

Impact of Fluoride Deficit on Dental Health in High Mountainous Regions of Georgia

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Summary

Oral Diseases have a significant role in global morbidity. Dental health is affected by both endogenous and exogenous factors. One of the most important factors in caries development is the fluoride deficit. The aim of the research was to study the rate intensity and prevalence of dental caries among the adult population of high mountainous regions of Georgia and their correlation with fluoride deficit in drinking water. The investigation was performed in high mountainous villages of Georgian regions (Svaneti, Racha, Samegrelo). During the study, risk-factors of the caries development were assessed, such as the hygiene of oral cavity, existence of general diseases, socioeconomic status, availability of dental assistance, diet content, smoking and etc. In addition, the fluoride content in drinking water was assessed. According to our investigation, it was detected, that together with such risk factors as oral hygiene, general health condition, socioeconomic status and etc., the fluoride deficit in drinking water, plays an important role in dental caries development.

Key words: *high mountainous region, dental caries, Fluoride.*

Problems Statement:

Dental caries continues to pose an important public health problem across the world. The World Health Organization (WHO) emphasizes that the disease affects about 60–90% of schoolchildren, the vast majority of adults and that dental caries contributes to an extensive loss of natural teeth in older people globally. Meanwhile, in most westernized high income countries, an improvement in dental health has taken place over the past three decades in parallel with the introduction of prevention-oriented oral health systems. A decline in the prevalence and the severity of dental caries is particularly observed in countries having established public health programmes using fluoride for dental caries prevention, coupled with changing living conditions, healthier lifestyles, and improved self-care practices [1, 2, 3].

Dental caries affects quality of life and has a negative impact on daily performance. The compartmentalization involved in viewing the mouth separately from the rest of the body must cease because oral health affects general health by causing considerable pain and suffering and by changing what people eat, their speech and their quality of life and well-being. Oral health also has an effect on other chronic diseases. Because of the failure to tackle social and material determinants and incorporate oral health into general health promotion, millions suffer intractable toothache and poor quality of life and end up with few teeth [4].

Oral health affects people physically and psychologically and influences how they grow, enjoy life, look, speak, chew, taste food and socialize, as well as their feelings of social well-being. Severe caries detracts from children's quality of life: they experience pain, discomfort, disfigurement, acute and chronic infections, and eating and sleep disruption as well as higher risk of hospitalization, high treatment costs and loss of school days with the conse-

quently diminished ability to learn. Caries affects nutrition, growth and weight gain [5].

Fluoride is widely recognized for reducing the prevalence of dental caries. Although dental caries is multifactorial and complex, it is preventable. Results of numerous studies have shown that fluoride decreases the incidence of dental caries and slows or reverses the progression of existing lesions by decreasing the rate of dental enamel demineralization and enhancing the rate of enamel remineralization [6].

The “Fluoride” has very important role in the development of tooth in general and in the development of enamel in particular. It is incorporated in the enamel at molecular level during developmental stage and form Fluorapatite after binding with the hydroxyapatite crystals of the enamel. Fluoride mostly enters the body via the gastrointestinal tract and is absorbed quickly in the stomach without the need of specialized enzymatic systems [4].

It is worth to point out that Fluorine is not the panacea for caries, but it is just the meanse of its prevention. In order to avoid caries, the right way nutrition and regular visits to the dentist are also critically important.

The aim of the research:

The aim of the research was to study the intensity and prevalence of dental caries among adult population of high mountainous regions of Georgia and their relationship with the Fluorine deficit in drinking water.

Materials and Methods:

The research was held in high mountainous villages of Georgian regions (Svaneti, Racha, Samegrelo). In total, 614 people were investigated (Svaneti-208, Racha-202, Samegrelo-204 people). We used 5 age groups according

to the International Healthcare Organization: (35-44)-221 people; (45-54)-152 people; (55-64)-124 people; (65-74)-66 people; (74-85) – 51 people. According to the gender, 269 males and 345 females were investigated by an experienced practicing dentist in attendance of 4 assistants, on the basis of prior informed consent. The quantitative as well as qualitative investigations were held.

During the research, risk factors of caries development were assessed, such as oral hygiene, existence of general diseases, socioeconomic status, availability of dental assistance, diet content, smoking and etc. Besides, the Fluorine content in drinking water was assessed.

The hygiene of oral cavity was assessed, using OHI_S (Oral Hygiene Indices – Simplified). Dental caries intensity was studied using DMF-index (decayed teeth, missing teeth, fillings) [7]. Obtained results were statistically processed in SPSS.21.

Results:

According to our investigation, among the adult population of high mountainous regions, the caries prevalence is high (Table 1).

Table 1. Prevalence of dental caries according to regions

Region	Rate (%)
Svaneti	94.7
Racha	98.0
Samegrelo	100.0

Caries intensity was also found very high according to DMF index in all three regions (Table 2).

Table 2. Dental caries intensity according to regions

Region	DMF index	P
Svaneti	12.56 ± 9.541	<0.05
Racha	9.67 ± 9.153	<0.05
Samegrelo	10.36 ± 8.262	<0.05

Obtained results of oral hygiene assessment are given in table 3.

Table 3. Oral cavity hygiene index value among investigated contingent

OHI_S- index	Rate (%)
0.5 (good)	7
1.2 (satisfactory)	11
1.9 (unsatisfactory)	57
2.8 (bad (poor))	25

Attention must be paid to the employment issue of the population of high mountainous regions, which is then reflected in socioeconomic status. 64% of the investigated individuals have a profession. 39% are employed and the remaining 61% are unemployed. Out of the latter, 13% are busy in agriculture.

During the investigation, we separated X group. In it we included the contingent that was employed, practically healthy and had good or satisfactory index of hygiene. It must be pointed out that in X group too, caries prevalence and intensity was high (Table 4).

Table 4. Caries rate and intensity in X group

Caries rate	100%	P < 0.05
Caries intensity	10.12 ± 7.29	P < 0.05

In spite of the fact, that in X group, we excluded the impact of such risk factors as socioeconomic status, general health condition and the index of the oral cavity hygiene, the caries rate and intensity still proved to be high. That is why we started studying of such risk factor as the impact of Fluoride deficit on dental health.

During the investigation of Fluoride consistency in drinking water, we found a very low consistency in all three regions (Table 5).

Table 5. Fluoride content in drinking water in Svaneti, Racha and Samegrelo.

Regions	Norm no more than mg/l	Result Fluoride F mg/l 2015-2017 years
Svaneti	0.7-1.5	0.05
Racha	0.7-1.5	0.05
Samegrelo	0.7-1.5	0.03

According to our investigation, the Fluoride deficit in drinking water has significant impact on dental health of high mountainous population.

Conclusion:

According to our investigation, we found that together with risk factors, such as oral hygiene, general health condition, socioeconomic status and etc., the Fluoride deficit plays an essential role in caries development.

Hence from the very high prevalence and intensity of Caries in Georgian population, including high mountainous regions, it is inevitable to develop and implement the preventive measures, which will be aimed to improve the dental health. In addition, it is crucial to plan these arrangements at state as well as individual levels.

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