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Original Research Article

Prevalence and severity of dental caries among 18-year-old Lithuanian adolescents

Miglė Žemaitienė *, *Rūta Grigalauskienė*, *Ingrida Vasiliauskienė*, *Kristina Saldūnaitė*, *Jaunė Razmienė*, *Eglė Slabšinskienė*

Department of Preventive and Paediatric Dentistry, Medical Academy, Lithuanian University of Health Sciences, Kaunas, Lithuania

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ABSTRACT

Objective: The aim of the study was to evaluate the prevalence and severity of dental caries among 18-year-old Lithuanian adolescents and to disclose possible differences in the prevalence and severity of dental caries related to gender, urbanization, and different county.

Material and methods: A total of 1063 18-year-old adolescents attending school, 427 boys and 636 girls from 10 Lithuanian counties including urban and rural areas, were included in the cross-sectional study on dental caries. The method of multistage cluster sampling was used. The dental examination was performed according to the methodology of oral status evaluation recommendations by the World Health Organization (WHO). The prevalence of dental caries, DMFT score, Significant Caries Index, and dental care index were determined.

Results: The overall prevalence of dental caries among 18-year-old Lithuanian adolescents was 78.3%. The study population had a mean DMFT score of 2.93 [SD, 2.81]. Considering the gender, a higher DMFT score was observed among girls than boys (3.03 [SD, 2.88] versus 2.73 [SD, 2.71]) and in rural than urban areas (3.02 [SD, 2.98] versus 2.89 [SD, 2.73]). The Significant Caries Index and the dental care index among 18-year-old adolescents were 6.14 and 62.3%, respectively.

Conclusion: This study showed a relatively high prevalence of dental caries. The existing differences of caries experience between the urban and the rural areas as well as between the counties could be influenced by the socioeconomic differences in the country.

* *Corresponding author at*: Department of Preventive and Paediatric Dentistry, Medical Academy, Lithuanian University of Health Sciences, J. Lukšos-Daumanto 6, 50106 Kaunas, Lithuania. Tel.: +370 37792992.
E-mail address: zemaitienemig@gmail.com (M. Žemaitienė).

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1. Introduction

Dental caries is one of the most prevalent oral diseases of public health concern affecting adolescents [1]. Dental caries forms through a complex interaction over time between acid-producing bacteria and fermentable carbohydrate, and many host factors including teeth and saliva [2]. Adolescence is the period in the human life when the relationships between biological, behavioral, socioeconomic, and psychological conditions have a very strong effect on caries etiology [3]. According to the World Health Organization (WHO), adolescents are individuals aged from 10 to 19 years [4]. The American Academy of Pediatrics divides adolescence into three stages: early adolescence (11- to 14-year-old), middle adolescence (15- to 17-year-old), and late adolescence (18- to 21-year-old) [5]. Late adolescence is very important for oral health because individual's personality, diet-related choices, oral hygiene behavior, and motivations formed during this period [6]. Behaviors and attitudes formed during adolescence usually last into adulthood [7].

Dental caries among adolescents is mainly explored in age groups younger than 15 years. Epidemiological information about caries experience in older adolescent groups is scarce because these adolescents are frequently omitted from oral health survey reports. To our knowledge, no studies on caries experience among 18-year-old have been conducted in Lithuania. This age group is important because after studying the prevalence and severity of dental caries, it will be possible to improve dental screening, treatment, and prevention strategies. In Lithuania, 87% of 18-year-old adolescents attend schools, and according to the Eurostat data this percentage is one of the highest among all the member states of the European Union [8]. Therefore, it is easy to implement the preventive program and involve adolescents in it, and it is the last chance before graduation from school and fall into the adult world where dental treatment will not be free of charge anymore.

The aim of the study was to evaluate the prevalence and severity of dental caries among 18-year-old Lithuanian adolescents and to disclose possible differences in the prevalence and severity of dental caries, related to gender, urbanization, and different Lithuanian administrative units – counties.

2. Materials and methods

2.1. Study design, population, and sample

This cross-sectional dental caries study was carried out among 18-year-old Lithuanian adolescents in 2014. The method of multistage cluster sampling was used. Lithuania is divided into 10 counties. In the first stage, each county was divided into smaller urban and rural administrative units (clusters). During the second stage, in each cluster, schools (sub-clusters) from the alphabetic list of all the schools based on the data from the education management information system of the Centre of Information Technologies in Education were selected (the first and the last school from the list were chosen). In the third stage, 3rd gymnasium classes (a block) were selected. One hundred adolescents from each selected block were asked to complete the questionnaire about their birth date, gender, and oral hygiene skills. Totally, 2000 adolescents from all over the country were approached. The study was voluntary; the inclusion criteria were age of 17.5–18.5 years and agreement to be enrolled into the study by signing written informed consent. A total of 1063 adolescents met the inclusion criteria. Adolescents were informed about the fact that they could withdraw from the study at any time.

The sample size was calculated using the Paniott's formula with the error of 0.05% based on the 18-year-old population in 2012 which was 37,036 according to the Statistics Lithuania. By using this formula, it was determined that not less than 39,618-year-old adolescents had to be included in the study.

The permission for the examination of schoolchildren was given by the Kaunas Regional Biomedical Research Ethics Committee on November 27, 2012 (No. BE-2-47).

2.2. Clinical examination

The dental examination was performed according to the methodology of oral status evaluation recommended by the WHO [9], under standardized conditions using dental chairs available in the school dental offices and portable dental units equipped with a halogen light source, compressed air, and suction device.

In oral health reports, the prevalence of dental caries usually is defined as the percentage of population affected by dental caries, and caries severity or experience is calculated based on D (decayed) M (missing) and F (filled) T (teeth) index following the WHO criteria (1997). Two pediatric dentists trained and calibrated for recording the parameters of oral health performed examinations. Training and calibration was performed on 35 18-year-old subjects who were not included in the final sample. Kappa statistics was used to test inter-investigator reliability. A kappa value for the inter-investigator reliability was 0.92.

2.3. Statistical analysis

Statistical data analysis was performed by using the SPSS 22.0 (Statistical Package for the Social Sciences for Windows) program. The interdependence of qualitative characteristics was evaluated with the help of chi-square (χ^2) criterion. Quantitative variables were expressed as mean with standard deviation or mean with 95% CI. One-way analysis of variance (ANOVA) was used to compare quantitative data of more than two independent groups. The Bonferroni post hoc test was used for multiple paired comparisons. The threshold for statistical significance was set at $P < 0.05$.

The Significant Caries (SiC) Index was calculated by adding the highest one-third of DMFT scores and dividing it by one-third of the total sample size [10]. The care index was also calculated; this is the proportion of teeth with caries experience, which have been filled, derived by taking the number of filled teeth and dividing by the total number of decayed, missing, and filled teeth and converting to a percentage (FT/DMFT) [11].