Caries experience and treatment need among adults responding to an invitation for dental examination and treatment in two Karelian communities in Russia

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This study was planned and conducted by the Health Authorities of Karelia in the Russian Federation and the Faculty of Dentistry, University of Kuopio, Finland. The aim of the study was to analyze caries experience and treatment need among adults who responded to an invitation for dental examination and offered free dental treatment in two communities in Karelia. A total of 227 adults aged 30–72 years from 2 rural communities were examined clinically in accordance with WHO criteria by a team of Finnish dental specialists. The participants represented two major ethnic groups (Fenno-Ugrians, 68%; Slavs, 32%). The mean DMFT and DMFS were 15.8 and 58.8, respectively. Among dentate subjects (n = 225) 88% had at least one carious tooth and 80% had one or more filled or crowned teeth. Altogether, 34% of the subjects needed extraction(s), and 83% needed restorative treatment. The main finding of the study was that with regard to caries experience, oral health was quite good compared with that found in Finland and the UK.

☐ *Dental caries; epidemiology; ethnic groups*

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The province of Karelia is situated in the northwestern region of the Russian Federation, adjacent to Finland. The population increased from 651,000 in 1959 to 792,000 in 1989, with a simultaneous decrease of the rural population density from 37% to 18% (1). Currently, the 799,400 inhabitants represent approximately 80 nationalities from different parts of the former Soviet Union. According to the Karelian authorities, the prevalence of oral diseases is high, with treatment need estimated at 94% (2).

During recent years the economic crisis has forced the authorities to set new goals for reorganizing the oral health services. This involves planning improved services on the basis of the prevalence of various oral diseases in different population groups. However, epidemiologic oral health studies of the population in Karelia are scarce. During the past 15 years only one report concerning oral health has been published on the epidemiology of maxillofacial malignant tumors (3).

Because of Karelia's proximity to Finland and the current political and economic developments taking place in the area, the Finnish oral health authorities are interested in providing humanitarian aid and specialist support. To this end a team of Finnish dental specialists was invited to Karelia to perform a collaborative, baseline survey of the population. The authorities wanted a survey done by internationally defined common methods.

The aims of this study were to describe the caries experience and estimate treatment need among adult residents who would respond to an invitation for dental examination and for free dental treatment in two rural communities: Megrega (inhabitants, approximately 1000) and Sheltozero (approximately 1200). These communities were chosen for two reasons: first, because approximately half of the adults represent the Fenno-Ugrian ethnic group fairly well (Karelians in Megrega and Vepses in Sheltozero), with low migration from outside, and secondly, because both communities lack a regular dental service for adults.

Subjects and methods

Approximately 1 month before the study the Karelian authorities provided general information about the aims of the study to the target population through the local mass media. All adults were invited to participate. Altogether, 227 adults aged 30–72 years participated in the examinations (Table 1), conducted in August 1991. Before clinical examination the participants filled out a structured questionnaire including questions on certain background factors. After the examination dental treatment was given by one dentist and one dental therapist in a mobile dental unit from the government.

Table 1. The population studied in the two villages

	Men			Women		
	No.	Age (years)	SD	No.	Age (years)	SD
Megrega	52	41.7	9.6	105	45.1	11.8
Sheltozero	16	42.2	12.6	54	45.4	13.4
Total	68	41.8	10.2	159	45.2	12.3

The participants represented two major ethnic groups (Fenno-Ugrians, 68%, and Slavs, 32%). The ethnic subgroups were Karelians (51.1%), Vepses (14.6%), Finns (1.8%), Russians (26.9%), Ukrainians (2.6%), Byelorussians (2.6%), and Poles (0.4%). The total study group consisted of 30% men and 70% women. Neither the mean ages of men and women nor the mean ages of the Fenno-Ugrians and Slavic ethnic groups differed statistically significantly between the two communities. The age distribution by 5-year categories of the study group in Megrega did not differ statistically significantly from that of the general adult population at 30–70 years, according to available population statistics.

Clinical examinations were performed by the Finnish team. The subjects were investigated in a dental chair or an arm-chair with the aid of artificial light and with a dental mirror and dental probe. The diagnoses of caries experience by tooth surface followed the WHO criteria (4). The state of the wisdom teeth was not recorded. Caries were measured in accordance with the traditional indices as decayed, missing, and filled teeth and surfaces (DMFT, DT, MT, FT, DMFS, and DS). In addition, the FT index was split into the number of filled (Filled T) and crowned (Crowned T) teeth, and the DS index into the number of surfaces with primary (Primary DS) and secondary (Secondary DS) caries. Incisors, canines, and premolars (n = 17) missing for reasons other than caries, periodontal disease, or trauma, found among 11 subjects, were excluded from the analyses. Restorative treatment need was determined by estimating the need 1) for extractions due to loss of all surfaces of the tooth crown and/or mobility of tooth in all directions, and 2) for fillings (including endodontic treatment) in the remaining dentition.

Data were evaluated in accordance with the place of residence, sex, ethnic group, and use of dental (stomatologic) services. In some analyses the subjects were classified into eight age groups: 30–34 (n = 52), 35–39 (50), 40–44 (38), 45–49 (11), 50–54 (25), 55–59 (14), 60–64 (20), and ≥65 (17) years. When age was considered a confounding factor, it was adjusted as a continuous variable in years by the analysis of variance. The chi-square and t tests were used in statistical testing, and the ANOVA test (5) in age standardization.

Results

Approximately 80% of the subjects reported being born in Karelia, with a mean residence period in Karelia of 40.0 ± 13.7 years. All the subjects studied had at least some caries experience. The subjects in Sheltozero had more filled or crowned teeth than those in Megrega (Table 2). Women had more DMF teeth and secondary decayed surfaces than men. No other significant sex differences were found. Among dentate subjects (n = 225) 88% had at least one carious tooth and 80% had one or more filled or crowned teeth. The mean number of decayed teeth decreased from 5.8 in

Table 2. Age-adjusted caries variables on the basis of place of residence and sex

	Megrega	Sheltozero	Men	Women	Overall mean
DMFT	15.8	15.9	14.4	16.4*	15.8
DT	3.9	3.7	3.6	3.9	3.8
MT	9.1	7.8	8.0	9.1	8.7
FT	2.8	4.4***	2.8	3.4	3.3
Filled T	1.9	2.5	1.6	2.3	2.1
Crowned T	0.9	1.9***	1.2	1.2	1.2
DMFS	59.0	58.1	54.7	60.5	58.7
DS	7.7	6.7	8.0	7.2	7.5
Primary DS	6.9	5.7	7.6	6.1	6.6
Secondary DS	0.8	1.0	0.4	1.1***	0.9

ANOVA, significance of F: * = $0.05 \geq p > 0.01$; ** = $0.01 = p > 0.001$; *** = $p \leq 0.001$.

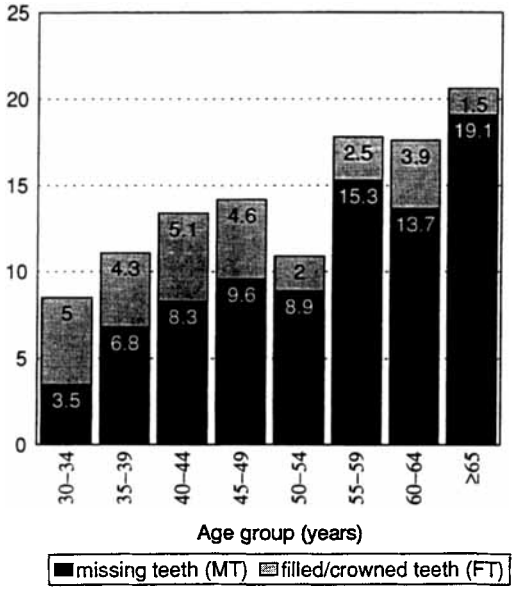

Fig. 1. Missing and filled teeth on the basis of age group.

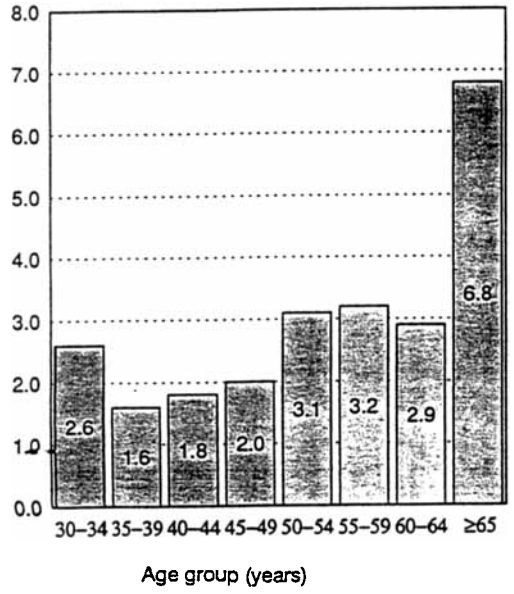

Fig. 3. The mean number of teeth needing restorative treatment by age group.

the 30- to 34-year age group to 3.1 at 40–44 years. Thereafter the variation was rather small.

Only seven subjects (two men and five women; mean age, 32.6 years) had all their natural permanent teeth. The great majority (96.9%) had one or more missing teeth. Two women (0.9% of the sample, 59 and 71 years of age) were edentulous. The pattern of missing teeth was quite similar in the two sexes: lower molars (2.6) followed by upper molars (1.8), upper premolars (1.7), upper incisors (1.3), lower premolars (1.1), and lower incisors (0.5). Women had on average 2.4 more missing teeth than males—that is, more missing upper premolars, upper incisors, and lower molars. The number of missing and filled/crowned teeth (MFT) increased consistently with age except for the age group 50–54 years, which had the same level as the 35 to 39-year group (Fig. 1).

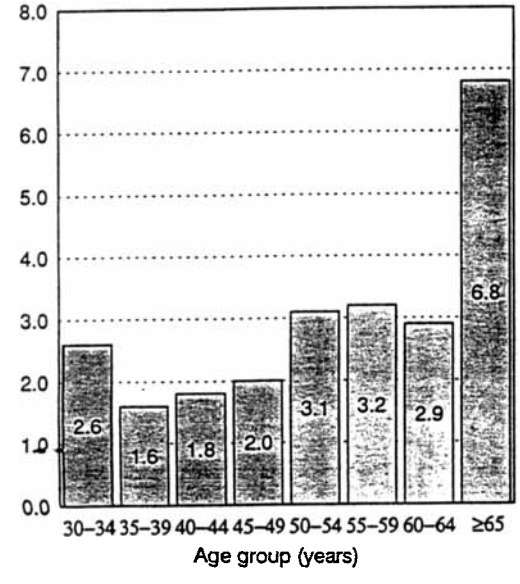

Fig. 2. The mean number of teeth needing extraction by age group.

Altogether 34.2% of the subjects had a need for extraction(s). The mean number of teeth needing extraction was 0.9 ± 2.1 in the total sample and 2.6 ± 2.9 among those who needed extractions. In this respect there were no statistically significant differences between men and women or between the two villages. Among those needing extractions nearly half (46.8%) needed only one. The need for extractions increased with increasing age (Fig. 2).

All in all, 82.7% of the subjects had a restorative treatment need. The mean number of teeth needing restoration(s) was 3.0 ± 2.6 in the total sample and 3.7 ± 2.4 among those who needed such treatment. There were no significant differences between men and women or between the two villages. Among those who needed restorations more than half (58.6%) needed three or more teeth restored. The mean number of teeth needing restoration decreased consistently with increasing age with the exception of the 45- to 49-year age group (Fig. 3).

When measured by the DMFT index and its components, the subjects of the Fenno-Ugrian ethnic

Table 3. Caries experience indices and estimated treatment need by major ethnic group and self-reported use of dental services

	Ethnic group		Use of services	
	Fenno-Ugrians	Slavs	Rare	Regular
DMFT	16.4	14.6*	15.9	15.3
DT	3.5	4.5*	3.8	3.9
MT	9.7	6.6***	9.2	6.2*
FT	3.2	3.4	2.9	5.2***
Need for extraction(s)	0.8	1.1	1.0	0.2*
Restorative treatment	2.7	3.6*	2.9	3.7

Significance of t test: * = $0.05 \geq p > 0.01$; ** = $0.01 = p > 0.001$; **** = $p \leq 0.0001$.

group had higher caries experience than their Slavic counterparts. However, among the Slavs the need for restorative treatment was greater (Table 3). According to the questionnaire, approximately 84% of the subjects had used dental services rarely or only occasionally. There were no differences in use of such services between males and females, places of residence, nor ethnic groups. About one third of the subjects had had their previous dental visit more than 3 years ago. The regular use of dental services was reflected in the higher number of missing teeth, in the lower number of filled teeth and in the lower need for extraction(s) than the irregular use (Table 3).

Discussion

This study was planned to provide an estimate of development needs for oral health services in the Karelian region of Russia, because no descriptive studies were available to the Karelian Ministry of Health. This study was designed as part of the Finnish–Karelian oral health cooperation program and was carried out by internationally defined criteria, to enable general comparisons with epidemiologic surveys in other countries. On the basis of these findings it was expected to be easier to plan development cooperation on the basis of mutual interest and understanding. For practical reasons we did not have access to a larger, more representative sample for this investigation, and so these two rural communities with low migration rate were chosen for gathering current oral health estimates. There was no access to population registers for a detailed epidemiologic survey. However, for planning and development of dental services in Karelia, it was crucial to estimate a demand for dental services. During the study week about 10% appeared for dental examination and free dental treatment. As the participation rate was low, the various indices might be biased, most probably as underestimates of the real situation, because treatment need among edentulous people is generally low. However, the age distribution of the sample corresponded quite well to that of the total population in Megrega. There was a overrepresentation of women in the sample, but this is quite common in epidemiologic surveys, probably because it is easier for them to find time for dental check-ups and because they are in general more concerned about their health than men. However, this introduced no bias, because the genders were analyzed separately.

The main finding of the study was that oral health was quite good among the adults of these two Karelian communities, as measured by caries experience. The mean FT index was low, reflecting lack of funds or interest in obtaining restorative services. The MT index was also low (3.5–19.1, from 30–34 years to >65 years), revealing good oral health compared with national studies in Finland (10–22, from 30–34 years to >65 years) (6) and the UK (8.8–16, from 35–44 years to >55 years) (7). Comparison of the 35- to 44-year age group with the nationwide study conducted in Finland (8) and the International Collaborative Study (9) confirmed the finding of good oral health in the study group.

It was of interest that, when measured by MT and FT indices, the 50- to 54-year-olds seemed to have better dental health than those of the proximal age groups. This conforms with corresponding findings in a Finnish survey (10). World War II and the succeeding years of sugar rationing seem to have resulted in similar effects on both sides of the Finnish/Russian border. This is because the permanent molars are especially susceptible to caries immediately after eruption during the maturation period.

The differences in MT and FT indices between men and women corresponded well with the data obtained from Finland (6) and the UK (7). These figures are generally higher among women because they use dental services more often than men. However, there were no differences in the DT index, although women in Finland and in the UK also had fewer untreated caries than men. This is probably the result of scarce restorative services, especially fillings, in the Karelian communities.

Treatment need was strongly associated with

age—the need for extractions positively and the need for restorative treatment negatively. This is natural since caries risk tends to decrease with the decreasing number of teeth in aged persons, whereas the need for extractions increases with the rising risk of periodontal disease (11).

The difference in caries experience between the Fenno-Ugrians and Slavs is an interesting and unexpected result that is difficult to explain with a study of this size. More information on background factors would be necessary to explain this finding. However, this was a minor problem with no consequences for the aim of the study, and it did not affect the investigation.

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