BALKAN ORL-HNS

Otitis Media with Effusion and Factors Associated with it Among Children 4-7 Years Old in Albania

ORIGINAL ARTICLE
BALKAN ORL-HNS 2024;1(1):12-18

ABSTRACT

Background: Otitis media with effusion (OME) is a common health condition among young children. Within a multicenter study involving 16 countries from Balkan to Caspian basin, we assessed the prevalence of this condition and factors associated with it among preschool and primary school-age children in Albania.

Methods: A cross-sectional study was carried out in a representative sample of 529 children aged 4-7 years selected randomly in Tirana, the capital of Albania, during April-May 2019. A structured questionnaire was delivered to parents of selected children, comprising various sociodemographic and other exposures. Presence of OME was based on otoscopy and tympanometry at 226 Hz. Binary logistic regression was used to assess the factors associated with OME.

Results: The overall prevalence of OME in this sample of children (55% males) was 23.1%. After controlling for confounding effects of child age and gender, the major factors significantly associated with the presence of OME were: history of allergy (OR=29), signs of allergy (OR=21), diagnosis of asthma (OR=28), previous upper respiratory and/or ear infections (OR=14 for 1-2 infections and OR=65 for ≥3 infections). Other significant risk factors included diagnosis of cleft palate (OR=6), mother's higher education (OR=2.0), maternal actual smoking status (OR=3.6), household smoking (OR=4.0), living in overcrowded family (OR=2.6).

Conclusion: The prevalence of OME in this sample of children was rather high, probably due to conducting the survey in spring time. The potential consequences of late diagnosed and/or untreated OME warrant hearing evaluation of affected young children.

Keywords: Albania, epidemiology, otitis media with effusion, prevalence, risk factor

Introduction

According to the American Academy of Pediatrics, otitis media with effusion (OME) is defined as the presence of fluid in the middle ear without signs or symptoms of acute ear infection[1]; when lasting for more than 3 months it is referred as chronic OME[2]. The fluid in OME could be serous or mucoid and usually it is not inflammatory, conversely to ear infection, and usually there is little or no pain associated with it.[2,3]

OME is one of the most common health condition during childhood. Earlier reports suggest that about 90% of children are affected by this condition before school age, most commonly between ages 6 months and 4 years.[1,3] By age 10, about 80% of all children have had at least one episode of OME.[2] The prevalence of OME peaks at age 2 years and 5 years, corresponding to initiation of kindergarten and primary school, respectively,[2] and then it decreases beyond age 5 or 6.[4,5] The prevalence of chronic OME among children varies between 5% to 30%.[6]

The main clinical feature of OME in children includes unilateral or bilateral hearing impairment, dependent on whether one or both ears are affected; this is due to conductive hearing

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Received: April 3, 2023
Revision requested: April 18, 2023
Last revision received: April 19, 2023
Accepted: April 21, 2023
Publication Date: January 31, 2024

Cite this article as: Sallavaci S, Toci E, Stroni G. Otitis media with effusion and factors associated with it among children 4-7 years old in Albania. *Balkan ORL-HNS* 2024;1(1):12-18.

DOI: 10.5152/bohns.2024.23009

loss caused by the fluid collection in the middle ear.[2,7] Otitis media is the most common cause of hearing loss among young children.[8]

OME is considered as a continuum of related processes, involving acute otitis media, mucoid effusion, serous effusion and chronic otitis media. The pathogenesis of OME involves the disruption/obstructi on/dysfunction of the Eustachian tube, leading to negative middle ear pressure, serous middle ear transudate that can evolve to OME or acute otitis media if infection occurs.[6]

On the other hand, OME could be a consequence of upper respiratory tract infection or acute otitis media.[4,9] Besides young age and infection, other factors that could increase the risk of OME include bottle feeding or feeding while supine; daycare attendance; longer stay in daycare; allergy; lower socioeconomic status; exposure to second hand smoking, for example, living with people that smoke at home; having brothers or sisters with OME or parental history of OME; early onset of otitis media; male gender; disruption of the Eustachian tube (such as in cleft palate, etc.) and any factor that could affect its functioning such as nasal obstruction, snoring, frequent colds, etc.; probably childhood overweight and obesity, etc.[6,10]

In addition, OME reveals a seasonal pattern with most cases occurring in winter or early spring.[2,6,9]

The prevalence of otitis media is higher in developing than in developed countries.[11] In Albania, a developing country in South-East Europe, the information about prevalence of OME is largely scarce or outdated. In this context, and given that early detection and proper treatment of OME are of particular importance, the aim of this study was to evaluate the prevalence of OME and the factors associated with it in a representative sample of children aged 4–7 years in Tirana, Albania.

Material and Methods

Type of Study

This was a cross-sectional survey carried out in the city of Tirana, the capital of Albania.

The actual study is part of a larger multicenter study involving 16 different countries and 18 survey sites from Balkans to Caspian basin, undertaken in 2019 and aiming to highlight the potential etiologic factors of OME in children aged 4-7 years and its association and variation with geographic altitude and latitude. The initially participating countries were: Albania, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Greece, Iraq, Kyrgyzstan, Kosovo, Montenegro, Northern Macedonia, Romania, Serbia, Tajikistan, Türkiye, Ukraine and Uzbekistan. However, finally only 10 countries did manage to collect the required data,[12] with Albania being among them. This paper highlights Albania specific findings in the context this larger multicenter study.

MAIN POINTS

- *Otitis media with effusion is a rather common condition among preschool and primary school-age children in Albania.*
- *The major factors significantly associated with the presence of OME were a history of allergy, signs of allergy, diagnosis of asthma, and previous upper respiratory and/or ear infections.*
- *The potential consequences of late diagnosed and/or untreated OME warrant hearing evaluation of affected young children.*

Study Population and Sampling

The target population comprised children aged 4-7 years attending kindergarten or pre-school education system (age 4-6 years old) and first grade of elementary school (age 6-7 years old). In Albania the parents can choose to first send their child in school system at age 6 or 7 and therefore there is some overlapping of children attending 1st grade, in terms of their age.

The sampling strategy has been standardized and carried out by the multicenter study international experts' team and was based on robust statistical sampling parameters, aiming to generate a representative sample of children aged 4-7 years and representing various levels of education system (kindergarten or preschool and first grade of elementary school) as well as different strata of socioeconomic status in every survey site.

For Albania, the expert team used these parameters: total population of the country: about 3 million, total population of Tirana: about 700,000, total population aged 4-7 years in the country: about 107,143, total population aged 4-7 years in Tirana: about 25,000. Assuming an OME prevalence rate of 10%, the required sample size for Tirana was 500 children, selected randomly and applying a ±2.5 margin of error and design effect 1 in EpiInfo statistical software, version 7.2.2.6 (source paper submitted).

In order to maximize the power of the study we interviewed 529 children of this age, thus meeting the requirements of the sample size estimation. This is our final study population.

Data Collection

In Tirana the data collection process took place in spring time, between April 1st and May 15th, 2019.

The data collection process involved examination of selected children and interviewing the respective parents through a standard questionnaire. Examinations of participating children involved otoscopy, tympanometry (at 226 Hz) and stapedial reflexes. Otoscopy examination allowed assessing the state of tympanic membrane as well as the presence of any effusion or other conditions that could hamper the realization of tympanometry. The presence of OME was based on the classification originally developed by Liden[13] and Jerger.[14]

Basic socio-demographic data and detailed information about factors potentially associated with OME were collected through face-to-face interviews (with parents of participating children) using a structured questionnaire. The potential etiologic factors addressed in the questionnaire included: mother's education level and occupation, father's education level and occupation, smoking at home and parental smoking status, number of family members living at home, presence of pets at home, home heating type, history of allergy, frequency of respiratory infections during last year, presence of cleft palate, etc.

The study was approved by the Committee of Ethics of Albania.

Statistical Analysis

Based on Liden[13] and Jerger[14] classification, the results of tympanogram were classified as type A (normal), type Ad (highly compliant middle ear), type As (shallow peak or less compliant middle ear), type B (suggesting middle ear effusion) and Type C (Eustachian tube dysfunction). Type B and type C tympanograms were considered as suggestive for the presence of OME. Presence of OME was our main dependent variable.

The prevalence rate of OME in this representative sample of children was calculated and 95% Confidence Intervals for the prevalence rate were also reported in order to obtain a more accurate estimation about the range values of OME prevalence in the target population (children aged 4-7 years).

Absolute numbers and respective percentages were reported. For continuous variables, mean value and standard deviation was calculated. As the sample was representative of target population of children aged 4-7 years, 95% confidence intervals were calculated and reported for the prevalence of OME and other categorical variables included in the study. Binary Logistic Regression was used to calculate the likelihood (odds ratio, OR) of presence of OME by selected independent variables, through univariate and multivariable adjusted procedures. First, crude, unadjusted ORs were calculated and reported (Model 1 in Binary Logistic Regression analysis) and in Model 2 we took into account the confounding effects of child age and gender (age-and-gender adjusted ORs). An association was considered statistically significant if P value was <0.05. The statistical analysis has been carried out by using the Statistical Package for Social Sciences (SPSS) statistical software, version 17.

Results

The characteristics of participating children and information about prevalence of OME in this sample are provided in Table 1. More than half (55%) of participating children were males, and over three-quarters (76.7%) were frequenting public education institutions at the time of the survey. The prevalence of lifetime smoking among children's mothers and fathers was 15.5% and 40.3%, respectively and the prevalence of home smoking was 6.2%. About 80% of families had 4-5 members, about 1.1% of families used natural gas or a combined electric-natural gas system for heating and about one in four (25.7%) participating children had pets at home. History of allergy, signs of allergy and diagnosed asthma was present in 16.7%, 21% and 3.1% of children, respectively. More than one-quarter (25.9%) of children had experienced at least one infection of upper respiratory tract and/or ear in the last year and 1.6% were diagnosed with cleft palate (Table 1).

The total prevalence of OME in this sample of children was 23.1%, being significantly higher among children aged 5-6 years, children with lower educated mothers and fathers, children of actual smoking parents and living with parents who smoke at home, children with history and signs of allergy, diagnosed asthma and those with at least one episode of upper tract and/or ear infections during last year and cleft palate children (Table 1).

The associations of OME with independent variables included in the study are presented in Table 2. After controlling for child age and gender (Model 2 in Table 2), the factors most strongly associated with significantly higher odds of OME were: 1-2 or more infections of upper respiratory ways or ear in the last year (OR=13.60 and 64.58, respectively); history of allergy (OR=28.60), diagnosis of asthma (OR=27.57) and experiencing signs of allergy (OR=21.18). Other factors that significantly increased the likelihood of OME included: cleft palate (OR=5.98), living in homes where members smoke (OR=4.04), mother actually smoking (OR=3.60), living in large families with more than 5 members (OR=2.64), lower father's education (OR=2.20) and lower mother's education (OR=2.01) [Table 2].

Discussion

This is the first study scientifically addressing the prevalence of otitis media with effusion in a representative sample of preschool and school children aged 4-7 years and the factors associated with it in Albania. Our findings provide interesting and novel insights on this under researched topic in this South-East European country. Among Albanian children aged 4-7 years, the overall prevalence of OME was 23.1%. Significant risk factors for the presence of OME included: history and signs of allergy, diagnosed asthma and cleft palate, one or more upper respiratory or ear infection in the last year, lower mother's education, having actually smoking mother, living in homes were members smoke and living in families with five or more members.

The results of this study are in general in concordance with previous research but there are differences as well. The prevalence of 23.1% is higher than previous research in Albania that has also included OME. For example, an earlier survey aiming to assess the prevalence of hearing impairment and the factors associated with it among 400 preschool children aged 4-6 years in Albania during November 2009-May 2011 reported that the prevalence of OME was 14.6%.[15] This discrepancy might be explained by the fact that the actual survey was conducted in spring time, a period often associated with increased rates of otitis media with effusion.[9] A study among 3271 children aged 2-8 years in China reported that the overall prevalence of OME was 4.3%,[16] much lower compared to our results. In this study, the prevalence of OME varied by age and peaked among children aged 2-3 years (14.0%) and 3-4 years (8.2%) and then decreased until age 7-8 years,[15] thus not replicating the bimodal pattern of OME in young children highlighted in other research.[4,5] In our study, even though the association with age and gender did not reach the statistical significance, the clinical significance suggested that ages 5 and 6 years show a higher likelihood of OME compared to children aged 4 years and by age 7 the odds of OME decrease considerably (Model 2, Table 2), being in concordance with previous research suggesting a bimodal pattern of OME prevalence in young children, with peak figures occurring at age 2 and 5.[2,16,17] The prevalence of OME among 1165 primary school-age children was 12.2%,[18] it was 7.5% among 1488 children aged 6-12 years in another study,[19] with the annual prevalence of OME in developed countries varying between 14%-62% and 2%-62%.[18] It is clear OME prevalence varies greatly by survey site, age of children surveyed, method of examination and other methodological factors.[20]

In our study there was no statistically significant gender difference in the prevalence of OME, but OME prevalence was higher among boys than girls, a finding similar to previous reports.[16]

We found that mother's lower education level was a significant risk factor for OME in children even after controlling for confounding effects of child age and gender. Similar findings were reported by another survey among 1488 children aged 6-12 years.[19] The significantly lower risk of OME among children of highly educated women could be explained by the effects of higher education in the increasing rate of primary care,[21] specialist care,[22] and preventive care[23] use, the negative association with hospitalization rates,[24] the strong positive association between education and income,[25] etc. In other words, highly educated mothers could experience a healthier lifestyle and better living conditions and might take better care of themselves

Table 1. Characteristics of participating children and prevalence of OME by independent variables

Variable	n (%)	95% CI for proportion	Prevalence of OME	P-value
Total	***529 (100.0)***	**-**	***23.1%***	**-**
Age				
4 years	79 (14.9)	12.0-18.3	21.1%	**0.016**
5 years	183 (34.6)	30.5-38.8	27.2%	
6 years	187 (35.3)	31.3-39.6	25.7%	
7 years	80 (15.1)	11.4-19.5	10.0%	
Gender				
Female	238 (45.0)	40.7-49.3	21.1%	0.349
Male	291 (55.0)	50.7-59.3	24.8%	
Educational institution type				
Private	123 (23.3)	19.7-27.1	22.1%	0.807
Public	406 (76.7)	72.9-80.3	23.4%	
Mother's education				
High school or less	208 (39.3)	35.1-43.6	31.7%	**<0.001**
University	321 (60.7)	56.4-64.9	17.5%	
Father's education				
High school or less	196 (37.1)	32.9-41.3	33.2%	**<0.001**
University	333 (62.9)	58.7-67.1	17.1%	
Smoking status of mother				
Never	447 (84.5)	81.1-87.5	23.8%	**<0.001**
Previous smoker	64 (12.1)	9.8-15.6	9.4%	
Actual smoker	18 (3.4)	2.0-5.3	55.6%	
Smoking status of father*				
Never	314 (59.7)	55.4-63.9	21.9%	**0.022**
Previous smoker	99 (18.8)	15.6-22.4	17.2%	
Actual smoker	113 (21.5)	18.1-25.2	32.4%	
Smoking at home				
No	496 (93.8)	91.4-95.7	21.2%	**<0.001**
Yes	33 (6.2)	4.3-8.7	51.5%	
Family size				
1-3 members	75 (14.2)	11.3-17.4	18.7%	0.229
4-5 members	418 (79.0)	75.3-82.4	23.1%	
>5 members	36 (6.8)	4.8-9.3	33.3%	
Home heating type				
Air-conditioning, central heating, electric	523 (98.9)	97.6-99.6	22.8%	0.117
Gas-fuel soba	6 (1.1)	0.4-2.5	50.0%	
Pets in the house *				
No	391 (74.3)	70.4-78.0	23.6%	0.813
Yes	135 (25.7)	22.0-29.6	22.2%	
History of allergy				
No	435 (83.3)	79.9-86.4	12.6%	**<0.001**
Yes	87 (16.7)	13.6-20.2	77.0%	
Signs of allergy				
No	418 (79.0)	75.3-82.4	11.2%	**<0.001**
Yes	111 (21.0)	17.6-24.7	67.6%	
Diagnosis of asthma *				
No	507 (96.9)	95.1-98.2	21.4%	**<0.001**
Yes	16 (3.1)	1.8-4.9	87.5%	
Upper respiratory or ear infections during last year				
No	392 (74.1)	71.2-77.8	8.8%	**<0.001**
1-2 infections	92 (17.4)	14.3-20.9	54.4%	
≥3 infections	45 (8.5)	6.3-11.2	84.4%	

(*Continued*)

Table 1. Characteristics of participating children and prevalence of OME by independent variables (*Continued*)

Variable	n (%)	95% CI for proportion	Prevalence of OME	P-value
Diagnosis of cleft palate *				
No	499 (98.4)	96.9-99.3	22.%	**0.018**
Yes	8 (1.6)	0.7-3.1	62.5%	
Presence of OME (one or both ears) *				
No	402 (76.9)	73.0-80.4	-	-
Yes	121 (23.1)	19.6-27.0	-	

* Discrepancies with the total number of subjects are due to missing information.
† P-value according to chi square test (or Fischer's exact test for 2x2 comparisons).

Table 2. Association of OME with characteristics of participating children – Odds Ratios from Binary Logistic Regression

	Model 1		Model 2	
Variable	**B (SE)**	**OR (95% CI)**	**B (SE)**	**OR (95% CI)**
Age				
4 years	-	1.00 (reference)	-	1.00 (reference)
5 years	0.34 (0.33)^{NS}	1.40 (0.74-2.67)	0.35 (0.33)^{NS}	1.42 (0.75-2.70)
6 years	0.26 (0.33)^{NS}	1.29 (0.68-2.46)	0.27 (0.33)^{NS}	1.31 (0.69-2.49)
7 years	-0.87 (0.47)^{NS}	0.42 (0.17-1.04)	-0.88 (0.47)^{NS}	0.42 (0.17-1.04)
Gender				
Female	-	1.00 (reference)	-	1.00 (reference)
Male	0.21 (0.21)^{NS}	1.24 (0.82-1.86)	0.24 (0.21)^{NS}	1.27 (0.84-1.92)
Educational institution type				
Private	-	1.00 (reference)	-	1.00 (reference)
Public	0.07 (0.25)^{NS}	1.08 (0.66-1.75)	-0.01 (0.25)^{NS}	1.00 (0.61-1.65)
Mother's education				
University	-	1.00 (reference)	-	1.00 (reference)
High school or less	0.79 (0.21)***	2.20 (1.46-3.32)	0.70 (0.22)**	2.01 (1.32-3.07)
Father's education				
University	-	1.00 (reference)	-	1.00 (reference)
High school or less	0.88 (0.21)***	2.40 (1.59-3.63)	0.79 (0.22)**	2.20 (1.45-3.37)
Smoking status of mother				
Never	-	1.00 (reference)	-	1.00 (reference)
Previous smoker	-1.11 (0.44)*	0.33 (0.14-0.78)	-1.20 (0.45)**	0.30 (0.13-0.72)
Actual smoker	1.39 (0.49)**	4.00 (1.54-10.39)	1.28 (0.49)**	3.60 (1.37-9.48)
Smoking status of father				
Never	-	1.00 (reference)	-	1.00 (reference)
Previous smoker	-0.30 (0.30)^{NS}	0.74 (0.41-1.33)	-0.34 (0.30)^{NS}	0.71 (0.39-1.29)
Actual smoker	0.54 (0.25)*	1.71 (1.06-2.76)	0.43 (0.25)^{NS}	1.54 (0.94-2.52)
Smoking at home				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	1.37 (0.37)***	3.94 (1.93-8.07)	1.40 (0.38)***	4.04 (1.94-8.43)
Family size				
1-3 members	-	1.00 (reference)	-	1.00 (reference)
4-5 members	0.27 (0.32)^{NS}	1.31 (0.70-2.43)	0.39 (0.32)^{NS}	1.48 (0.79-2.78)
>5 members	0.78 (0.46)^{NS}	2.18 (0.88-5.38)	0.97 (0.47)*	2.64 (1.05-6.67)
Home heating type				
Air-conditioning, central heating, electric	-	1.00 (reference)	-	1.00 (reference)
Gas-fuel soba	1.22 (0.82)^{NS}	3.38 (0.67-16.9)	0.92 (0.84)^{NS}	2.52 (0.49-13.07)
Pets in the house				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	-0.08 (0.24)^{NS}	0.92 (0.58-1.48)	-0.29 (0.25)^{NS}	0.75 (0.46-1.22)
History of allergy				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	3.15 (0.29)***	23.3 (13.1-41.3)	3.35 (0.32)***	28.60 (15.2-53.7)

(*Continued*)

Table 2. Association of OME with characteristics of participating children – Odds Ratios from Binary Logistic Regression (*Continued*)

	Model 1		Model 2	
Variable	**B (SE)**	**OR (95% CI)**	**B (SE)**	**OR (95% CI)**
Signs of allergy				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	2.81 (0.26)***	16.58 (10.0-27.4)	3.05 (0.28)***	21.18 (12.1-36.8)
Diagnosis of asthma				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	3.25 (0.76)***	25.78 (5.77-115)	3.32 (0.78)***	27.57 (5.95-127)
Upper respiratory or ear infections during last year				
No	-	1.00 (reference)	-	1.00 (reference)
1-2 infections	2.52 (0.28)***	12.44 (7.2-21.4)	2.60 (0.29)***	13.60 (7.6-24.2)
≥3 infections	4.03 (0.45)***	56.5 (23.5-136.2)	4.17 (0.47)***	64.58 (25.8-161.8)
Diagnosis of cleft palate				
No	-	1.00 (reference)	-	1.00 (reference)
Yes	1.76 (0.74)*	5.80 (1.37-24.67)	1.79 (0.76)*	5.98 (1.36-26.39)

Note: OR of presence of OME vs. healthy ears.
Model 1: Unadjusted (crude) ORs from binary logistic regression.
Model 2: ORs adjusted (controlled) for child age and gender.
* P<0.05, ** P<0.01, ***P<0.001.
NS: not significant

and their children thus reducing the risk of various disadvantageous health conditions for themselves and their babies, including OME.

We found that parental household smoking and maternal smoking were significantly associated with increased likelihood of OME in young children, a finding that replicates previous international reports.[26] Interestingly, maternal smoking increased the likelihood of OME by 3.93 folds among children aged 3-7 years in a previous study,[26] a finding very similar to our corresponding figure (OR=3.6). A literature review reported that parental smoking was associated with a significantly increased risk of OME among children as well.[27] Exposure to environmental smoke appears to significantly increase the risk of Eustachian tube disorders (ETD) among children and adolescents[27,28] subsequently increasing the risk of OME in these subjects.[29]

Living in overcrowded families (>5 members) was also a significant risk factor for OME in our study, a finding supported by literature.[30] Living in overcrowded families increases the risk of infection spreading through close contacts of family members, leading to increased risk of acute otitis media and OME could be a sequence of such infections in young children.[4]

The strong association between allergy (including asthma) and otitis media with effusion, clearly highlighted in our study, is well documented in the international literature.[31-33] The physiopathology of OME includes prolonged inflammation, biofilms (different types of microorganisms growing in different surfaces) that accompanying chronic infections, mechanical obstruction of the nasopharynx such as cleft palate, genetic factors and allergy.[31] With regard to allergy there is still not detected a causal relationship with OME[31] but it is believed that allergy plays a role in the development of OME probably due to disruption of natural defense mechanisms and innate immunity by allergy, leading to increased vulnerability to upper respiratory tract and middle ear infections and ultimately to an increased risk of developing OME.[32]

In our study we found that upper respiratory infections and ear infections are significant major risk factors for OME, further supporting related international reports on the matter.[4,34]

In Albanian children aged 4-6 years otitis media was a significant risk factors of hearing impairment in.[15] The association of OME with hearing impairment has been highlighted in a recent literature review, which concluded that OME was associated with conductive hearing loss (all reviewed studies) and mixed (conductive and sensorineural) hearing loss (only three studies); mixed hearing loss was probably caused by a temporary reducing of vibratory movement of the oval and/or round window membrane due to middle ear fluids or alteration of ionic composition of the later causing a temporal dysfunction of the cochlea.[20] The hearing loss associated with OME was in the range of 18-35 dB, corresponding to mild-moderate hearing loss.[20] Another survey among children aged 3-15 years with hearing loss reported that OME was the most common cause of hearing loss.[35]

Otitis media with effusion typically has a favorable prognosis: more than half of cases resolve within three months and about 95% resolve within one year.[4] However, when untreated, OME can have serious consequences. These include: permanent high-frequency sensorineural hearing loss due to inner ear damage,[6] speech and language developmental delay and poor school performance.[7] About 70% of children with chronic OME develop mild-moderate hearing loss.[6] Untreated OME could lead to impairment in expressive language skills, poorer attention skills, impairment of speech perception including poorer discrimination of short similar sounds, lower diversity of babbling among young infants, poorer speech production, more speech errors, etc.[6] Other complications include chronic suppurative otitis media; sclerosis, atrophy, perforation and retraction of tympanum, cholesteatoma, drainage after myringotomy and tympanostomy tube insertion, etc.[6] The later complication could lead to higher rates of tympanoslecrosis many years after treatment.[6] In rare cases meningitis, extradural abscess and lateral sinus thrombosis might develop.[6]

Otitis media with effusion is a rather common condition among preschool and primary school-age children in Albania, partially

explained by conducting the survey in spring time. Several factors are associated with significantly increased likelihood of OME. Because the signs and symptoms of OME in children are not-acute and non-specific, often the condition gets undiagnosed[7] or the diagnosis is done later, thus increasing the opportunity for the development of various potentially serious consequences. This highlights the need for hearing evaluation of affected children.

Ethics Committee Approval: *This study was approved by Ethics Committee of University Hospital Center "Mother Teresa", Tirana, Albania, (Approval No: 22, Date: 14 March 2019).*

Informed Consent: *Informed consent was obtained from the patients who agreed to take part in the study.*

Peer-review: *Externally peer-reviewed.*

Author Contributions: *Concept – S.S., E.T., G.S.; Design – S.S.; Supervision – G.S.; Resources – S.S.; Materials – S.S.; Data Collection and/or Processing – S.S., G.S.; Analysis and/or Interpretation – E.T.; Literature Search – G.S.; Writing – S.S., E.T.; Critical Review – E.T., G.S.*

Declaration of Interests: *The authors have no conflict of interest to declare. One of the authors (S.S.) is among the Section Editors of Balkan ORL-HNS, however, she did not take place at any stage of the peer review and editorial decision processes of this article.*

Funding: *The authors declared that this study has received no financial support.*

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