

SHORT COMMUNICATION

# Dental caries experience among 15-year-old adolescents in north-west Russia

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## ABSTRACT

**Objectives.** To estimate the prevalence and experience of dental caries among 15-year-old adolescents in north-west Russia between 2007 and 2008.

**Study design.** A cross-sectional study.

**Methods.** In total, 352 adolescents at the age of 15 were selected at random from 3 urban and 4 rural areas in the Arkhangelsk region. Girls comprised 53.4% of the sample. Caries experience was assessed at D3 level by a single calibrated examiner and was estimated as a sum of decayed, missing and filled teeth (DMFT).

**Results.** The prevalence of caries was 91.8% with a mean DMFT of 4.92. On average, there were 2.61 decayed, 0.13 missing and 2.18 filled teeth per participant. No gender differences in the prevalence of caries in any of the settings or in the full sample were observed. In urban areas, the average number of decayed teeth was lower (2.15 vs. 2.95,  $p=0.006$ ), while the number of filled teeth was greater (2.71 vs. 1.79,  $p<0.001$ ) than in rural areas.

**Conclusions.** Under assumption of the representativeness of the sample, no improvements in the overall caries prevalence among 15-year-old children in the Arkhangelsk region occurred since 1997–1998. Urban-rural variations, but not gender variations, in caries experience were observed. The levels are considerably higher than those in neighbouring Nordic countries and the Russian average. Urgent public health measures on both population and individual levels are needed to improve the situation.

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**Keywords:** caries experience, adolescents, Russia

## INTRODUCTION

The latest dental health survey conducted in Russian circumpolar areas in 1997–1998 showed substantially poorer dental health among adolescents living in the North than in Russia in general: caries prevalence was 93% in the northern region, compared with 88% in the country on average (1). Caries experience expressed as a DMFT (Decayed, Missing and Filled Teeth) index is 3.0 affected teeth per child in Finland, 2.3 in Sweden, 1.6 in Denmark and 4.4 in Russia (1–3). To date, the information on caries prevalence and experience among children in Northern Russia is scarce, resulting in no solid foundation for preventive programs.

### *Aims*

The aim of the study was to estimate the prevalence and experience of caries among 15-year-olds in the Arkhangelsk region.

## MATERIAL AND METHODS

The study was performed as a part of a national dental health survey in the Russian Federation (4). Fifteen-year-old study participants were recruited in 2007–2008 from 3 towns (Arkhangelsk, Novodvinsk and Velsk) and 4 rural districts (Plesetsk, Konosha, Leshukonskoe and Krasnoborsk), selected at random from all parts of the Arkhangelsk region. The total number of 15-year-olds in the region was 12,639 in the study period. At least 50 children from each location, both male and female, were randomly recruited as recommended by the WHO to achieve a 2.5% sample (5). Further details about sampling procedure are available

elsewhere (6). Altogether, the sample consisted of 352 adolescents (202 from rural and 150 from urban areas), 53.4 % of which were girls.

Dental examination was performed at schools by a single calibrated dentist (MG) with a WHO-type periodontal probe and plain mouth mirror, using clinical criteria for caries as defined by the WHO (5). The prevalence and the mean DMFT index of dental caries in permanent teeth was calculated for rural and for urban areas, as well as for the full sample. Ninety-five percent confidence intervals (CI) for proportions were calculated using Wilson's method. Differences in the prevalence and experience of caries between areas and by gender were analysed by Pearson's chi-square tests and by Mann-Whitney tests, respectively.

Written informed consent was obtained from all participants. The study was approved by the ethical committee of the Northern State Medical University.

## RESULTS

The overall prevalence of caries was 91.8% with a mean DMFT of 4.92 (Table I). No differences were observed within each category or by gender; therefore, the data are presented together for both genders and stratified only by rural/urban area. No differences in either the prevalence of caries (88.7% vs. 94.1%,  $p=0.069$ ) or the mean DMFT index (4.95 vs. 4.90,  $p=0.897$ ) between rural and urban areas were observed (Table I). Decayed, missing and filled teeth constituted 53.0%, 2.7% and 44.3%, respectively, in the DMFT index structure. On average, there were 2.61 decayed, 0.13 missing and 2.18 filled teeth per child. The average

**Table 1.** The prevalence of dental caries, mean DMFT index and dental caries indices by component for permanent dentition with 95% confidence intervals (CI) among 15-year-old children in the Arkhangelsk region, north-west Russia, 2007–2008.

Area	Prevalence of caries, % (95% CI)	Mean DMFT (95% CI)	DT (95% CI)	MT (95% CI)	FT (95% CI)
Rural areas	94.1 (89.9–96.6)	4.90 (4.45–5.36)	2.95 (2.56–3.33)	0.16 (0.09–0.24)	1.79 (1.51–2.06)
Urban areas	88.7 (82.6–92.8)	4.95 (4.37–5.53)	2.15 (1.79–2.52)	0.09 (0.03–0.14)	2.71 (2.29–3.13)
Total	91.8 (88.4–94.2)	4.92 (4.56–5.28)	2.61 (2.33–2.88)	0.13 (0.08–0.18)	2.18 (1.94–2.42)

number of decayed teeth in urban areas was lower (2.15 vs. 2.95,  $p=0.006$ ), but the number of filled teeth was greater (2.71 vs. 1.79,  $p<0.001$ ) than in rural areas. No gender differences were found in any of the components (decayed teeth: 2.93 vs. 2.32,  $p=0.113$ ; missing teeth: 0.12 vs. 0.14,  $p=0.134$ ; filled teeth: 1.95 vs. 2.38,  $p=0.125$  for boys and girls, respectively).

## DISCUSSION

The observed prevalence of caries (91.8%) in this study is similar to the 93% observed in 1997–1998 and exceeds the Russian average of 82% in 2008 (7).

The mean number of decayed teeth increased from 1.81 in 1997–1998 to 2.61 in this study, and the proportion of decayed teeth in the structure of the DMFT index increased from 36.0% to 53.0%. The number of missing teeth was halved during the last decade (0.13 vs. 0.3) and their proportion in the DMFT structure decreased from 6% to 2.7% (1). The mean number of filled teeth decreased from 2.9 in 1997–1998 to 2.18 in 2007–2008 (1). Moreover, the proportion of filled teeth in the DMFT index decreased from 58.0% to 44.3% (1).

The combination of an increased number of decayed teeth in the DMFT index and a decreased number of filled teeth may reflect a significant decrease in the number of pediatric dentists and

school dental offices. Children in rural areas had more decayed teeth and fewer filled teeth than urban children, suggesting poorer dental services in villages. A decrease in the number of missing teeth may reflect either a lack of dental care or improvements in the quality of services for those who have access to it.

The main advantage of the study is that it, like the previous study in 1997–1998, was performed using internationally accepted methodology recommended by the WHO (1997), allowing comparability of the findings with European studies and with earlier studies in the region. Small sample size, however, is the main limitation of the study. It resulted in rather broad confidence intervals and low statistical power for comparisons of caries prevalence and experience between genders and locations. Given that the sample was taken at random from all parts of the region, we consider our results generalizable to the whole region. Moreover, given relative homogeneity between the regions in north-west Russia, one may cautiously generalize the findings to other north-western parts of the country.

## Conclusions

Under assumption of the representativeness of the sample, no improvements in the overall caries prevalence and experience among 15-year-old children in the Arkhangelsk region occurred after 1997–1998. More decayed teeth and fewer filled

teeth may reflect the reduction of pediatric dental services in the region. Significant urban-rural, but not gender, variations in caries experience were observed. Urgent public health measures on both population and individual levels are needed to improve the situation.

## REFERENCES

1. Ushmanova TN, Obraztsov UL. Стоматологическое здоровье населения европейского севера [Oral health of population in north-west of Russia]. Arkhangelsk: Northern State Medical University; 2001. 223 p. [in Russian]
2. World Health Organization. Oral health country/area profile programme. Significant caries index. Geneva: World Health Organization; 2004. Available from: <http://www.mah.se/capp/>
3. Vehkalahti M, Tarkkonen L, Varsio S, Heikkilä P. Decrease in and polarization of dental caries occurrence among child and youth populations, 1976–1993. *Caries Res* 1997;31(3):161–165.
4. Ministry of Health and Social Development, Russian Federation. Edict №394 from 2007 Jun 4th. О проведении эпидемиологического стоматологического обследования населения Российской Федерации [About performing the epidemiological oral health survey of population in Russian Federation]. Moscow: Ministry of Health and Social Development, Russia; 2007. Available from: <http://www.minzdravsoc.ru/docs/mzsr/orders/102> [in Russian]
5. World Health Organization. Oral health surveys: basic methods, 4th ed. Geneva: World Health Organization; 1997. 68 p.
6. Gorbatova MA, Grjibovski AM, Gorbatova LN, Honkala E. Dental caries experience among 12-year-old children in Northwest Russia. *Community Dental Health*: Accepted, in press.
7. Kuzmina EM, Kuzmina IN, Vasina SA, Smirnova TA. Стоматологическая заболеваемость населения России [Oral health of population in Russian Federation]. In: Kuzmina EM, editor. Ministry of Health and Social Development in the Russian Federation. State Medical University of Dentistry. Moscow: Informelectro; 2009. 236 p. [in Russian]

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