



The Impact of Supervised Tooth Brushing on the Level of Oral Hygiene in First Year Schoolchildren in Minsk, Belarus

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Abstract

Oral health is linked with general health, and diseases occurring in oral cavity are of major public health importance due to their high prevalence and tremendous social impact. Dental caries is one of the most common preventable diseases occurring among children.

Keywords: Oral Hygiene; Supervised Tooth Brushing; Dental Plaque; Oral Health; Oral Health Education; Oral Health Practice; Schoolchildren

Purpose of the Study

To study the hygienic state of the oral cavity in primary schoolchildren in dynamics.

Introduction

Oral health is linked with general health, and diseases occurring in oral cavity are of major public health importance due to their high prevalence and tremendous social impact. Dental caries is one of the most common preventable diseases occurring among children [1].

According to data of epidemiological research in 2018 prevalence of dental caries among 6-year old children in the Republic of Belarus was 80,50%. Incidence of dental caries of primary and permanent teeth in this age group in our country was 4,79 and 0,09 respectively [2].

The first permanent molar due to early time of eruption (between the ages of 6-7), the presence of grooves and cavities on the occlusal surface and other factors initially related to the early age of young children, including the lack of proper sanitation and unbalanced consumption of sugar content, is more predisposed to caries [3]. Caries of the pits and fissures of permanent teeth continues to be a problem for children. Researchers confirm a significant relationship between level of oral hygiene and first permanent molar caries [4,5].

Oral hygiene measures have been shown to be able to reduce the incidence of caries [6]. However children at the age of 6-7 years old have low tooth brushing skills [7]. A few studies also reported about primary school children having irregular oral hygiene practices [8-10]. Children could be given an increasing responsibility from 7 year of age but parental help and supervision is considered necessary and recommended until 10 years of age [11].

The school-supervised tooth brushing programs are also effective in improving oral hygiene [12]. Oral health habits, attitudes, and behavior are the best established during childhood. It is believed that visualization, active participation, skill training, and reinforcement are of paramount importance in establishing and altering behavior in a child. Also, the largest and the most significant group accessible for oral health education is always seen in school systems. For this reason classroom was considered an ideal setting to conduct supervised toothbrushing program [13].

Study design

This is a prospective cohort study which was conducted from September 2018 to September 2019. It was organized by the authors as a part of Government Program «People's health and demographic security of the Republic of Belarus 2016 – 2020». The program took place in two randomly selected schools in Minsk, Belarus. Mean and percentage differences were compared (baseline and follow-up).

Materials and Methods

196 pupils (6 classes) of the 1st grade took part in the preventive program. The primary examination was done at the beginning of the school year, in September 2018. The level of oral hygiene was assessed using the Simplified Oral Hygiene Index (OHI-S), Greene and Vermillion, 1964 [14]. According to this index, oral hygiene index of between 0.0 and 0.6 was described as good, 0.7 and 1.6 as satisfactory, and between 1.7 and 3.0 is said as unsatisfactory.

Then 2 groups were formed. Group 1 included 113 children. Children in group 1, their school teachers and educators were taught tooth brushing according to the Marthaler's method (Figure 1-3). This method is adapted to the psychophysical capabilities of primary schoolchildren [15]. Children were instructed twice a week until they performed good manual skills in tooth brushing.



Figure 1: Dentist is instructing schoolchildren about the method of tooth brushing.



Figure 2: Tooth brushing instructions.



Figure 3: Schoolchildren brushing teeth under supervision of teacher.

Then, tooth brushing was carried out daily under the supervision of school teachers and educators after a day meal before afternoon sleep. They used medium toothbrushes and fluoride-containing toothpastes with concentration of fluoride 1450 ppm. Reevaluation of the level of oral hygiene was carried out at the end of the school year, in May, after 9 months of supervised brushing. As the children had school holidays from June to August supervised tooth brushing was not carried out. 12 months later at the beginning of the 2nd grade after the summer school holidays the assessment of the oral cavity hygiene of the children was carried out according to the OHI-S index.

Group 2 included 83 children. An oral hygiene lesson in brushing teeth using the Marthaler's method was carried out in group 2 at the beginning of the 1st grade. 12 months later the oral hygiene of the children was assessed using the OHI-S index.

Results and Discussion

The study found out that the average value of the OHI-S hygiene index in children in group 1 was $1,22 \pm 0,05$, which was interpreted as a satisfactory level of oral hygiene (Figure 4). At the same time, good oral hygiene according to the OHI-S index was noted in $12,39 \pm 3,10\%$ of the first-graders, satisfactory in $65,74 \pm 4,47\%$, unsatisfactory in $22,12 \pm 3,90\%$ (Figure 5).

In children in group 2 the average value of the OHI-S hygiene index was $1,49 \pm 0,06$ that corresponded to a satisfactory level of oral hygiene (Figure 4). At the same time, good oral hygiene according to the OHI-S index wasn't noted in the first-graders, satisfactory was in $42,17 \pm 5,42\%$, unsatisfactory in $42,17 \pm 5,42\%$ (Figure 5).

After 9 months of supervised tooth brushing the oral hygiene status of the children in group 1 was re-evaluated. The average OHI-S index was $0,76 \pm 0,05$, which corresponded to good oral

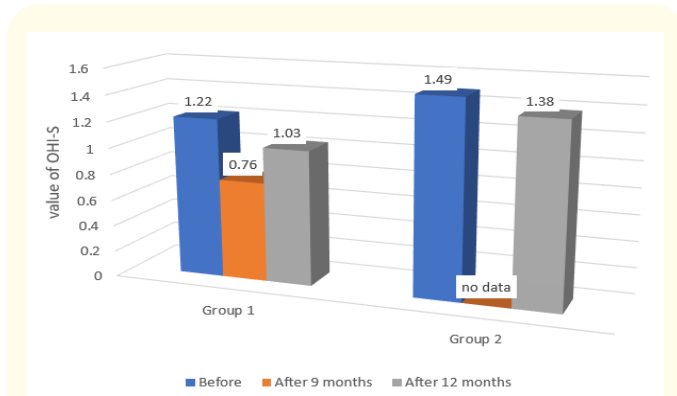


Figure 4: OHI-S value changes in groups 1 and 2 within the study.

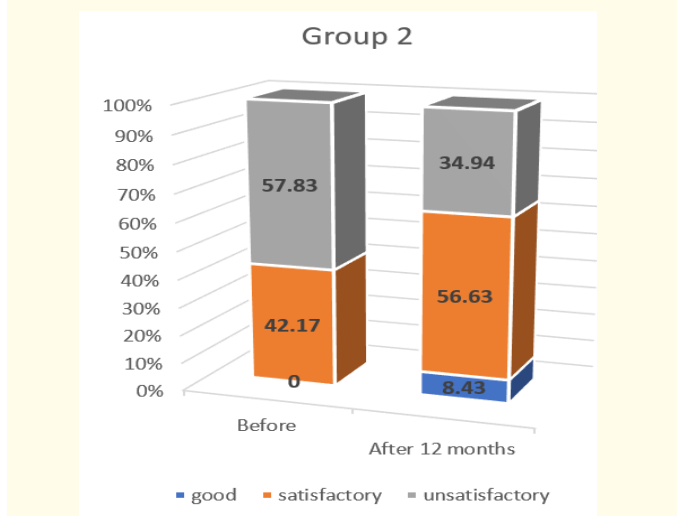
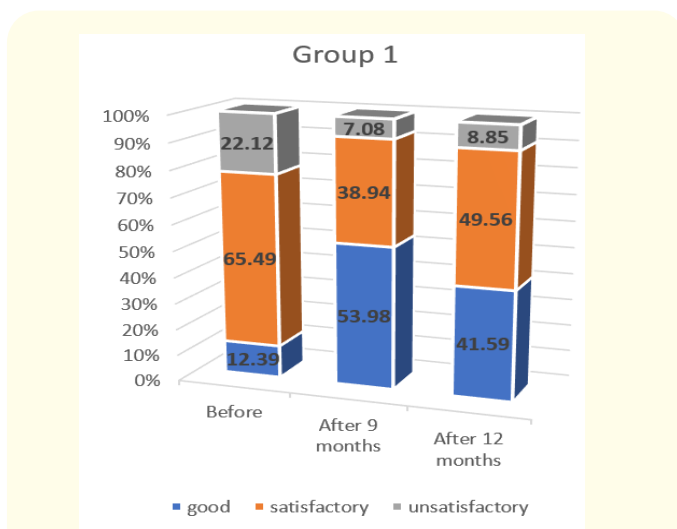


Figure 5: First-graders OHI-S Hygiene Index Structure in Group 1 and 2.

hygiene. An improvement in the hygienic state of the oral cavity in children was noted. Reduction of OHI-S index during 9 month

of supervised tooth brushing was 37,71%. There were significant ($p < 0,05$) difference in the level of oral hygiene at baseline and after 9 months (Figure 4). At the same time, $53,98 \pm 4,69\%$ of the schoolchildren had good oral hygiene according to the OHI-S index, $38,94 \pm 4,59\%$ were satisfactory, $7,08 \pm 2,41\%$ were unsatisfactory (Figure 5).

After 12 months from the start of the study at the beginning of the 2nd grade a reevaluation of the oral hygiene in children was carried out. The average OHI-S hygiene index in children in group 1 was $1,03 \pm 0,05$, which corresponded to satisfactory oral hygiene. Reduction of OHI-S index during 12 months was 15,57% ($p < 0,05$), increase of OHI-S during 3 summer months without supervised tooth brushing was 35,53% ($p < 0,05$) (Figure 4). At the same time, good oral hygiene according to the OHI-S index was noted in $41,59 \pm 4,64\%$ % of first-graders, satisfactory in $49,56 \pm 4,70\%$, unsatisfactory in $8,85 \pm 2,67\%$ (Figure 5).

In children in group 2 the average value of the OHI-S hygiene index was $1,38 \pm 0,06$, which corresponded to a satisfactory level of oral hygiene (Figure 4). At the same time, $8,43 \pm 3,05\%$ of first-graders had good oral hygiene according to the OHI-S index, $56,63 \pm 5,44\%$ - satisfactory, $34,94 \pm 5,23\%$ - unsatisfactory (figure 5). Reduction of OHI-S index during 12 months was 7,38%. There were no significant ($p > 0,05$) difference in the level of oral hygiene at baseline and after 12 months.

Thus, after 3 months of summer vacations and, accordingly, because of the absence of supervised tooth brushing there is a deterioration in oral hygiene in children of group 1. However, despite this, the value of the OHI-S hygiene index is significantly ($p < 0,05$) better than in children of group 2.

Conclusion

Regular supervised brushing of teeth in first-graders helps to instill and improve oral care skills and, as a result, improve oral hygiene. The reduction in the hygiene index was 37,71%, which confirms the reasonability of the participation of primary school teachers in teaching children the oral cavity hygiene and conducting supervised tooth-brushing.

Our results are conformed with those obtained by other researchers. Leous PA., *et al.* showed significant difference in hygienic index on 35-52% from initial level in 1 month period of supervised tooth brushing in primary schoolchildren [16]. It was reported by Slot., *et al.* the effectiveness of supervised tooth brushing reduces plaque from baseline plaque scores by 42% on average, with a variation of 30—53%, dependent on the plaque index used [17].

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