



## ASSESSMENT OF ORAL HEALTH CONDITION IN CHILDREN WITH DIFFERENT SOCIAL STATUS IN GEORGIA

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### ABSTRACT

**Task:** Oral diseases are prevalent worldwide. Children from the families with low economic capacity are particularly vulnerable to this group of diseases. Planning dental care is impossible without studying the intensity and prevalence of dental diseases. The aim of the research is to study the oral health condition in a contingent of children with different social status in Georgia.

**Methods:** During the study was selected a prospectus, cross-sectional study through the direct consultation. Children and adolescents deprived of care included within the leaving prevention and deinstitutionalization process are the subjects of study. Target population was studied in 10 facilities located in Tbilisi, Rustavi, Kutaisi, Batumi, Martkopi, Norio (276 beneficiaries). And control population was studied in secondary education institutions of Tbilisi, Rustavi, Chiatura, Kutaisi and Poti (276 students). The contingent studied was divided into two age groups - the study and control group: children and adolescents aged 6-13 and 13-18. Age and gender distribution were similar to the group of target children. The results obtained were recorded in the medical and dental cards, where information on the following variables was filled: name of the institution; social status of the object; age; sex; oral hygiene index; caries intensity (DMFT index); prevalence of caries; BoP index; determination of the teeth with extraction indication; prematurely extracted teeth. The standard software was used for the statistical analysis (SPSS 24).

**Results:** The prevalence rate of caries among the children and adolescents of the target group is 98.9% and in the control group the same rate is 64.8%. The prevalence rate of caries among the female individuals of the target group is 93.4%, and in the female population of the control group is 56.8%. The prevalence rate of caries in the male population of the target group is 97.8%, and in male individuals of the control group it is 69.5%. The prevalence rate of caries among the children of the target group aged 6-13 is 94.2%, and among the children of the control group is 64.6%. The prevalence rate of caries among the adolescents of the target group aged 13-18 is 97.1%, and among the adolescents of the control group is 61.9%. Statistical analysis showed that the DMFT index is significantly higher by age, gender and region among the children and adolescents of the target group ( $p < 0.001$ ). 40.6% of the study group has very high levels of caries intensity and 13% the has higher level. A different data is among the children and adults of the control group, only 4% has very high level of caries intensity and 2.9% has a high level. Comparing the sex, age and region of the control and target groups showed that the difference between these two groups is statistically significant, the individuals of the target group have a higher caries intensity than those of the control group ( $P < 0.001$ ). The hygiene index rate of a third of the beneficiaries studied is very poor (31.2%), and if poor in 15.2%. Only a fifth (19.2%) had a good condition. Comparison of the sex, age and region of the control and target groups showed that the difference between these two groups is statistically significant, and the individuals from the target group had a poorer oral hygiene index rates than those of the control group ( $P < 0.001$ ). 62% of the target group had no signs of bleeding (0%), 11.6% in total had a high bleeding rate (25-75% and 75-100%). 96.7% of the control group had no signs of bleeding. 15.1% of the study population had a prematurely extruded permanent dentitions and 2% of the control group. 15.7% of the control population had a caries complication of the permanent dentitions and 38.1% of the study population.

**KEYWORDS :** Children, Adolescents, Oral Health, Social Status.

### INTRODUCTION:

Oral diseases are prevalent worldwide (Peres et al., 2019). The caries and periodontal diseases are characterized by high prevalence among the oral diseases and are a global problem for the public health, however, especially their increasing prevalence is observed in low and middle-income countries and is associated with extensive social, economic and commercial changes (Kassebaum et al., 2017; Petersen et al., 2005). Periodontal diseases occur in about 50% of the adults, while about 11.2% of the world's population have a severe periodontitis (Kassebaum et al., 2014). Caries is the most common in permanent dentitions, it covers 2.4 billion of people, and early childhood caries are a silent global epidemic affecting 621 million of children (Kassebaum et al., 2015) that negatively affects their quality of life and well-being (Duangthip et al., 2020).

Dental caries, its complications and, as a result, the early extraction of the deciduous and permanent dentitions, is the cause of the appearance of deformation of the maxillofacial system, which can affect the aesthetic of visual, chewing function, facial harmony and psychosocial well-being (Perillo et al., 2013; Perillo et al., 2014).

Dental diseases impose a substantial economic burden on society (Listl et al., 2015). Direct expenses for dental diseases in 2015 were estimated at 356.80 billion USD and indirect costs at 187.61 billion USD (Peres et al., 2019). As of 2015, the list of three diseases whose direct and indirect costs of prevention and treatment are the highest in the world is as follows: diabetes (119 billion euros); cardiovascular disease (111 billion euros); dental diseases (90 billion euros) (Chen, 2020).

The stark and persistent socioeconomic inequalities exist in the prevalence of oral diseases in a consistent and graded manner across the social hierarchy, serving as a classic example of a social gradient in health (Peres et al., 2019).

It is often recommended to strengthen the prevention of oral diseases (Pitts, Zero, 2016) in order to reduce the prevalence and severity of the disease that is consistent with the general health agenda (World Health Organization, 2013).

However, the oral diseases are a neglected issue, rarely seen as a priority in the health policy. (Benzian et al, 2011). Children from the families with low economic capacity are particularly vulnerable to this group of diseases. (Cheng, Emmanuel, 2015; Baggio, Abarca, 2015; Innes, Frencken, 2016; Dusseldorp, Kamphuis, 2015, Bast, Nordahl, 2015; Geboers, Reijneveld, 2018, Hofstetter, Dusseldorp, 2016.)

There is no data on the dental status of children and adolescents deprived of care included within the leaving prevention and deinstitutionalization process in Georgia. In this regard, it is relevant to conduct the studies aimed at studying the dental morbidity among a given contingent of the population, justifying the need for the dental care in order to develop an adequate service system for integration into the state insurance.

### MATERIAL AND METHODS:

During the study was selected a prospectus, cross-sectional study through the direct consultation.

Children and adolescents deprived of care included within the leaving prevention and deinstitutionalization process are the subjects of study. Target population was studied in 10 facilities located in Tbilisi, Rustavi, Kutaisi, Batumi, Martkopi, Norio (276 beneficiaries). And control population was studied in secondary education institutions of Tbilisi, Rustavi, Chiatura, Kutaisi and Poti (276 students). The contingent studied was divided into two age groups - the study and control group: children and adolescents aged 6-13 and 13-18. Age and gender distribution were similar to the group of target children.

Examination of the population's dental status was made based on WHO recommendation (WHO – Oral Health Assessment Form 2013).

In order to determine the dental status of the population studied, oral examination was carried out with disposable dental instruments under the natural lighting conditions. The results obtained were recorded in the medical and dental cards, where information on the following variables was filled: name of the institution; social status of the object; age; sex; oral hygiene index; caries intensity (DMFT index); prevalence of caries; BoP index; determination of the teeth with extraction indication; prematurely extracted teeth.

The standard software was used for the statistical analysis (SPSS 24).

The methods of descriptive statistics were used in the study. The quantitative variables in the study results for both the total population and each subgroup are cited as average (Mean) Standard Deviation-SD, and the qualitative variables are given as percentages.

Pearson Chi-square test was used in order to check the differences according to dichotomous variables between the groups.

Non-parametric tests Mann-Whitney U (when comparing two groups) and Kruskal Wallis Test (when comparing few groups).

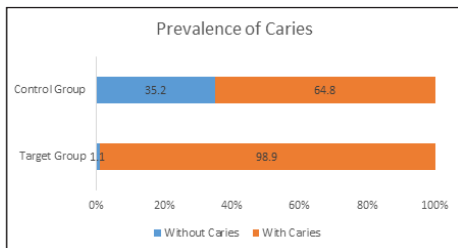
Odds Ratio – OR 95% and Confidence Intervals – 95% CI were listed when evaluating of risk factors by the groups, and the statistical credibility of the results was checked by bilateral Z-test.

The multiply regressive analysis was also used. The significant risk factors that affect the oral hygiene index, the caries intensity and the BOP-index were determined from the combination of risk factors. Result and Discussion:

**Prevalence of Caries**

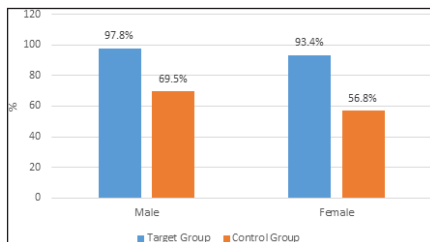
The prevalence rate of caries among the children and adolescents of the target group is 98.9% and in the control group the same rate is 64.8%. The difference between the groups according to this indicator is statistically significant ( $X^2(1, N=552) = 90.958, p<0.001$ ).

**Diagram 1. The prevalence of caries among the children and adolescents of the target and control groups**



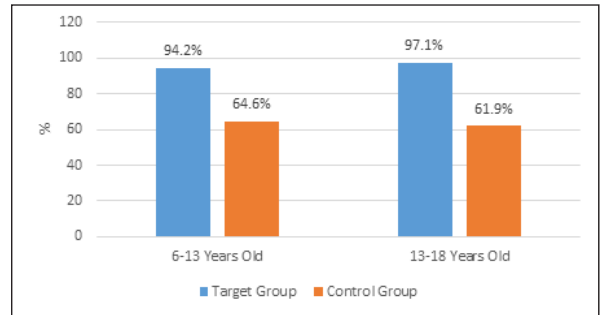
The prevalence rate of caries among the female individuals of the target group is 93.4%, and in the female population of the control group is 56.8% ( $X^2(1) = 50.221, p<0.001$ ). There is a similar trend when comparing male individuals. The prevalence rate of caries in the male population of the target group is 97.8%, and in male individuals of the control group it is 69.5% ( $X^2(1) = 40.290, p<0.001$ ).

**Diagram 2. The prevalence of caries among the male and female individuals of the target and control groups**



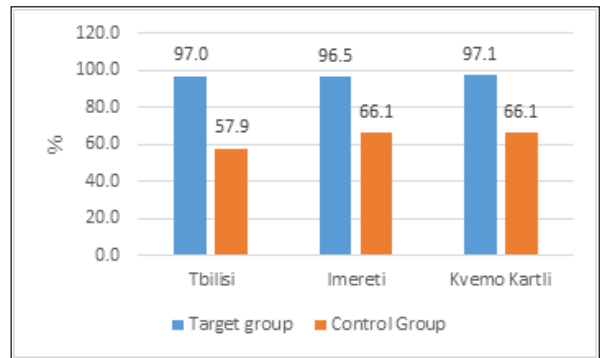
The prevalence rate of caries among the children of the target group aged 6-13 is 94.2%, and among the children of the control group is 64.6% ( $X^2(1) = 31.617, p<0.001$ ). The prevalence rate of caries among the adolescents of the target group aged 13-18 is 97.1%, and among the adolescents of the control group is 61.9% ( $X^2(1) = 56.128, p<0.001$ ).

**Diagram 3. The prevalence of caries among the children and adolescents aged 6-13 and aged 13-18 of the target and control groups**



When comparing the groups by regions, it was found that the prevalence rate of caries among the children and adolescents of the target group in each region was higher than among the children and adolescents of the control group in the same region. The difference between these groups is statistically significant ( $p<0.001$ ).

**Diagram 4. The prevalence of caries among the children and adolescents of the target and control groups by regions**



Caries Intensity (DMFT Index)

DMFT index data of each group/subgroup is shown in the Table No1. Statistical analysis showed that the DMFT index is significantly higher by age, gender and region among the children and adolescents of the target group. The difference between groups is even statistically reliable when comparing all groups ( $p<0.001$ ).

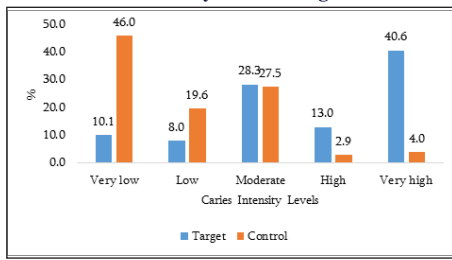
**Table 1. DMFT index indicators in target and control groups.**

	N	Mean	Std.Deviation	Std. Error Mean
Target Group	276	5,19	3,03	.18
Control Group	276	1,81	1,812	.11
Target group female	137	4,95	3,02	0,26
Control group female	148	1,68	1,78	0,15
Target group male	139	5,42	3,03	0,26
Control group male	128	1,95	1,84	0,16
Target group children aged 6-13	137	4,81	2,91	0,25
Control group children aged 6-13	79	1,94	1,89	0,21
Target group adolescents aged 13-18	139	5,56	3,10	0,26
Control group adolescents aged 13-18	197	1,76	1,78	0,13
Tbilisi (target group)	100	4,66	2,72	0,27
Tbilisi (control group)	76	1,58	1,75	0,20
Achara (target group)	85	5,26	3,31	0,36
Imereti (target group)	57	6,54	3,04	0,40
Imereti (control group)	81	1,69	1,82	0,20
Samegrelo (control group)	60	1,88	1,46	0,19
Kvemo Kartli (target group)	34	4,29	2,42	0,41
Kvemo Kartli (control group)	59	2,19	2,15	0,28

**Caries Intensity Levels**

40.6% of the study group has very high levels of caries intensity and 13% has higher level. A different data is among the children and adults of the control group, only 4% has very high level of caries intensity and 2.9% has a high level.

**Diagram 5. The caries intensity levels in target and control groups**



Comparing the sex, age and region of the control and target groups showed that the difference between these two groups is statistically significant, the individuals of the target group have a higher caries intensity than those of the control group (P<0.001).

The rates of caries intensity levels of the target and control children groups by Odds Ratio - OR and 95% Confidence Intervals - 95% CI are given in Table No2.

The chances that the caries intensity among the children of the study population will be 3.9 times higher than the chance of having the same level among the children of the control population (p<0,001), and the intensity of caries among the children of the study population will be very high, 14.9 times higher than the chance of having the same level among the children of the control population (p<0,001).

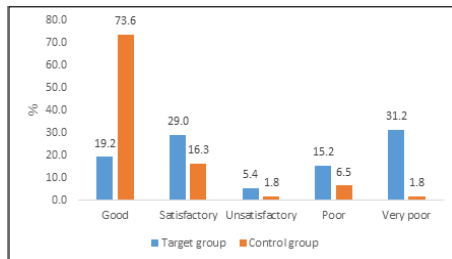
**Table 2. The caries intensity levels OR and 95%CI, study group vs. control group**

Caries Intensity Levels	OR	95%CI	Z-test	P
Very low	0.02	0.007 – 0.05	7.69	<0.001
Low	0.31	0.19 – 0.52	4.44	<0.001
Moderate	1.10	0.77 – 1.58	0.52	0.527 (NS)
High	3.90	1.95 – 7.53	3.91	<0.001
Very high	14.87	8.27 – 26.76	9.01	<0.001

**Oral Hygiene Index Indicators**

The hygiene index rate of a third of the beneficiaries studied is very poor (31.2%), and if poor in 15.2%. Only a fifth (19.2%) had a good condition. Comparison of the sex, age and region of the control and target groups showed that the difference between these two groups is statistically significant, and the individuals from the target group had a poorer oral hygiene index rates than those of the control group (P<0.001).

**Diagram 6. Oral hygiene index indicators in the target and control groups**



The chance that children and adolescents of the study population will have an unsatisfactory rate of OHI index is 1.8 times higher than the chance of having the same rate among the children of the control group (p=0.002); the chance of having a poor rate of OHI index among the children and adolescents of the study population is 3.6 times higher than the chance of having the he same rate among the control group (p<0.001); the chance of having very poor rate of OHI index among the children and adolescents with the status is 20.2 times higher than the chance of having the he same rate among the children and adolescents without the status (p<0.001).

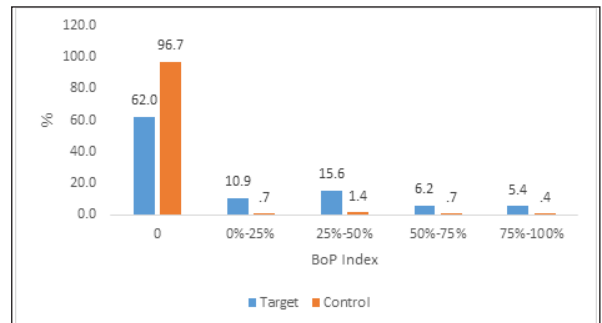
**Table 3. OHI indicators OR and 95%CI in the target and control groups.**

OHI	OR	95%CI	Z-test	P
Good	0.10	0.06 - 0.14	11.84	<0.001
Satisfactory	3.10	1.09 - 8.82	2.13	0.017
Unsatisfactory	1.75	1.2 - 2.56	2.9	0.002
Poor	3.58	1.94 - 6.63	4.08	<0.001
Very poor	20.17	9.15 - 44.51	7.44	<0.001

**BoP index.**

62% of the target group had no signs of bleeding (0 %), 11.6% in total had a high bleeding rate (25-75% and 75-100%). 96.7% of the control group had no signs of bleeding. There was no statistically significant difference among the gender and age groups according to the BoP index.

**Diagram 7. BoP index indicators in the target and control groups**



The chance of having a 0% -25% BoP index rate among the children and adolescents of the study population is 19.3 times higher than the chance of having the same index in the control group (p<0.001); the chance of having a 25% -50% BoP index in the study group is 29.3 times higher than the chance of having the same index in the control group (p<0.001); the chance of having a 100% BoP index rate is 18.3 times higher than the chance of having the same rate in the control group (p=0.003).

**Table 4. BoP index indicators OR and 95%CI in the target and control groups**

BoP-Index	OR	95%CI	Z-test	P
0	0,04	0.02 - 0.08	8.23	<0.001
0%-25%	19.33	4.57 - 81.67	4.03	<0.001
25%-50%	29.25	7.02 - 121.97	4.03	<0.001
50%-75%	10.40	2.38 - 45.44	3.11	<0.001
75%-100%	18.28	2.40 - 139.27	2.80	0.003

Chi-Square test was used for comparison of the groups by Dichotomy variables (Table 7).

**Table 5. Comparison of the target and control groups, levels of χ2 test indicators (P)**

	P
Deciduous teeth with extraction indication	0,241
Permanent teeth with extraction indication	0,369
Prematurely extracted deciduous teeth	0,150
Prematurely extracted permanent teeth	0,000*
Complications of caries of the deciduous teeth	0,167
Complications of caries of the permanent teeth	0,000*
Treated deciduous teeth	0,301
Treated permanent teeth	0,252

\* statistically significant difference

15.1% of the study population had a prematurely extradited permanent dentitions and 2% of the control group. Difference between them is a statistically significant (X2 (1) = 20.238, P<0001).

15.7% of the control population had a caries complication of the permanent dentitions and 38.1% of the study population. Difference between them is a statistically significant (X2 (1) = 21.796, P<0001).

**CONCLUSION:**

As a result of descriptive analysis, the prevalence of caries is high (98.8%) and the level of caries intensity is very high (40.6%) among the children and adolescents deprived of care included within the leaving prevention and deinstitutionalization process. The χ2 test revealed a statistically significant difference in the number of prematurely extracted permanent teeth in the study and control groups, which is a risk factor for the development of anomalies in the maxillofacial system. And by analyzing multiple regression models, we received the following results: children's social status and age affects the oral health condition assessed by oral hygiene index; and only children's social status affects the oral health condition assessed

by caries intensity; children's social status and type of educational organization affects the oral health status assessed by the BOP index. Therefore, the social status reveals a significant correlation with all three indexes. Therefore, it represents a significant risk factor for worsening of the oral health condition.

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