ASSOCIATION BETWEEN PASSIVE SMOKING AND OTITIS MEDIA WITH EFFUSION IN CHILDREN ATTENDING EL-MINIA UNIVERSITY HOSPITAL

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ABSTRACT:

Background: Otitis media with effusion (OME) is one of the most frequently encountered morbid conditions of childhood. Recent reports have implicated passive smoking as a predisposing factor in the pathogenesis of OME. This study was conducted to assess the association between passive smoking and OME.

Methods: This cross sectional study was conducted on a cluster random sample of children attending El-Minia university hospital with OME in the period from 1st of June to 31st of August, 2011. They were 40 children. After full diagnosis by clinical examination and investigations, Indoor smoking behaviour of parents of the children and other household members in addition to housing conditions were asked for by a questionnaire.

Results: The study showed that exposure to passive smoking was a real risk factor of OME, as there was a statistically significant difference between exposed and non exposed patients with OME (P = 0.1) and relative risk of exposure to passive smoking was greater than 1. Results showed a statistically significant association between prenatal maternal exposure to smoking and occurrence of OME among their children (P = 0.0001). Multiple regression analysis showed that the most important factors affecting the occurrence of OME was smoking followed by crowding then antenatal exposure to smoking.

Conclusion: These results supported the need to avoid exposure to domestic tobacco smoke and over crowdness, health education about this relationship and the importance of screening programs for early detection of middle ear diseases in children for early management because of its dangerous complications.

KEYWORDS:

Otitis media with effusion, Passive Smoking, Children, El-Minia.

INTRODUCTION:

Otitis media with effusion (OME) is defined as the presence of fluid in the middle ear without signs or symptoms of acute ear infection, OME is considered distinct from acute otitis media (AOM), which is defined as a history of acute onset of signs and symptoms, the presence of middle-ear effusion, and signs and symptoms of middle-ear inflammation[1].

The inhalation of tobacco smoke by nonsmokers has been variably referred to as "passive smoking" or "involuntary smoking". Smokers, of course, also inhale secondhand smoke. The smoke inhaled by nonsmokers that

contaminates indoor spaces and outdoor environments has often been referred to as "secondhand smoke" or "environmental tobacco smoke"[2].

In 2006, US Surgeon General reviewed available literature on the relationship between parental smoking and otitis media in children and concluded that there was sufficient evidence that there a relationship between parental smoking and middle ear disease in children, including acute and recurrent otitis media and middle ear effusion. Children exposed to environmental tobacco smoke (ETS) have more ear infections than those not exposed. Tobacco smoke disrupts the normal clearing mechanism of the ear canal, facilitating infectious organism entry into the body. The resulting middle ear infection can be very painful, as pressure and fluid build up in the ear. Continued exposure to tobacco smoke may result in persistent middle ear infections and eventually, hearing loss[3].

Egypt is one of high rate countries of cigarette consumption and there is no sufficient research about the association of smoking and OME.

This study was conducted to assess the association between passive smoking and OME in children and to detect possible risk factors of OME.

SUBJECTS AND METHODS :

This cross-sectional hospital based study was conducted on a cluster random sample of patients having OME in the age group from 1–11 years attending ENT outpatient clinic in El-Minia university hospital in the period from 1st of June to 31st of August, 2011. They were 40 patients. Parents or guardians were asked for verbal consent to be inter-viewed and to examine their children. A standard questionnaire was administered to them after full diagnosis of OME by clinical examination and investigations to estimate the extent of children exposure to passive smoking, or presence of other suspected risk factors as allergy, atopy and social level using social scoring (Sadek, 1989).

STATISTICAL ANALYSIS:

The statistical program SPSS for windows version 11 had been used in data analysis. The lowest accepted level of signifycance was 0.05 or less.

RESULTS:

Regarding sociodemographic variables of patients, as shown in table (1). This table showed that mean age of patients was 4.3±2.9 years and 65.0% of them were males. The average crowding index was 2.2±1.3. 57.5% of patients belonged to social Class I and 7.5 % of patients had wood stoves at home.

Table (2) showed that patients with OME who were exposed to passive smoking were 25(62.5%) and non exposed were 15(37.5%), and the difference was statistically significant.

Regarding the relation between smoking habits and OME among the studied children, as shown in (table 3), it was found that 88.0% patients exposed to passive smoking had bilateral OME while 12.0% had unilateral

OME. In the group of patients not exposed to passive smoking: 60.0% had bilateral while 40.0% had unilateral OME and the difference was statistically signify-cant. The mean number of smoked cigarettes was 29.4±15.5 for pati-ents with unilateral OME while the mean number was 40±17.8 in the group of patients with bilateral OME. The smoking index was found to be 120±102.7 in those patients suffering from unilateral OME while it was 151.1±146.8 in patients suffering from bilateral OME. These differences weren't statistically significant. 16.2% of patients who had a positive ante-natal maternal exposure to smoking, had unilateral OME, and 83.8% had bilateral OME and that difference was statistically significant.

Table (4) showed that exp-osure to passive smoking was a real risk for OME (R.R. was grea-ter than 1).

As shown in table (5) the most important factors affecting the occur-ence of OME was smoking followed by crowding then antenatal exposure to smoking. The studied factors were responsible for 44% of variability in occurrence of OME.

Table (1): Distribution of patients with otitis media with effusion according to their socio-demographic data, El-Minia university hospital.

Sociodemographic variables	**OME** Total No. = 40
Age (mean ± SD)	4.3 ± 2.9
Sex: (No.)	
Male	26 (65.0 %)
Female	14 (35.0%)
Crowding index (mean ± SD)	2.2 ± 1.3
Social class (No.)	
Class I	23 (57.5%)
Class II	17 (42.5%)
Presence of wood stoves (No.)	
NO	37 (92.5%)
YES	3 (7.5%)

Table (2): The relation between exposure to smoking and otitis media with effusion among the studied children, El-Minia university hospital

Variable	**Non exposed to passive smoking**	**Exposed to passive smoking**	**p-value**
OME	15(37.5%)	25 (62.5%)	0.01*

*statistically significant.

Table (3): The relation between smoking habits and otitis media with effusion among the studied children, El-Minia university hospital

Variables	Unilateral OME	Bilateral OME	P-value
Smoking of household members:			
yes (25)	3(12.0%)	22(88.0%)	0.0006*
no (15)	6(40.0%)	9(60.0%)	
Average number of smoked cigarettes	29.4±15.5	40±17.8	0.2
Smoking index	120±102.7	151.1±146.8	0.4
Antenatal maternal exposure to smoking:			
Non exposed (9)	4(44.4%)	5(55.6%)	0.0001*
Exposed (31)	5(16.2%)	26(83.8%)	

*statistically significant.

N.B.: Smoking index = No. of smoked cigarettes/ day × duration of smoking in years

Table (4): The relative risk of exposure to passive smoking on otitis media with effusion among the studied children, El-Minia university hospital

Exposure to passive smoking	OME
Exposed	25 (62.5%)
Not exposed	15 (37.5%)
Total	40 (100%)

N.B.: Relative risk (R.R) = incidence of disease in the exposed group/ incidence in non exposed group

R.R. = 62.5/37.5

= 1.7

Table (5): Multiple regression analysis of risk factors affecting the otitis media with effusion among the studied children, El-Minia university hospital

Variables	T	B	p
Passive smoking	1.6	4.8	0.08*
Crowding index	0.42	1.5	0.2
Antenatal maternal exposure to smoking	0.33	1.2	0.9
Allergy	0.01	1.01	0.4
Social class	0.30	0.7	0.7
Wood stoves	1.8	0.1	0.1

R^2 =44% * statistically significant

DISCUSSION:

Investigating the possible association between passive smoking and OME in children would help in the early management of middle ear diseases and would reduce hearing loss. This study was conducted on 40 children in the age group 1-11 years.

Males were found to be more affected by OME than females and that was consistent with results of many previous studies[4,5]. Also the same results were consistent with that concluded by Peter et al in 2008 who found that males were more affected than females in prevalence of OME[6]. Regarding socioeconomic status, the current study confirmed the results of previous studies that found OME to be more prevalent in lower socioeconomic families[4].

Results were also consistent with Richardson et al in 1976 who found that the prevalence of OME was highest where social conditions were poor, and children of non-manual workers had significantly better hearing than did those of manual workers[7]. Results of this study were also parallel to the results of Pittsburgh study which documented the effects of secondhand smoke exposure during the first year of life which remained significant after adjustment for factors as area of residence, gender, socio-economic status (SES), family size, day care, and infant feeding on OME[5].

In 2006, an american study was done and concluded that the prevalence of ETS exposure in the United States was still high, and its role in causing infections as OM in children is no longer in doubt even if still poorly understood[8]. In 2007 another study also came parallel to the results and documented relation between OME and prenatal exposure to smoking, in which mothers were asked to fulfill a questionnaire about prenatal smoking exposure[9]. Also, these results were consistent with a study done in the 2008 in which 82 Aboriginal and 157 non-Aboriginal children attended for routine clinical examinations. OM was diagnosed at least once in 74% of Aboriginal children and 45% of non-Aboriginal children; 64% of Aboriginal children and 40% of non-Aboriginal children were exposed to ETS. Exposure to ETS increased the risk of specialist-diagnosed OM in Aboriginal children[6].

These results were also consistent with other studies indicating that maternal smoking was associated with an increased risk of acute otitis media in early childhood[10].

In contrary to these results, a cross-sectional study with 192 children of up to 3 years of age, were unable to show greater prevalence of non-recurrent AOM, in children exposed to passive smoking[11]. Also, In 1999, Daly et al., were unable to demonstrate association between the early onset of OM and the rate of cotinine-creatinine in urine[12]. In the same year, in Netherlands, parental smoking was not a risk factor for early OME, but a more appropriate measure for such a common outcome may be the duration of the effusion[13]. In 2002, Lieu and Feinstein, through a cross-sectional population study assessing 11, 728 children under the age of 12 years, showed that the occurrence of no otologic infection was increased by exposure to passive smoking, with adjusted prevalence ratio of 1.01. This result confirms that of other studies that also did not demonstrate any increased risk for OME. However, it is

parallel to our study as it showed this risk was slightly increased by gestational exposure[14].

This study agreed with Kraemer et al., who confirmed the association between (atopy and allergy) and OME in a case-control study of 76 cases submitted to tympanostomy for ventilation tube placement and 76 controls paired by age, sex and season of the year on admission to have general pediatric surgery performed. But our study differs in only 35% of patients had atopy and allergy history, but in (Kraemer et al) study which found that children had middle ear effusion presented with approximately four times more complaints of atopic symptoms, and also differs in that it concentrated all the effort to confirm the allergic factor as a risk for OME[4].

Limitations of the study:

- This cross sectional study allowed studying the association but not causality.
- The studied risk factors explained variability in 44% of cases so further researches were required to identify other factors.

CONCLUSION:

This study showed a significant association between exposure to passive smoking and OME. The results supported the need to avoid exposure to domestic tobacco smoke and over crowdness. Health education about this relationship is of high importance to guard against children ear diseases. Screening programs for early detection of middle ear diseases in children for early management because of its dangerous complications .

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العلاقة بين التدخين السلبي و التهاب الأذن الوسطى مع الارتشاح في الأطفال المترددين على مستشفى المنيا الجامعي

الملخص العربي

المقدمة:

يعتبر التهاب الأذن الوسطي مع الارتشاح من أكثر الأمراض انتشارا في الأطفال ويتسم بوجود تجمع سائل بالأذن الوسطي دون وجود علامات الالتهاب الحاد وقد يؤدي إلى ضعف جزئي بالسمع التوصيلي وتأخر مستوى المهارات اللغوية، والسمعية والتواصل للأطفال.

هناك دراسات عديدة اهتمت بإيضاح العلاقة بين التدخين والتهاب الأذن الوسطي بأنواعه.ويقوم هذا البحث علي دراسة العلاقة بين التدخين السلبي والتهاب الأذن الوسطي المصحوب بالارتشاح.

طرق البحث:

هذه دراسة مقطعية في الأطفال المترددين علي عيادة الأنف والأذن بمستشفي المنيا الجامعي في الفترة بين 1 يونيو إلى 31 أغسطس عن طريق توجيه أسئلة لآباء الأطفال المصابين بالتهاب الأذن الوسطي المصحوب بالارتشاح للوقوف علي العوامل المساعدة لزيادة حدوث مثل هذا الالتهاب وتجنب حدوثها.

النتائج:

تظهر الدراسة دليلا واضحا أن التعرض للتدخين السلبي يشكل خطرا على التهاب الأذن الوسطي المصحوب بالارتشاح وان تعرض الأم للتدخين أثناء فترة الحمل يعتبر احد العوامل المساعدة لحدوث المرض في فترة ما بعد الولادة .

الخلاصة:

هذه النتائج تساند ضرورة منع التعرض لدخان السجائر والازدحام والتثقيف الصحي ن هذه العلاقة وأهمية برامج الفحص للاكتشاف المبكر لأمراض الأذن الوسطى في الأطفال لعلاجهم مبكرا قبل المضاعفات الخطيرة.

الكلمات الدالة: التهاب الأذن الوسطى, التدخين السلبى, الأطفال, المنيا