



RESEARCH ARTICLE

FIRST RESULTS OF THE IMPLEMENTATION OF THE NATIONAL PROGRAM FOR THE PREVENTION OF DENTAL DISEASES AMONG SCHOOLCHILDREN “BOLASHAQQA – SAU TISPEN” IN THE REPUBLIC OF KAZAKHSTAN

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Abstract

Background. The high prevalence of dental diseases among children highlights the need to move from a predominantly treatment-oriented model of dental care toward systematic prevention focused on organized groups of children. The school setting provides an opportunity to achieve broad coverage of children through preventive dental examinations, oral hygiene education, early detection of dental pathology, and preventive clinical interventions.

Objective. To evaluate the initial results of the “Bolashaqqa – Sau Tispen” program based on the coverage of schoolchildren with preventive dental measures and to identify areas for further improvement of the program.

Materials and Methods. A descriptive observational study was conducted based on a secondary analysis of aggregated, anonymized routine monitoring data collected during the first half of 2026. The analysis covered reporting data from January through June 2026, inclusive. The analysis included data from 115 schools in the Republic of Kazakhstan, comprising a total of 184,412 children. The following indicators were assessed: coverage with preventive dental examinations; referrals for complicated dental caries and to specialist care; oral hygiene education; individual selection of oral hygiene products; dietary counseling; application of fluoride varnish; remineralization therapy; pit and fissure sealing; and preventive cusp grinding. Descriptive statistical analysis was performed using absolute values and proportions.

Results. Preventive dental examinations were provided to 127,761 of 184,412 children (69.3%). A total of 48,703 children (26.4% of the total cohort) were referred for further treatment of complicated dental caries, while 71,056 children (38.5%) were referred to specialist care. Oral hygiene education was provided to 119,461 children (64.8%), individual selection of oral hygiene products was performed for 105,312 children (57.1%), and dietary recommendations were provided to 118,309 children (64.2%). Fluoride varnish was applied to 87,746 children (47.6%), remineralization therapy was provided to 40,211 (21.8%), pit and fissure sealing was performed in 41,219 (22.4%), and preventive cusp grinding was performed in 19,061 children (10.3%).

Conclusion. The initial results of the program demonstrate the organizational feasibility of implementing large-scale preventive dental care directly within educational institutions. At the same time, the substantial number of children requiring further treatment and specialist consultation indicates a considerable accumulated need for dental care. Further monitoring using standardized epidemiological indicators and longitudinal assessment of comparable age cohorts is required to evaluate clinical effectiveness. The reported indicators should primarily be regarded as a baseline organizational and monitoring level for subsequent assessment of the clinical outcomes of the program rather than as independent evidence of its clinical effectiveness.

Keywords: preventive dentistry; children; schoolchildren; dental caries; oral health; school dental services.

INTRODUCTION

Dental diseases are among the most common noncommunicable diseases worldwide. According to the World Health Organization (WHO), approximately 3.5 billion people are affected by oral diseases, representing nearly 45% of the global population; the burden is disproportionately high among socially vulnerable groups 1.

The modern concept of public oral health emphasizes a shift from treatment of established disease toward prevention, early identification of risk factors, and minimally invasive interventions. The WHO Global Strategy and Action Plan on Oral Health 2023–2030 call for strengthened prevention, integration of oral health care into universal health coverage, and improved

The school-based prevention model makes it possible to reach large numbers of children regardless of how frequently their families independently seek dental care. Systematic reviews and studies of school-based programs have demonstrated beneficial effects of comprehensive interventions on preventive behaviors and selected clinical outcomes, while also emphasizing the need for long-term follow-up and assessment of the sustainability of these effects [3–7].

Clinical preventive measures also have a well-established evidence base. Fluoride varnishes are used for the prevention of dental caries in children and adolescents [8]. Pit and fissure sealing is an established preventive strategy for the occlusal surfaces of molars [9,10]. The 2026 WHO guideline identifies prevention and minimally invasive care as fundamental principles for the prevention and management of dental caries [11].

In the Republic of Kazakhstan, the issue is particularly relevant because of the need to ensure access to preventive dental care for children, including those living in rural and remote areas. Within the framework of the Roadmap approved by Order No. 680 of the Ministry of Health of the Republic of Kazakhstan dated September 27, 2024, implementation of the “Bolashaqqa – Sau Tispen” program (hereafter, the Program) was initiated to develop a system for the prevention of dental diseases among schoolchildren.

A key feature of the Program is the transfer of a substantial proportion of preventive dental activities directly into educational institutions. The comprehensive package includes preventive dental examinations, assessment of oral health, individual oral hygiene education, selection of oral hygiene products, dietary counseling, professional preventive care, use of fluoride-containing agents, remineralization therapy, pit and fissure sealing, identification of children requiring treatment, and subsequent referral and care coordination.

The practical significance of this study lies in obtaining baseline data for subsequent monitoring of program implementation, identification of organizational gaps, and improvement of referral pathways for children with identified dental diseases.

The objective of this study was to evaluate the initial results of the Program based on the coverage of schoolchildren with preventive dental measures and to identify the main areas for its further improvement.

Study Design and Study Population

A descriptive observational study was conducted based on a secondary analysis of aggregated routine monitoring data from the “Bolashaqqa – Sau Tispen” program. The analysis included reporting data from 115 general education schools in the Republic of Kazakhstan participating in the Program during the first half of 2026. The total number of children enrolled in the participating educational institutions was 184,412.

The analysis covered reporting data from January through June 2026, inclusive, and was aimed at assessing the actual coverage of the principal components of the Program during its initial implementation stage.

Statistical Analysis

The analysis was conducted across three groups of indicators. The first group characterized coverage with preventive dental examinations and subsequent referral: the number of children examined; the number referred for further treatment because of complicated dental caries; and the number referred to specialist care.

The second group comprised behavioral preventive measures: education on individual oral hygiene practices; individual selection of oral hygiene products; and dietary counseling.

The third group included clinical preventive interventions: application of fluoride varnish; remineralization therapy; pit and fissure sealing; and preventive cusp grinding.

For each indicator, the absolute number of children and the proportion relative to the total number of children in the analyzed school population were determined using the formula $P = n/N \times 100\%$, where P is the proportion of children receiving the respective intervention; n is the number of children who received the intervention; and N is the total number of children in the schools included in the monitoring program (184,412).

The individual preventive measures were not mutually exclusive; a child could receive several types of preventive interventions according to clinical indications. Therefore, the absolute numbers of individual interventions were not summed to calculate the total number of children covered.

The study was not a clinical trial and did not involve any additional diagnostic or therapeutic interventions for research purposes. Only aggregated, anonymized routine

monitoring data were analyzed; individual personal data of the children were not made available to the researchers.

Because the source data were aggregated, the analysis was limited to descriptive statistics. Causal relationships and individual risk factors were not assessed.

RESULTS

Main Program Implementation Indicators

The 115 schools included in the analysis enrolled 184,412 children. Preventive dental examinations were performed in 127,761 children, corresponding to 69.3% of the analyzed population. Thus, during the initial stage of program implementation, more than two-thirds of the children in participating schools had undergone a preventive dental examination (Table 1).

Table 1. Main Indicators of Program Implementation

Indicator	Number of children	% of cohort
Total number of children	184,412	100.0
Examined by a dentist	127,761	69.3
Referred for complicated dental caries	48,703	26.4
Referred to specialist care	71,056	38.5
Received oral hygiene education	119,461	64.8
Received individual selection of oral hygiene products	105,312	57.1
Received dietary recommendations	118,309	64.2
Received fluoride varnish application	87,746	47.6
Received remineralization therapy	40,211	21.8
Received pit and fissure sealing	41,219	22.4
Received preventive cusp grinding	19,061	10.3

One of the most significant findings was the substantial need for subsequent dental care. A total of 48,703 children were referred for further treatment because of complicated dental caries, representing 26.4% of the total school population analyzed.

However, this indicator should not be interpreted as

the epidemiological prevalence of complicated dental caries because the denominator was the entire number of children in the participating schools rather than only those who underwent a standardized dental examination.

A total of 71,056 children (38.5%) were referred to specialist care. These findings indicate that the school-based preventive examination serves not only a preventive function but also an important role in the early identification of children requiring specialized care and subsequent referral.

Coverage of interventions aimed at developing individual preventive behaviors was also substantial. Oral hygiene education was provided to 119,461 children (64.8%), dietary recommendations were given to 118,309 children (64.2%), and individual selection of oral hygiene products was performed for 105,312 children (57.1%).

Among clinical preventive interventions, fluoride varnish had the highest coverage, with 87,746 children (47.6%) receiving the intervention. Remineralization therapy was provided to 40,211 children (21.8%), and pit and fissure sealing was performed in 41,219 children (22.4%). Preventive cusp grinding was performed in 19,061 children (10.3%).

Thus, the results of the initial stage demonstrate the development of a comprehensive school-based model integrating mass screening, health education, individual prevention, clinical preventive interventions, and referral of children requiring further treatment.

DISCUSSION

The findings demonstrate that implementation of the “Bolashaqqa – Sau Tispen” program creates an organizational framework for delivering preventive dental care directly within the educational environment.

A preventive examination coverage rate of 69.3% at the initial stage represents a substantial volume of organized preventive dental activity. Importantly, the Program is not limited to examinations alone. More than 100,000 children received oral hygiene education, individualized selection of oral hygiene products, or dietary recommendations, while tens of thousands received clinical preventive interventions.

This comprehensive approach is consistent with the current international direction of pediatric dentistry. The WHO emphasizes the need to shift toward a prevention-oriented and minimally invasive model of dental care [12–17].

The use of fluoride varnish is particularly relevant, with

47.6% of children in the analyzed population receiving this intervention. In a three-year study of schoolchildren in China, twice-yearly application of 5% sodium fluoride varnish combined with oral hygiene education was associated with a lower prevalence and lower increment of caries in first permanent molars compared with health education alone [3].

Pit and fissure sealing was performed in 22.4% of children. Systematic reviews support the preventive value of both fluoride varnish and pit and fissure sealants in school-aged children, although the available evidence does not support considering one method universally superior to the other across all groups of children [8,9]. Therefore, the choice of intervention should be determined by the child's age, stage of tooth eruption, and individual caries risk.

This consideration is particularly important for the further development of the Kazakhstani program: increasing the absolute number of procedures should not become the sole criterion of effectiveness. A transition toward risk-based prevention is needed, whereby the type, intensity, and frequency of interventions are determined by the individual dental status and caries risk of each child.

At the same time, coverage indicators for individual interventions should be interpreted as measures of program implementation rather than direct indicators of clinical effectiveness. Because the source data were aggregated, the present study cannot determine the extent to which a specific preventive intervention altered the risk of development or progression of dental caries in an individual child.

International experience also supports the advantages of school-based models. A prospective six-year study of a comprehensive school-based prevention program involving 6,927 children in 33 schools in the United States demonstrated the feasibility of sustained implementation of multicomponent preventive interventions directly within schools [5].

Other studies indicate that school-based programs are particularly important for population groups experiencing difficulties in accessing regular dental care. Sealant programs can increase preventive coverage among children with a higher need for dental care [6].

In this context, the “Bolashaqqa – Sau Tispen” model may be particularly relevant for Kazakhstan, given its large geographic area and regional differences in access to dental care [18–20].

At the same time, the results identified several challenges. First, preventive dental examinations had not yet reached all children: 30.7% of the population in the participating schools had not been recorded as having undergone an examination during the reporting period. This indicates a need to improve organizational coverage.

Second, there was a difference in coverage between the various components of prevention. For example, 64.8% of children received oral hygiene education, whereas 57.1% received individualized selection of oral hygiene products, and clinical preventive interventions were provided to a smaller proportion of children. Some of this difference is expected because clinical interventions should be provided according to clinical indications; however, the current aggregated reporting system does not allow appropriate clinical selection to be distinguished from insufficient coverage.

Third, the large number of referrals for treatment indicates a substantial accumulated burden of dental disease. This emphasizes the need to establish a closed preventive care pathway: examination — identification of risk or disease — preventive intervention/referral — treatment — verification of treatment completion — return to preventive follow-up [21–23].

The completion of this pathway should become one of the key indicators of program effectiveness in future monitoring.

Further monitoring should therefore record not only whether a child was referred for treatment, but also whether the referral pathway was completed, including receipt of specialized care, completion of treatment, and subsequent return of the child to the preventive care system.

The next stage of monitoring should include indicators of dental caries prevalence and severity at index ages, oral hygiene status, the proportion of children with untreated caries, the number of children receiving comprehensive treatment, the proportion of completed treatment episodes, and repeated assessment of the same cohorts.

Such an approach would allow a transition from assessing processes (“how many children were examined and how many procedures were performed”) to assessing outcomes (“to what extent did the oral health of children improve”).

In the future, prospective age-based cohorts with repeated examinations of the same children at predefined time intervals should be established. This would make it possible to assess caries increment, changes in dental status, and the relationship between preventive interventions and clinical outcomes.

It should also be recognized that the present study reflects only the initial stage of program implementation and is based on aggregated data. Therefore, the reported indicators do not allow causal conclusions to be drawn regarding the relationship between the preventive interventions provided and changes in children's oral health.

CONCLUSION

The initial results of the “Bolashaqqa – Sau Tispen” program indicate the feasibility of establishing a large-scale school-based preventive dental care system in the Republic of Kazakhstan [24,25].

Among 184,412 children in 115 schools, 127,761 schoolchildren (69.3%) received preventive dental examinations. Oral hygiene education was provided to 119,461 children (64.8%), dietary recommendations to 118,309 (64.2%), and individual selection of oral hygiene products to 105,312 (57.1%). Fluoride varnish was applied to 87,746 children (47.6%), pit and fissure sealing was performed in 41,219 (22.4%), and remineralization therapy was provided to 40,211 (21.8%).

At the same time, the large number of children referred for further dental treatment and specialist consultation indicates a substantial accumulated need for dental care.

At the next stage of program implementation, it is advisable to standardize monitoring criteria, expand preventive infrastructure, record completion of the child's referral pathway after identification of disease, and implement longitudinal follow-up using standardized dental indices.

This will make it possible to assess the program not only in terms of the number of preventive procedures performed but, most importantly, in terms of final outcomes, including reductions in the prevalence and severity of dental caries, a decrease in the number of complications, and the development of sustainable preventive behaviors among children.

Thus, the present findings should be regarded as a baseline organizational and epidemiological level for subsequent assessment of the clinical outcomes of the program. Evidence-based evaluation of effectiveness will require repeated standardized examinations of comparable age cohorts, documentation of treatment outcomes, and analysis of changes in dental health indicators over subsequent follow-up periods.

Conflict of Interest

The author declares no conflict of interest.

Author Contributions

The author developed the study concept, conducted the analysis and interpretation of the results, and prepared and critically revised the manuscript.

Funding

This study received no external funding.

Data Availability Statement

The study was based on a secondary analysis of aggregated, anonymized routine monitoring data from the preventive program. Individual personal and medical data of the children were not included in the research database

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