The frequency of adenotonsillectomies in relation to socioeconomic status among primary school students in Yozgat province

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The present study aimed to investigate the frequency of tonsillectomy and adenoidectomy and its relation to socioeconomic status (SES) among 6- to 13-year-old primary school students in Yozgat province.

Between March 1, 2012 and March 15, 2012, 1098 primary and nursery school students who had complete ear, nose and throat examination in our department were included in the study. The students were queried regarding age, gender and history of tonsillectomy and adenoidectomy via data collection forms. SES was evaluated according to the mean monthly income within the family, educational level of parents and absence or presence of smoking habits.

The age of the 1098 students (678 males, 420 females) ranged between 6 and 13 years (mean age: 10.7). Of the cases, 27 (2.5%) had tonsillectomy, 23 (2.1%) had adenoidectomy, and 36 (3.3%) had both tonsillectomy and adenoidectomy. When we compared the SES between the operated and non-operated subjects in the families with mean monthly income lower than the minimum wage, educational level lower than university degree and in the presence of smoking habits, adenotonsillectomy operation rate was significantly higher than in the non-operated group ($p<0.001$).

We conclude that in children of the lower SES group families, with a mean monthly income lower than the minimum wage, parental educational level lower than university degree and the presence of smoking habit of family members, the rate of adenotonsillectomy operations is higher than in the other SES groups.

Key words: student, tonsillectomy, adenoidectomy, socioeconomic status.

Recurrent infections of the palatine tonsils account for a substantial portion of childhood diseases. With the determination of certain therapeutic criteria and with the administration of appropriate antibiotics, the rate of tonsillectomy operations has decreased in recent years. However, tonsillectomy remains the most common surgical procedure performed on children[1]. These operations are performed on more than 300,000 patients annually in the United States[2]. Although the World Health Organization has overemphasized the epidemiological research, there are no reliable data on the current frequency of infectious diseases of the palatine tonsils, even in the developed countries[1]. There are two studies concerning the frequency of tonsillectomy and adenoidectomy operations among children in Turkey[3,4].

The present study is the first to investigate the frequency of adenotonsillectomy operations and the relation to socioeconomic status (SES) among children between 6 and 13 years of age in the Yozgat province.

Material and Methods

Totally, 1098 students (678 males, 420 females) aged between 6 and 13 (mean age: 10.7) years

Table I. Number, Gender and Age of Students with Respect to Operations

	Tonsillectomy (T)	Adenoidectomy (A)	T+A
Number of children (n, %)	27 (2.5%)	23 (2.1%)	36 (3.3%)
Male/Female (n)	15/12	12/11	19/17
Age (mean±SD)	10.3±1.2	11.1±1.5	10.7±1.3

attending the same school between March 1, 2012 and March 15, 2012 were included in the study.

The province of Yozgat is one of the oldest settlement areas of Anatolia. The city's geographic location provides a transition point between the Central Anatolian region and the Black Sea region of Turkey. Prior to the study, permissions were obtained from the Yozgat Provincial Directorate of National Education, the Directorate of the primary school and the families of the students. The study was approved by the local ethics committee. All participants underwent a general ear, nose and throat examination. Prepared data collection forms were given to the students to be completed, and the students were queried regarding age, gender and history of tonsillectomy and adenoidectomy operations.

Socioeconomic status (SES) was evaluated according to the mean monthly income within the family, educational level and smoking habits of parents (Educational level: university degree: 2 points, lower than university degree: 1 point; Monthly income: higher than the minimum wage: 2 points, lower than the minimum wage: 1 point, Smoking habits of parents: Smoking negative: 2 points, smoking positive: 1 point). We used 'value added' points from 1-3 when comparing the SES between the groups. A mean monthly income lower than the minimum wage, educational level lower than university degree and presence of smoking habits corresponded to 1, 2, and 3 points, respectively (Scoring system: SES I ≤3; 4≤SES II<5; and SES III ≥5).

Statistical Analysis

Children with tonsillectomy and/or adenoidectomy were compared to the other students using the calculated SES points. Chi-square test was used to compare categorical variables. Statistical significance was set at $p<0.05$. Statistical analysis was carried out using the Statistical Package for the Social Sciences software (version 18.0; SPSS Inc., Chicago, IL, USA).

Results

The present study included 1098 students who underwent a detailed ear, nose and throat examination and accurately completed the data collection form. Of the students, 678 (61.7%) were males and 420 (38.3%) were females. The mean age of the students was 10.7±1.3 years for adenotonsillectomy patients, 11.1±1.5 years for adenoidectomy patients, and 10.3±1.2 years for tonsillectomy patients (Table I). Twenty-seven (15 males, 12 females) of the students previously underwent tonsillectomy, 23 (12 males, 11 females) had adenoidectomy, and 36 (19 males, 17 females) had both tonsillectomy and adenoidectomy operations. The number of non-operated students was 1012; 242 of these were scored as 1, 265 were scored as 2, and 505 were scored as 3. The number of operated students was 86; 66 of these were scored as 3, 13 were scored as 2, and 7 were scored as 1 (Table II). When we compared the SES between the operated and non-operated students, in families with a mean monthly income lower than the minimum wage and educational level lower than university degree with positive smoking habit, the adenotonsillectomy operation rate was statistically higher than among non-operated students ($p<0.001$). The numbers of students with scores of 1 or 2 were higher in the non-operated than operated group ($p<0.05$ for both).

There was no significant difference between the male and female students with respect to surgical procedures performed ($p<0.05$). In the present study, the frequency of tonsillectomy was 2.5%, the frequency of adenoidectomy was 2.1%, and the rate of students who had both tonsillectomy and adenoidectomy was 3.3% (Table I).

Table II. Scoring of Operated and Non-Operated Students According to Socioeconomic Status

	Operated students	Non-operated students	Total		
Number of students	86	1012	1098	P	$\chi 2$
Score 3	66 of 86 (76.7%)	505 of 1012 (49.9%)	571	p<0.001	33.42
Score 2	13 of 86 (15.1%)	265 of 1012 (26.1%)	278	p<0.05	52.37
Score 1	7 of 86 (8.1%)	242 of 1012 (23.9%)	249	p<0.05	71.64

p<0.05: Statistically significant. $\chi 2$: Pearson chi-square value.

Discussion

Infectious diseases involving the palatine tonsils are the leading cause of various morbidities among children. Particularly during the childhood period, "acute tonsillitis" ranks first among upper respiratory tract infections[1,2]. Considering the morbidity caused by acute or chronic tonsillitis, possible infectious complications, the choice of treatment, treatment-related complications, and workforce or school-day losses, the extent of the picture we face becomes even more prominent[6]. It was reported that each 100 students in the United States missed 152 days from school in 1996 because of morbidity caused by upper respiratory tract infections[5]. In addition to the cost brought by a single tonsillitis attack in the early period, the treatment cost of recurrent attacks and related complications also increase the economic burden. Due to recurrent tonsillitis attacks despite medical treatment, tonsillectomy becomes inevitable. Although the number of tonsillectomy operations has decreased in recent times along with the use of appropriate antibiotics, it remains the most common surgical procedure performed on children[1,6]. The decrease in the number of tonsillectomy operations has been attributed to factors such as appropriate antibiotic use, increase in the number of patients that are able to access health care, and consideration of the operation criteria during surgical decision-making.

On the other hand, in developing countries, SES is considered to be an impact factor on adenotonsillectomy rates. Additionally, SES of the family is known as one of the most important subjects affecting school success and the health of children. Yoo et al.[7] evaluated the SES by using educational and occupation statuses. Turrell[8] used occupation and family income for measuring SES. Low SES is generally associated with higher psychiatric morbidity, more disability, and poorer access to health care. The children of the families with lower SES may have more frequent exposure to various diseases due to facts such as unhealthy conditions in early childhood and poorer hygienic conditions, causing their immune systems to develop inadequately. The children who have a regular and balanced diet with higher than average living conditions are healthy and happy, have sufficient mental development, and their weight and height percentages are within normal values[9]. In our study, SES was evaluated according to the mean monthly income of the family, educational level and smoking habits of parents in accordance with the previous studies of Yoo[7] and Turrell[8]. These three major indicators of lower SES can be attributed to higher operation rates in these children as explained previously.

Tonsillectomy was first described by Celsus in the first century B.C. Since its first description, this procedure has been performed until now via numerous surgical techniques[1,2]. Cold knife dissection is the most commonly performed among these methods; others include cautery dissection, cryosurgery, microdebrider, laser tonsillectomy, coblation, ultrasonic scalpel, thermal welding, and plasma knife tonsillectomy[2,5]. Choosing the type of the surgical technique depends on various criteria including the general status of the patient, pain, operative time, time to commencement of oral feeding, cost, and preferences of the surgeon and the patient. In our study, all operations were performed with general anesthesia and under cold knife instrumentation.

While infectious reasons such as chronic tonsillitis were the leading indications for tonsillectomy in the nineteenth century, today, obstructive pathologies rank first[1,5]. While tonsillectomy accounted for one-third of all surgical interventions in the United States in

1930s, in England, 50%-75% of all children had their tonsils removed in the same time period. The number of tonsillectomy operations performed in the United States decreased to 259,000 in 1987 from 1,019,000 in 1971[1,6]. A decrease by 15% in the number of childhood tonsillectomies was reported between 1990 and 1996 in Scotland, while a decrease of 67% was reported between 1974 and 1985 in the Netherlands[10,11]. In the Netherlands in 1998, 33,741 tonsillectomies were performed in the 0-14 year age group, 90% of which were combined with adenoidectomy. As compared to Canada, the number of tonsillectomy operations is six times higher in Northern Ireland and the Netherlands, whereas it is 1.5 times higher in the north west region of England as compared to south east England[10,12]. In Finland, the frequencies of childhood adenoidectomy and tonsillectomy have been reported as 24% and 8%, respectively[13].

In Turkey, tonsillectomy and/or adenoidectomy accounted for 75% of all childhood operations performed in a year as reported by Erisen et al.[3]. Polat and Demiroren[4] determined that, of 775 children in Elazığ province, 4.9% had tonsillectomy, 2.7% had adenoidectomy, and 2.1% had both tonsillectomy and adenoidectomy. The authors found that the frequency of tonsillectomy and adenoidectomy was significantly higher among children from families with higher educational and economic level, as well as in schools of children from families with higher socioeconomic level[4]. In contrast, our series showed that smoking habits of parents and lower socioeconomic and educational levels were the major indicators of higher operation rates. This difference could be explained as variations according to the geographical characteristics, access to advanced medical techniques, decision of the specialist, and sociocultural differences.

In the present study, it was found that 27 (2.5%) students previously underwent tonsillectomy, 23 (2.1%) underwent adenoidectomy and 36 (3.3%) underwent both tonsillectomy and adenoidectomy. These rates are similar to those reports mentioned above, except regarding the SES relation. Our study showed that the absence or presence of smoking habits in the family environment should be an integral part of SES evaluation studies. To our best knowledge, this study is unique in terms of the frequency of tonsillectomy and adenoidectomy operations and the relation to SES among students between 6 and 13 years of age in Yozgat, providing a basis for further studies that are conducted among the same age group.

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