion of the tympanic membrane without perforation, beginning of complications such as; irritation of the labyrinth, weakness of the facial nerve or meningism. Moreover, when advanced complications occur such as mastoiditis, labyrinthitis, or meningitis¹⁶.

Objectives

This study was designed to assess the knowledge and awareness of otitis media risk factors among Saudi population who live in AlAhsa province and to alert people about the effect of risk factors to reduce or avoid having otitis media. Ethical approval obtained from the College of Medicine, King Faisal University's Research Ethics Committee.

The study was done after approval of ethical board of King Faisal University.

Inclusion criteria

Female and male gender, age 18 years old or older, Saudis only and live in Al-Ahsa province.

SUBJECTS AND METHODS

A cross sectional survey study carried out online, in Saudi Arabia, Eastern Province, Al Ahsa, between, 08 August, 2017 and 18 September, 2017.

A sample of 924 participants' male and female, data was collected using a valid and reliable questionnaire containing 12 questions. With three possible answers; (yes, no, I do not know). Survey questions included the thought possible risk factors of otitis media; (male gender, overcrowding, absence of vaccination, winter season and absence of breast feeding).

Demographic characteristics; age, marital status, educational level, number of children, and profession were also included.

Participants who answered correctly were assigned a score of '1' where as those who answered either incorrect or I do not know were assigned a score of '0', total knowledge score and percentage were computed, total score of each participants with percentage are also calculated, where those who get score of 50% or more of the correct answers assigned of having adequate knowledge and awareness of OM, and those who get less than 50% were considered as having inadequate knowledge and awareness of OM.

Statistical Analysis

Data were entered in Microsoft Excel first then transferred to SPSS software version 23. Descriptive statistics using frequency to calculate count and

percentage were computed, chi-square test used to compute associations among variables, and Spearman's rho is also used to calculate the correlation among risk factor questions and demographic characteristics, p-value of <0.05 was considered as statistical significant.

RESULTS

The study comprised 924 participants, females were the majority 639 (69.2%), age groups range between 18-25 years, (338, 36.6%) and 31-40 years (252 27.3%), more than 70% were married (662, 71.64%) of those over 30% have 3 or more children.

Almost 50% of them live in cities and the other 50% live in villages, less than 50% their income is 5000 SR or less and about 25% their income lies between 10000 and 15000 SR. Most of the participants were holding bachelor degree 579 (62.7%) and about 30% were high school 260 (28.1%), teachers and government employees comprised 30% [167(18.1%) and 137,(14.8%)] respectively, only 29(3.1%) working in the medical field (table 1). According to the answers of participants the most frequent known risk factor of

otitis media were winter season (73.1 %), acute otitis is greater younger children (48.4%), (overcrowding) playing with other children (41.2%), and breast feeding while laying down (40.7%). The overall inadequate knowledge of all participants reported 85.39% (table 2). There were no statistical significant associated of demographic characteristics (age, job, number of children, and income) and knowledge and awareness of otitis media. But there is with educational level $p=0.006$.

There were also no statistical significant associated between stated risk factors and knowledge and awareness of otitis media.

Multiple responses

In analysis of the questions result showed that 11/12 questions were answered correctly by less than 50% of participants, and only 2/12 questions answered correctly by more than 50% of participants (Q7 winter season increases OM) and (Q9 young children are more at risk of OM) 73.1% of participants distribution of correct answer is listed in (figure 1).

Table 1: Association among demographic characteristics of 924 participants and their knowledge and awareness of OM risk factors, adequate who answered correctly 50% or more, inadequate who answered correctly less than 50% of the total 12 questions, bold value means statistically significance.

Knowledge and awareness of OM risk factors					
Participant's characteristics	N	(%)	Inadequate	Adequate	Chi-square test
			No 789	No 135	
			(%) 85.4	(%) 14.6	
<i>Gender</i>					
Male	285	30.8	241(85.6)	44(15.4)	0.351
Female	639	69.2	548(85.8)	91(14.2)	
<i>Age (Years)</i>					
18-25	338	36.6	285(84.3)	53(15.7)	0.559
26-30	157	17	132(84.1)	25(15.9)	
31-40	252	27.3	222(88.1)	30(11.9)	
40+	177	19.2	150(84.7)	27(15.3)	
<i>Marital status</i>					
Single	245	26.5	206(84.1)	39(15.9)	0.355
Married	662	71.6	566 (85.5)	96(14.5)	
Divorced	12	1.3	12 (100)	0(0)	
Widow	5	100	5(100)	0(0)	
<i>Number of children</i>					
0	326	35.3	275(84.4)	51(15.6)	0.674
1	121	13.1	103(85.1)	18(14.9)	
2	133	14.4	117(88.0)	16(12.0)	
3	114	12.3	101(88.6)	13(11.4)	
4	230	24.9	193(83.9)	37(16.1)	
<i>Income (in SR)</i>					
5000 or less	431	46.6	375(87.0)	56(13.0)	0.103
5001-10000	205	22.3	175(85.4)	30(14.6)	
10001-15000	183	19.8	156(85.2)	27(14.8)	
15001-20000	71	7.7	53(74.6)	18(25.4)	
20000+	34	3.7	30(88.2)	4(11.8)	
<i>Living place</i>					
City	464	50.2	397(85.6)	67(14.4)	0.478
Village	460	49.8	392(85.2)	68(14.8)	
<i>Educational level</i>					
Primary	15	1.6	13(86.7)	2(13.3)	0.006
Intermediate	32	3.5	26(81.2)	6(18.8)	
High school	260	28.1	204(78.5)	56(21.5)	
Bachelor	579	62.7	513(88.6)	66(11.4)	
Post graduate	15	1.6	14(93.3)	1(6.7)	
Other	22	2.4	18(81.8)	4(18.2)	
<i>Profession</i>					
Teacher	167	18.1	149(89.2)	18(10.8)	0.847
Employee	137	14.8	116(21)	21(15.3)	
Retired	12	1.3	11(91.7)	1(8.3)	
Business	72	7.8	61(84.7)	21(15.3)	
Medical field	29	3.1	27(93.1)	2(6.9)	
Student	52	5.6	44(84.6)	8(15.4)	
House keeper	18	1.9	16(88.9)	2(11.1)	
Other	489	52.9	1(100)	0 (0)	

Table 2: Frequency of correct answer of the 12 questions risk factors of otitis media presented to the 924 participants, percentage of known risk factors and, accumulation of correct answer

	Item	Number of cases answered correctly of the total 924	Percentage of common known risk factors according to participants	Accumulation % of correct answer of each question 100%
Q1	One of the contributing factors of acute otitis media in children (position of feeding)	376	40.70%	-10.4
Q2	When a child is infected with flu	319	34.50%	-8.8
Q3	One of the contributing factor of acute media in children (overcrowding)	131	14.20%	-3.6
Q4	One of the contributing factor of acute media in children (facial and mouth problem)	381	41.20%	-10.6
Q5	Child exposure to smoke can contribute to middle ear infection	241	26.10%	-6.7
Q6	Facial and mouth disorders such as cleft palates are contributing factors to middle ear infection	234	25.30%	-6.5
Q7	Winter season is one of the factors that increases the incidence of the middle ear infection in children	675	73.10%	-18.7
Q8	Female children are more likely to get otitis media than male children	106	11.50%	-2.9
Q9	The risk to have acute otitis is greater younger children	447	48.40%	-12.4
Q10	Ear cleaning is contributing in ear infection	170	18.40%	-4.7
Q11	Immunodeficiency in children, especially during teething lead to ear infection	249	26.90%	-6.9
Q12	Genetic factor has no role in recurrence of middle ear infection	278	30.10%	-7.7
				100.00%

Table 3: Spearman’s rho correlation, of demographic characteristics and questionnaire questions (bold statistical significant)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Risk factor questions												
Education level	.118	.589	.402	.026	.717	.343	.202	.575	.570	.028	.146	.987
Number of children	.337	.600	.131	.830	.788	.436	.107	.426	.044	.886	.529	.154
Marital status	.860	.425	.977	.013	.661	.298	.155	.622	.299	.513	.435	.989
Gender	.614	.387	.835	.904	.277	.130	.240	.320	.771	.790	.083	.898
Monthly income	.027	.085	.203	.494	.005	.155	.014	.015	.979	.238	.748	.948
Age	.158	.182	.750	.469	.131	.196	.564	.370	.769	.377	.112	.499
Job	.399	.225	.962	.351	.212	.459	.791	.461	.429	.259	.105	.986

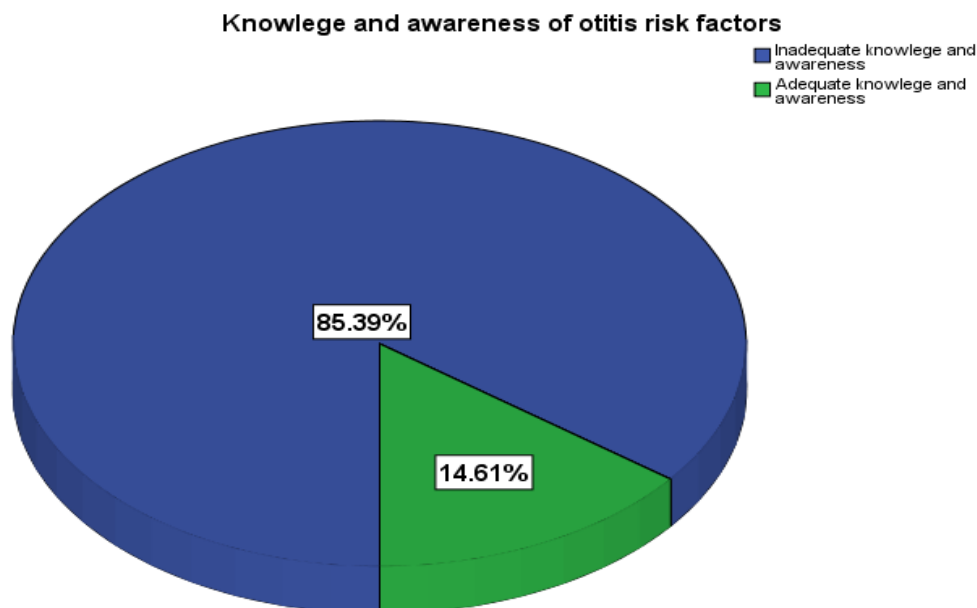


Figure 1: Participants level of knowledge and awareness of OM risk factors.

DISCUSSION

Number of otitis media risk factors were recognized in the previous studies, variation of most common risk factors of OM and awareness and knowledge is noticed, however, among those short or absence of breast feeding^{2, 9, 17}, respiratory tract infection¹², overcrowding children¹⁸, position of feeding, male gender, winter season and socioeconomic status⁸. Stating the most common risk factors will assist parents to reduce the adverse effect, and increase their knowledge and awareness, and also help to control the load of the disease in children¹⁹.

Young children especially infants of less than six months old are susceptible for having OM or even in their first year of age, male gender and sibling history are associated with prolong OM, absence of breast feeding also found to increase the risk of OM⁷, Rubin, et al found that, even though breast feeding decreased from 88% at 1 month to 20% at 12 months of age however no relationship between incidence of otitis in babies present or absence of breast feeding¹². Educational level of the participants showed association with awareness level regarding the risk factors.

Winter season and upper respiratory infection

Winter found to be one of the common risk factor⁸ in this study as it scores a high percentage (73.1%) this

could be explained by the fact that younger children lack of protective immunity and a shorter course of Eustachian tube, where this enable bacteria to attack middle ear which may necessitate the use of antibiotic to prevent OM, studies showed that almost 70% of OM are caused by bacterial infection, and accompanied by redness and bulging of the tympanic membrane, antibiotic use for short term still the appropriate management of OM¹⁵. The adjusted incidence for upper respiratory illnesses was 0.984¹².

Low socioeconomic

No differences found in the level of knowledge between participants who live in cities or rural area in our study inadequate villages 85.2% and cities 85.6%, however, in a study in Al Qassim, Saudi Arabia participants found was significant OM higher in rural school ($p < 0.001$, OR= 2.82, 95% CI: 1.86–4.28¹⁷, similar to what found in India where prevalence of upper class lower 4% and lower class 43%²⁰ Where that variation may be due to the access to proper health services¹⁹, that is different from place to other or even from cities to villages in the same country.

Passive smoker children at home increase the risk, in the current study 30% answered the question correctly, Lubianca Neto, et al, found similar result². Whereas Taino et al, reported that no evidence found that parents smoke increase the risk³, also family with parent

smoker showed no significant association found, this could be explained by the increase of parents awareness of the hazard caused by smoking¹⁷.

Overcrowding

Good ventilation especially in the day care found to be play an important role in reducing viral infection of the upper respiratory tract that may lead to Eustachian tube dysfunction and OM, poor hygiene promote vicious cycle that may include antibiotic resistant¹⁸, in the current study only 16.3% of all participants got correct answer which almost the same found in by **Alatabaniet al.** (16.1%)¹⁹.

Male gender

In the current study we could not found relationship between genders that is similar to other studies⁵, however, some other studies observed gender differences, culture differences may play role in the findings.

Limitation

The study was online survey; one to one interview with caregiver is advisable in order to obtain more reliable result.

CONCLUSION

Knowledge and awareness of OM risk factors are inadequate, extensive education and child health programs advised, family healthcare practitioner should encourage and train parents, health education is recommended.

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