

## The prevalence of middle ear diseases among 7- to 13-year-old primary school students in Yozgat province

Mahmut Özkırış, Zeliha Kapusuz, Levent Saydam

Department of Otolaryngology, Head and Neck Surgery, Bozok University Faculty of Medicine, Yozgat, Turkey.  
E-mail: drzeliha19@hotmail.com

**SUMMARY:** Özkırış M, Kapusuz Z, Saydam L. The prevalence of middle ear diseases among 7- to 13-year-old primary school students in Yozgat province. *Türk J Pediatr* 2012; 54: 493-496.

External and/or middle ear pathologies are commonly encountered by otolaryngologists, family practitioners and pediatricians. If left undiagnosed, these conditions may result in significant irreversible damage such as varying degree of hearing loss that can affect the social or professional performance of the individuals in later stages of life. In this study, we aimed to investigate the prevalence of several external and/or middle ear diseases among 7-13-year-old primary school students in Yozgat province. The province of Yozgat serves as a transition point between the Central Anatolian and Black Sea regions of Turkey. Nine hundred and seventy-eight primary school students were included in the study between March 1, 2012 and March 15, 2012. All subjects underwent a routine ear examination in school with a diagnostic otoscope. The students with pathologic ear findings were further evaluated to identify the underlying process. The age range of 978 students (527 males, 451 females) was 7 to 13 (mean: 10.5) years. Tympanic membrane (TM) pathology was detected in 33 (3.37%) of the cases overall. Of the cases, 3 (0.30%) had TM perforation, 11 (1.12%) had myringosclerosis (MS), 13 (1.32%) had serous otitis media, 1 (0.10%) had atresia of the left ear, and 4 (0.40%) had retraction pocket. One patient (0.10%) had undergone a left cochlear implantation procedure. The results of our study seem to be comparable with the other studies reported in the literature. Routine periodic ear examinations during the primary school ages are mandatory to obtain the exact prevalence of these pathologies in the entire population. We believe that early childhood screening of middle ear disease will have a positive effect on treatment.

**Key words:** student, middle ear disease, prevalence.

Chronic middle ear disease (CMED) is an inflammatory process of the middle ear and mastoid cavity, which may be related to several conditions such as cholesteatoma and otitis media with effusion (OME), etc. It mostly presents with a tympanic membrane (TM) perforation and suppurative discharge noted in the external ear canal. CMED may be classified clinically as active, intermittent or inactive according to the absence or presence of the inflammatory discharge<sup>1</sup>. Due to its insidious progress and irreversible damage, the disease is an important pediatric health topic especially in developing or underdeveloped countries. While the etiopathogenesis mainly includes uncontrolled recurrent middle ear infections

and chronic functional dysfunction of the Eustachian tube, the unfavorable effects of poor socioeconomic status, climatic factors, allergy, familial tendency, various immune deficiency conditions, and passive smoking have also been accepted by many researchers<sup>2,3</sup>.

Although the World Health Organization has been sensitively focusing on this subject, there are no reliable data on the current prevalence of CMED even in the developed countries<sup>1</sup>. In Turkey, there are many studies on the epidemiology of MEDs<sup>4-9</sup>. The present study is the first performed to assess the prevalence of MEDs among students in the 7-13 years of age group in Yozgat province. The province of Yozgat serves as a transition point between

**Table I.** Age Distribution of Middle Ear Disorders among Students

	7 year olds	8 year olds	9 year olds	10 year olds	11 year olds	12 year olds	13 year olds
Tympanic membrane perforation			1		1		1
Myringosclerosis	1	1	3	2		1	2
Retraction pocket		1	1		1		1
Otitis media with effusion	2	1	2	1	3	3	1
Ear atresia			1				
Cochlear implant					1		

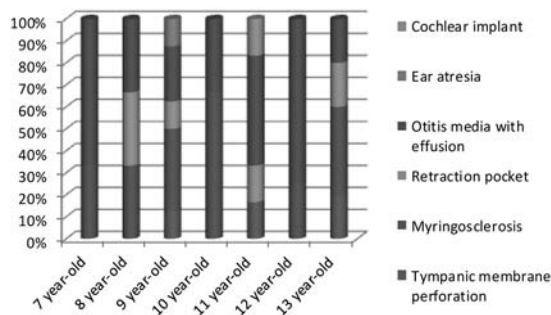


Fig. 1. The distribution of ear disorders among the age groups.

the Central Anatolian and Black Sea regions of Turkey, and is one of the oldest settlement areas of Anatolia.

### Material and Methods

Totally 978 students (527 males, 451 females) aged between 7 and 13 (mean age: 10.5) years attending the same primary school between March 1, 2012 and March 15, 2012 were included in the study. A questionnaire was applied one week prior to scanning (family income and previous surgeries were queried). Scanning was performed with the participation of all students in the primary school.

Prior to the study, consents were obtained from the Yozgat Provincial Directorate of National Education, the directorate of the primary school, and families of the students. Otoscopic examinations of all students were carried out by the same two otolaryngologists in the primary school. All of the 978 participants

underwent ear examination; external ear canal findings and the appearance of the TM were recorded. Otoscopic examination of the students was done. TM perforation, purulent drainage, retraction pocket, myringosclerosis (MS), OME, and cholesteatoma were considered otoscopic findings in favor of MED. The students in this group underwent audiometric measurement (via Maico MA 53 device) in hospital. The measurements were performed at 500, 1000, 2000, and 4000 Hz for the air and bone thresholds; pure tone average was calculated by the arithmetic mean of 500, 1000 and 2000 Hz thresholds. The students having MED were instructed regarding ear care and called for check-ups at three-month intervals.

The prevalence was calculated by dividing the total number of students by the number of the students with positive otoscopic finding, and 95% confidence interval (CI) was used. Statistical analysis of the data was done using chi-square test. Results with a p value <0.05 were considered significant. Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS 13) program.

### Results

The mean age of the cases was 10.5 years. The students belonged to families with monthly income between 215 and 1075 Euros. The most common finding in the examination was cerumen in 80 (8.17%) cases. TM pathology was detected in 33 (3.37%) of the overall cases. Of the cases, 3 (0.30%) had TM perforation, 11 (1.12%) had MS, 13 (1.32%) had OME, 1

(0.10%) had atresia of the left ear, 1 (0.10%) had left cochlear implant, and 4 (0.40%) had retraction pocket (Table I). Two of the cases with TM perforation had dry ear, whereas one had discharge. MS was present in both ears in one case (Fig. 1). Discharge throughout the ear was aspirated under microscopic guidance and examined in the hospital. No cholesteatoma or polyp was detected in any of the ears. All of the cases with TM pathology underwent audiologic examination. The pure tone average was measured as 12 dB for the right and 15.5 dB for the left ear that had MS only. The pure tone average of the cases with TM perforation was found as 36 dB for the right ear and 22 dB for the left ear. History of ventilation tube insertion was present in two of the cases with MS and in three of the cases with retraction pocket; the others were unremarkable. There was no significant difference between the male and female students with respect to MEDs ( $p < 0.05$ ).

## Discussion

Although many factors play a role in the pathogenesis of CMED, it is particularly associated with anatomic and functional characteristics of the Eustachian tube and the environmental factors. The incidence of CMED shows variation depending on the race and socioeconomic factors. Poor environmental factors, nutritional deficiency, upper respiratory tract infections, smoking, and crowded indoor places are suggested to increase the incidence of CMED, although not frequent<sup>10,11</sup>. CMED prevalence shows variation among different ethnic groups. It is more common among American Indians, Eskimos and Aborigines, and is also seen more frequently in poor living conditions, among crowded families, and in case of poor hygiene and nutrition<sup>12</sup>. Its incidence has been reported as 1.1% among British adults. The prevalence of TM perforation has been reported as 2.1% among the 60-year-old age group, 2.3% among the 50-year-old age group and 0.08% among the 20-year-old age group, and it is denoted that the prevalence is declining<sup>11</sup>. In the study conducted in the United Kingdom by Browning and Gatehouse on 48,313 18-80-year-old English adults, it was reported that the prevalence of inactive chronic otitis media (COM) was 2.6% and the prevalence of active COM was 1.5%, and 86%

of these cases had not undergone any surgical intervention<sup>13</sup>. Adhikari et al<sup>14</sup>. carried out a study on 500 children, aged 5-15 years, to identify the prevalence of chronic suppurative OM among the schoolchildren of high-income families in the urban private schools of Nepal and showed that the prevalence of chronic suppurative OM was 5%. Another study conducted by Adhikari<sup>15</sup> showed that the prevalence of COM was 7.6% among 2000 children of low-income families living in the rural areas of Nepal. They highlighted that the difference between the two prevalences emerged from different socioeconomic levels. Balle et al<sup>16</sup>. found the prevalence of COM as 6.9% in their study conducted on 3,300 Vietnamese children.

The present study is a unique study that puts forward the prevalence of MEDs among 7-13-year-old school children in Yozgat and is important in terms of forming a basis for further studies that are conducted on this subject in Yozgat. There are many studies on the epidemiology of MEDs in Turkey. Doğru et al<sup>4</sup>. conducted a study to identify the geographical distribution of army recruits diagnosed with COM and found that the geographical distribution of COM is strongly associated with the income distribution of the country. Vayisoğlu and Söken<sup>5</sup> found the prevalence of COM as 3.1% among 4,300 soldiers.

Almaç et al<sup>1</sup>. found the prevalence of COM (2.6%) and OME (15.1%) to be quite high. Özcan and Görür<sup>6</sup> found the prevalence of COM as 8% in their study conducted on 149 children at Kahramanmaraş Nursery School and attributed such a high prevalence to the low socioeconomic status of their families as well as to the poor nutrition and receipt of inadequate health services. Okur et al<sup>7</sup>. reported the prevalence of COM as 2.2% among 7-12-year-old children, 3.4% among 13-16-year-old children, and 2.9% among the children of all age groups staying at Kahramanmaraş Regional Boarding School. Öztürk et al<sup>8</sup>. found the prevalence of TM perforation as 0.9% and of COM as 5% in their study conducted on 1,282 children in Düzce.

The prevalence of MEDs was found as 3.4% in the present study and was observed to be similar to the statistics reported in the

above-mentioned studies. The present study is a unique study conducted to identify the prevalence of MEDs among 7-13-year-old students in Yozgat and is important in terms of forming a basis for further studies, which are undertaken among the same age group in Yozgat and surrounding territories. Studies performed on standard age groups with standard methods in other provinces of Turkey are needed to facilitate comparisons between the results in Turkey and those of other countries. We believe that early childhood screening for MEDs will have a positive effect on treatment.

#### REFERENCES

1. Akyıldız N. Kulak Hastalıkları ve Mikrocerrahisi. Ankara: Bilimsel Tıp Yayınevi; 1998: 337-354.
2. Bluestone CD, George A, Klein JO. Panel reports - 1. Definitions, terminology and classification of otitis media. *Ann Otol Rhinol Laryngol* 2002; 111: 8-18.
3. Bluestone CD. Epidemiology and pathogenesis of chronic suppurative otitis media: implications for prevention and treatment. *Int J Pediatr Otorhinolaryngol* 1998; 42: 207-223.
4. Doğru S, Konak M, Kapucu B, Cıncık H, Güngör A. Kronik otitis media'lı asker hastaların ülkemizdeki coğrafi dağılımı. *KBB-Forum* 2008; 7: 82-84.
5. Vayisoğlu Y, Söken H. Güzelyalı asker hastanesi'nde mayıs-eylül 2007 döneminde rutin sağlık muayenesi yapılan erlerde kronik süpüratif otitis media prevalansı. *Gülhane Tıp Dergisi* 2008; 50: 238-240.
6. Özcan C, Görür K. Kahramanmaraş çocuk yuvasında kronik otitis media prevalansı. *Mersin Üniv Tıp Fak Dergisi* 2000; 1: 44-47.
7. Okur E, Yıldırım İ, Kılıç MA. Yatılı bölge okulu öğrencilerinde kronik otitis media sıklığı. *KBB Klinikleri* 2003; 5: 71-74.
8. Öztürk Ö, Harputluoğlu U, Oğhan F, Mayda A. İlkokul çağındaki çocuklarda kulak burun boğaz hastalıkları tarama sonuçlarının sosyoekonomik seviyeye göre değerlendirilmesi. *Turk Arch Otolaryngol* 2003; 41: 213-217.
9. Yılmaz G, Caylan ND, Karacan CD. Effects of active and passive smoking on ear infections. *Curr Infect Dis Rep* 2012 Feb 2. [Epub ahead of print]
10. Verhoeff M, van der Veen EL, Rovers MM, Sanders EA, Schilder AG. Chronic suppurative otitis media: a review. *Int J Pediatr Otorhinolaryngol* 2006; 70: 1-12.
11. Mills RP. Management of chronic otitis media. In: Booth BJ (ed). *Scott-Brown's Otolaryngology* (6th ed) Vol 3. Oxford: Butterworth-Heinemann; 1997: 1-11.
12. Schaefer O. Otitis media and bottle-feeding. An epidemiological study of infant feeding habits and incidence of recurrent and chronic middle ear disease in Eskimos. *Can J Public Health* 1971; 62: 478-489.
13. Browning GG, Gatehouse S. The prevalence of middle ear disease in the adult British population. *Clin Otolaryngol Allied Sci* 1992; 17: 317-321.
14. Adhikari P, Joshi S, Baral D, Kharel B. Chronic suppurative otitis media in urban private school children of Nepal. *Braz J Otorhinolaryngol* 2009; 75: 669-672.
15. Adhikari P. Pattern of ear diseases in rural school children: experiences of free health camps in Nepal. *Int J Pediatr Otorhinolaryngol* 2009; 73: 1278-1280.
16. Balle VH, Tos M, Dang HS, et al. Prevalence of chronic otitis media in a randomly selected population from two communes in southern Vietnam. *Acta Otolaryngol Suppl* 2000; 543: 51-53.