

RESULTS OF EVALUATING THE CLINICAL-ECONOMIC EFFECTIVENESS OF DENTAL CARIES PREVENTION PROGRAMS IN PRESCHOOL CHILDREN

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Abstract. The article presents data on determining the cost of prevention programs by calculating the direct and indirect costs of materials for the prevention of caries, the production of sanitary and educational printed materials, the work of a dentist. We used the prices that were valid in the Republic of Uzbekistan as of September 1, 2020. All programs were conducted in kindergartens of the Bukhara region (Bukhara, Alat and Karakul districts). The cost of preventive measures was determined based on 80 pupils of one preschool educational institution.

Keywords: clinical and economic efficiency, prevention, CER and ICER indicators, caries, dental program, children.

Relevance.

Various preventive programs are conducted in different countries of the world [2]. The development of prevention programs is based on situational analysis. Preventive programs should be implemented on the basis of evidence-based medicine [3]. However, the use of the principles of evidence-based medicine in dentistry is hindered by low awareness and motivation of specialists, "pushing" methods and drugs by manufacturing firms and their representatives, low demand for preventive dentistry by the population and shifting responsibility to pediatric dentists [1, 4].

Chestnutt I.G. et al. the cost of using the first permanent molar fissure sealing program with composite sealants and the fluoride varnish application program in children (every 6 months) was estimated. After 3 years, carious lesions were detected in 17%-19% of cases, but the cost of the fluorolac program was cheaper than fissure sealing (£432 and £500, respectively) [7, 10, 19]. According to Moore D. et al., 2017, water fluoridation in New Zealand has a high clinical and economic efficiency and costs pay off 9 times. The clinical and economic analysis of the milk fluoridation program in Thailand also showed its high efficiency in expressing the saved cost of prevented caries (34% reduction of caries) when implemented in schoolchildren for 6 years (children drank fluoridated milk from 6 to 12 years) [5, 17, 20]. Kay E. et al.,

2017, conducted a cost-benefit study of two preventive programs (controlled brushing of teeth and applying fluoride varnish to teeth) in children aged 5 and 12 years. It was found that the cost of the programs is 55 pounds for brushing teeth and 100 pounds for fluoride, and both programs are beneficial to health. The authors believe that the result of the use of preventive programs should also be measured in terms of quality of life [6, 15, 18].

Hietosalo P. et al., 2010, found that the implementation of a prevention program is more expensive than its absence, however, in subsequent years, the benefits of the programs are realized in a lower frequency of visits to the dentist and better dental health than in the control group [9, 12, 16]. It is known that randomized clinical trials are the best way to determine the results of the use of various preventive means, methods and technologies. However, such studies are conducted in simple conditions on limited populations and cannot reflect the impact of the studied means, methods and technologies on public health.

System reviews and critical reviews are better suited for this. Ladewig N.M. et al., 2018, presented a systematic review, on the basis of which they concluded that only water fluoridation methods and the use of fluoride toothpastes have evidence for the criteria of "cost effectiveness", and further research is needed for the remaining methods [8, 11, 19]. Marthaler T.M., 2013, determined the cost of salt fluoridation 0.02–0.05 € per year per person and called the method the cheapest among the methods of caries prevention (with the effectiveness of caries reduction up to 50%) [12, 13, 14].

The purpose of the study: to evaluate the cost-effectiveness of programs by optimizing the prevention and treatment of dental caries in preschool children.

Research methods and materials: To determine the cost of prevention programs, direct and indirect costs of materials for the prevention of caries, the production of sanitary and educational printed materials, the work of a dentist were taken into account. We used the prices that were valid in the Republic of Uzbekistan on September 1, 2020. All programs were conducted in kindergartens of the Bukhara region (Bukhara, Alat and Karakul districts). The cost of preventive measures was determined based on 1 kindergarten (the number of children in one kindergarten, on average, 80 people). When carrying out caries prevention programs in kindergartens, various handouts can be used: memos for parents of preschoolers on oral hygiene and nutrition of children, the use of fluorides, timely visits to a dentist; memos for educators on measures to prevent caries in children in kindergartens; dental cleaning calendars, pictures (postcards) for children; a manual for kindergarten teachers involved in the implementation of caries prevention programs; a manual for dentists

on the implementation of dental caries prevention programs for preschoolers in kindergartens.

Results of the study: It should be noted that the costs of handouts for children and parents are annual, and for educators and dentists - one-time, since memos for educators and manuals on the prevention of caries in preschool children for educators and dentists can be used for many years. In addition, in order to save money, electronic publication of memos for parents and educators, manuals for educators and dentists is possible.

Demonstration materials can be used for hygienic education and training of kindergarten staff, children and their parents on the prevention of dental caries: posters, jaw models, computer presentations and videos. The cost of demonstration materials is shown in Table 1.

Table 1

The cost of demonstration materials for dental caries prevention programs for preschoolers in kindergartens (per 1 kindergarten)

Materials	Characteristics	Service life	Cost per 1 unit. (sum)
Poster	Issued 1 pc. for kindergarten	5 years	14282
Model of jaws	Issued 1 pc. for kindergarten	10 years	45715
Computer presentation (video) for classes with parents	Demonstrated at a parent-teacher meeting or class	10 years*	9046
Computer presentation (video) for classes with educators	with parents	10 years*	9046
Computer presentation (video) for classes with children	Demonstrated in class with educators	10 years*	9046

* The necessary adjustments can be made to the computer presentation annually.

The dentist is directly involved in the implementation of caries prevention programs for preschoolers in kindergartens: conducts sanitary education, hygienic

education and training of children, parents and educators, performs screening dental examination of children, issues referrals to dental clinics, conducts preventive procedures (coating teeth with fluoride varnish, sealing teeth fissures), non-invasive treatment of caries. The cost of a dentist's work on the implementation of dental caries prevention programs for preschoolers is presented in Table 2.

Table 2

The cost of a dentist's work when performing primary and secondary prevention of dental caries in preschoolers in kindergartens (per 1 kindergarten, 80 children)

Events	Characteristics	Cost per 1 unit. (sum)	Total	Quantity
Screening dental examination of 80 children, issuance of referrals to the polyclinic	It is held 2 times a year with an interval of 5-6 months	82147,70	2	164 295
Speaking at a parent-teacher meeting, once a year	30 minutes	3422,82	1	3422,82
Lesson with teachers, once a year	30 minutes	3422,82	1	3422,82
Classes with children (4 groups of 20 people)	30 minutes for 1 lesson	3422,82	4	13691,30
Material for sealing pits and fissures of teeth	Per 1 child	900	80	72000

Continuation of table 2

Sealing of tooth fissures	Per 1 child	1369	80	109520
Fluoride varnish	Per 1 child	1752	80	140160
Applying fluoride to teeth	Per 1 child	3423	80	273840
Non-invasive/minimally invasive caries treatment	Per 1 child	9050,5	80	724040

H Based on the presented data, the cost of prevention programs used in kindergartens was determined (Table 3). All programs included screening dental examination of children and the issuance of referrals to a dental clinic. In Program No. 2, parents were additionally provided with health education, in Program No. 3, educators were involved in caries prevention activities (classes with children, parents). In program No. 4, in addition to classes with educators, dentists carried out primary prevention of dental caries in children by sealing tooth fissures and applying fluoride varnish to teeth, secondary prevention by non-invasive and minimally invasive treatment of dental caries. We did not include dental practice with preschoolers in the ongoing caries prevention programs, as we considered it more appropriate to conduct this type of preventive work by kindergarten teachers (after their training).

The calculations made it possible to determine the cost of various dental caries prevention programs designed for preschoolers attending kindergartens.

Table 3

The cost of dental caries prevention programs for preschoolers in kindergartens (per 1 kindergarten, 80 children)

Program	Cost (sum)
Program No. 1 (screening dental examination of children 2 times a year, issuance of referrals to the polyclinic)	164295,0
Program No. 2 (in addition to the previous program – work with parents of children)	424910,8
Program No. 3 (in addition to the previous program – work with kindergarten teachers)	518635,8
Program No. 4 (in addition to the previous program – sealing of tooth fissures, applying fluoride varnish to teeth, non-invasive and minimally invasive treatment of caries)	1319560,0

According to the results of calculations, the total cost of Program No. 1 was 164295.0 soums, Program No. 2 - 424910.8 soums, Program No. 3 - 518635.8 soums, Program No. 4 – 1319560.0 soums.

The next task was to conduct a clinical and economic analysis, which showed the economic justification of the use of programs according to the criteria of the ratio

of their cost and clinical effectiveness. The results of the clinical and economic analysis are presented in the following sections.

The clinical effectiveness of preventive programs was determined by criteria for reducing the increase in carious lesions (according to the cfrs index). The CER and ICER criteria were used to assess the clinical and economic effectiveness of primary caries prevention.

The standardization of indicators was carried out to determine the annual increase in caries in preschoolers according to the cfrs index. It was found that the increase in carious lesions of the tooth surfaces (according to the cfrs index) in the examined preschoolers aged 3-6 years was 3.10 ± 0.31 per year.

After the implementation of Program No. 1, which did not provide for preventive measures, there were no changes in the growth of caries in preschoolers, which after standardization amounted to 3.16 ± 0.32 according to cfrs.

The use of programs No. 2, No. 3 and No. 4, which included preventive measures, led to a decrease in the growth of caries in preschoolers who participated in the programs: standardized indicators of annual growth of carious lesions, according to cfrs, were 2.16 ± 0.21 , 1.68 ± 0.13 and 1.32 ± 0.09 , respectively.

The clinical efficacy (according to the degree of reduction in the growth of carious lesions) for Program No. 2 was 30.32%, Program No. 3 – 45.81%, Program No. 4 – 57.42%. Program No. 1 had no clinical effectiveness in primary prevention of caries.

The calculation of the CER clinical and economic efficiency index for programs No. 2, No. 3 and No. 4 revealed the most economical program (Table 4).

The CER indicator for Program No. 2 was 14014.21 (second rank), for Program No. 3 – 11321.45 (first rank), for Program No. 4 – 16693.24 (third ranked place).

Thus, in reducing the increase in caries of the surfaces of teeth, according to the cfrs index, preschool children had the highest clinical effectiveness of Program No. 4, the cheapest was program No. 2, and the most cost-effective was Program No. 3.

Table 4

Indicators of the clinical and economic efficiency of CER prevention programs in relation to reducing the increase in carious lesions of the surfaces of the teeth of preschoolers (per 1 kindergarten, 80 children)

Program	Cost (sum)	Clinical Efficacy (%)	CER	Rank

№2	424910,8	30,32	14014,21	2
№3	518635,8	45,81	11321,45	1
№4	1319560,0	57,42	22980,84	3

The calculation of the CER index (per 1 child) was carried out in relation to the cheapest program, which gives 30.32% clinical effectiveness in reducing the increase in tooth decay of the surfaces of teeth in preschoolers (Table 5).

Table 5

Indicators of the increase in the clinical and economic efficiency of ICER prevention programs in relation to reducing the increase in carious lesions of the surfaces of teeth in preschoolers

Program	Cost per 1 child (sum)	Clinical Effectiveness (%)R	Cost Increase (sum)	Clinical Effectiveness Increase (%)	ICER (sum)
№2	5311,4	30,32	5311,4	30,32	175,18
№3	6482,9	45,81	1171,5	15,49	75,63
№4	16494,5	57,42	11183,1	27,10	412,66

The cost of programs per 1 child was 5311.4 soums for Program No. 2, 6482.9 soums for Program No. 3, and 16494.5 soums for Program No. 4. In relation to Program No. 2, the cost increase was 1171.5 soums for Program No. 3, 11183.1 soums for Program No. 4, 15.49% and 27.10% efficiency increase, ICER indicators – 75.63 soums and 412.66 soums respectively.

In comparison with the results of Program No. 2, in order to increase the clinical effectiveness of caries prevention by 15.49%, it is necessary to spend an additional 75.63 soums per 1 child for each percentage increase in efficiency when implementing program No. 3. In order to increase clinical effectiveness by 27.10%, it is necessary to spend an additional 412.66 soums per 1 child for each percentage of efficiency increase when implementing program No. 4.

Thus, the presented data make it possible to plan programs for the primary prevention of dental caries in preschoolers, taking into account the financial capabilities of the regions.

At the same time, it should be taken into account that the screening program (No. 1) did not affect the primary prevention of caries, the program with the participation of parents (No. 2) was cheaper than programs No. 3 and No. 4, but had the lowest efficiency (30.32%). The program with the active participation of dentists (No. 4) was the most expensive and most effective (57.42%). The program with the participation of educators (No. 3) had an average clinical effectiveness (45.81%) and the best cost-benefit ratio according to the CER criterion.

To evaluate the results of preventive programs, in relation to the secondary prevention of caries, the efficiency criterion was chosen to increase the number (in%) of cured (sealed) tooth surfaces according to cfrs indices recorded during the first and second dental examinations of preschoolers, that is, before and after preventive programs. As a result, it was found that the share of filled teeth in the structure of cfrs after Program No. 1 increased by 7.04%, after Program No. 2 – by 19.63%, Program No. 3 – by 36.66%, Program No. 4 – by 49.62%, and the values of the "ff" indicators increased by 48.79%, 130.52%, 363.33% and 403.41%, respectively ($p < 0.001$).

The calculation of the indicators of clinical and economic efficiency of CER made it possible to determine the ranking places of the studied programs (Table 6).

Table 6

Indicators of the clinical and economic efficiency of CER prevention programs in relation to increasing the number of cured carious lesions of the surfaces of the teeth of preschoolers (per 1 kindergarten, 80 children)

Program	Cost (sum)	Clinical Efficacy (%)	CER	Rank
№1	164295,0	48,79	3367,39	4
№2	424910,8	130,52	3255,52	2
№3	518635,8	363,33	1427,45	1
№4	1319560,0	403,41	3271,01	3

It was found that the CER indicators were arranged, in ascending order, in the following order: during the Program No. 3 – 1427.45 (first rank place), Program No. 2 – 3255.52 (second rank place), Program No. 4 – 3271.01 (third rank place) and Program No. 1 – 3367.39 (fourth rank place).

Thus, the cheapest Program No. 1 had the lowest clinical effectiveness and occupied the last ranking place in the clinical and economic indicator CER. The highest clinical effectiveness (403.41%) was achieved by Program No. 4, which ranked third in the clinical and economic indicator CER. Program No. 3 took the

second place in clinical effectiveness and the first rank in clinical and economic efficiency, that is, it was the most profitable in terms of cost and effectiveness. Program No. 2 ranked third in terms of clinical effectiveness and second in terms of cost-effectiveness ratio.

As a result of the analysis of these ICER indicators (calculated for 1 child), it was found that, in comparison with Program No. 1, in order to increase clinical effectiveness, it is necessary to additionally spend on 1 child (based on an increase of 1% efficiency) when using Program No. 2 – 39.86 soums, Program No. 3 – 14.08 soums, Program No. 4 – 27.99 soums (Table 7).

Table 7

Indicators of the increase in the clinical and economic efficiency of ICER prevention programs in relation to the increase in the number of sealed carious lesions of the surfaces of teeth in preschoolers

Program	Cost per 1 child (sum)	Clinical Effectiveness (%)	Cost Increase (sum)	Clinical Effectiveness Increase (%)	ICER (sum)
№1	2053,7	48,79	2053,7	48,79	42,09
№2	5311,4	130,52	3257,7	81,73	39,86
№3	6482,9	363,33	4429,2	314,54	14,08
№4	16494,5	403,41	14440,8	354,62	40,72

The data obtained show that the cheapest programs have the least clinical effectiveness in eliminating carious lesions of teeth in children, and certain financial costs are necessary to increase clinical effectiveness.

Thus, the cheapest program (No. 1) had a low clinical effectiveness in increasing the number of cured teeth in children and occupied the last rank in terms of economic feasibility. The most expensive program (No. 4) had the greatest clinical effectiveness, which ranked third in terms of the economic feasibility of its use. The best ratio of cost and clinical effectiveness was program No. 3 (first rank), which was cheaper and less effective than program No. 4, but more expensive and more effective than programs No. 1 and No. 2. The CER and ICER indicators take into account only the costs of conducting programs. Methods of mathematical analysis were used to assess the cost savings of public health for the treatment of dental caries in children after the implementation of caries prevention and treatment programs.

The method of mathematical modeling was used to calculate the possible cost savings of public health during dental preventive programs, since the treatment of

caries and its complications in children is carried out at the expense of the budget (free of charge for parents).

Initially, the cost of treatment of carious lesions in children identified during the first dental examination was calculated (the standardized cfrs indicator for 1 child was 5.65 ± 0.09) and the cost of treatment of new carious lesions identified after the implementation of the prevention programs under consideration. At the same time, it was taken into account that approximately 1/3 of cases required treatment of complications of caries and anesthesia. The total costs of the preventive program and the necessary treatment of carious lesions of the teeth were determined.

The estimated costs for the treatment of carious lesions detected during the first examination of preschoolers amounted to 16441183.5 soums, calculated per 100 children.

After the Program No. 1, preschool children did not show a decrease in the growth of dental caries. For the treatment of new carious lesions registered at the second examination, 9521841.0 soums were required, per 100 children. The total estimated costs for the screening program and the necessary treatment of carious lesions amounted to 26168394.5 soums, per 100 children. Savings in the costs of caries treatment in children were not expected.

The implementation of Program No. 2 reduced the costs of dental clinics by the amount that would be required for the treatment of pre-school children with prevented carious lesions. The estimated costs for the treatment of new carious lesions registered at the second examination amounted to 6513372.0 soums, per 100 children. The total costs of the preventive program and the necessary treatment of carious lesions amounted to 23485695.5 soums, per 100 children. The costs of the program were partially recoverable.

Экономия средств государственного здравоохранения, полученных в результате применения у детей дошкольного возраста профилактических программ, выражалась в уменьшении затрат на лечение кариозных поражений вследствие снижения прироста кариеса зубов.

Based on 100 children, the savings for the program No. 2 amounted to 3008469.0 soums, No. 3 – 4432711.7 soums, and No. 4 – 5518273.6 soums.

During the program No. 4, which included, in addition to preventive measures, non-invasive and minimally invasive treatment of caries of temporary teeth in kindergartens, the cost savings amounted to 2419341.0 soums, per 100 children. The total cost savings as a result of reducing the growth of caries and reducing the need for dental caries treatment in the dental clinic amounted to 7937614.6 soums, per 100 children.

Thus, the use of special primary prevention measures directly in preschool institutions (sealing of fissures and applying fluoride varnish to teeth) and secondary prevention (non-invasive and minimally invasive methods of caries treatment) can significantly reduce the costs of the state dental service, compared with traditional dental caries treatment for children's access to dental clinics. After the implementation of Program No. 4, the savings on the treatment of dental caries in preschool children in dental clinics were the greatest and exceeded the savings after the application of Program No. 3 by 1.8 times, Program No. 2 by 2.6 times (the application of Program No. 1 did not save money).

In addition, carrying out therapeutic and preventive measures directly in kindergartens allows you to save working time and money of parents, which would be spent on visiting dental clinics with children. It should also be taken into account that the preservation of healthy teeth in preschoolers and an increase in the number of cured teeth has a medical and social effect, as it improves the overall health of children and improves the quality of life of children and their parents.

Conclusions. Summing up the research presented in this section, we can draw the following conclusion:

- screening Program No. 1 is the cheapest, but does not lead to a decrease in the growth of dental caries and has no economic effect; according to all the criteria of clinical and economic efficiency considered, it occupies the 4th rank;
- the application of Program No. 2, which has a higher cost than Program No. 1, brings a small medical and economic effect due to some reduction in the increase in dental caries in children;
- after the application of Program No. 3, which is more expensive than the previous two programs, there is a more significant decrease in the increase in dental caries than Program No. 2; according to the CER criterion – the cost-effectiveness ratio – Program No. 3 is the most profitable, but it is inferior to Program No. 4 in saving public health funds for treatment of dental caries in preschoolers;
- the comprehensive Program No. 4 has a higher cost than programs No. 1-3, however, its application provides the greatest reduction in the growth of dental caries and an increase in the number of pre-school children filled with teeth, the most significant savings in public health funds for the treatment of temporary dental caries in children, and is the most beneficial from a medical, social and economic standpoint;
- the results of the study show that the method of mathematical modeling allows for a deeper and more accurate analysis of the clinical and economic effectiveness of programs for the prevention and treatment of dental caries in children than the use of CER and ICER criteria.

References

1. Kamalova M.K., Fomenko, I. V., Dmitrienko, D. S., Matvienko, N. V., Arjenovskaya, E. N., Gevorkyan, A. G., Maslak, E. E. (2020). Reasons for 1-17-year-old children to visit A dentist during the Covid-19 pandemic. *European Journal of Molecular and Clinical Medicine*, 7(7), 546-558. Retrieved from www.scopus.com
2. Maslak E. E., V. Naumova., Kamalova M.K. (2020). Relationship between General and Oral Diseases: Literature Review // *American Journal of Medicine and Medical Sciences*. - Америка, - Vol.10(9). - P. 690-696. Retrieved from www.scopus.com
3. Kamalova M. K., E.E. Maslak., I.V. Fomenko., A.L. Kasatkina., T.N. Kamennova., T.G. Khmizova., K.V. Nikitina. (2020). Reasons for primary teeth extraction in children aged 1-14 years: a retrospective study // *Palarch's journal of archaeology of egypt*. - Нидерланды, - Vol.17. - No6. - P. 13947-13964. Retrieved from www.scopus.com
4. Kamalova M.K., Komilov H.P. (2019). Maktabgacha yoshdagi bolalarda tish kariesini oldini olish va davolashni optimallashtirishning klinik-iqtisodiy tahlili [Clinical and economic analysis of the optimization of prevention and treatment of dental caries in preschool children]. *Biologiya va tibbiyot muammolari xalkaro ilmiy jurnali*.- № 4.2 (115). 53-56.
5. Kamalova M.K. (2019). Maktabgacha yoshdagi bolalarda tish kariesini davolashda stomatologik yordamni tashkil qilish [Organization of dental care in the treatment of dental caries in preschool children]. *Biologiya va tibbiyot muammolari xalkaro ilmiy jurnali*. - № 4.2 (115). 221-224.
6. Камалова М.К., Маслак Е.Е., Каменнова Т.Н., Осокина А.С., Афонина И.В., Огонян В.Р., Результаты лечения очаговой деминерализации эмали временных резцов у детей раннего возраста // «Tibbiyotda yangi kun» научно - реферативный, культурно - просветительский журнал. - Бухара, 2020. - №3(31). - С. 355-357.
7. Kamilov H.P., Kamalova M.K. The use of laser therapy in the treatment of chronic recurrent herpetic stomatitis in children // *Scientific journal European science review Vienna*, 2018. - No. 7-8.- pp. 120-121.
8. Маслак Е.Е., Камалова М.К. (2020). Проблемы организации стоматологической помощи детям дошкольного возраста // *Biomeditsina va amaliyot jurnali*. - Tashkent, - No. 1. - pp. 26-32.
9. Vokhidov U.G., Kamalova M.Q. The use of various techniques in the treatment of traumatic injuries of the oral mucosa in children // *European Journal of Molecular & Clinical Medicine*. - England, 2020. - Vol. 7. Issue 7. - P. 3743-3748.
10. Камиллов Х.П., Камалова М.К. Современные подходы в лечении хронического рецидивирующего герпети-ческого стоматита у детей // «Достижения науки и образования» Международный научный журнал. - Москва, 2018. - №3 (25). - С. 46-48.
11. Kamalova M.K., Maslak E.E. Can Dental Screening of Preschoolers with or without Education of the Parents Improve Children's Oral Health? The Longitudinal Study Results // *Integrative dentistry and maxillofacial surgery*. - Tashkent, - 2022. - № 1(1). - P. 58-62.
12. Kamalova M.K., Sadullayeva N.A. Innovations in surgical treatment of fractures of the zygoma- maxillarius complex // «British View» **Journal**. - London, - 2022. - Volume 7. - Issue 2. - P. 144-151.
13. Камалова М.К. Оценка экономической эффективности программ профилактики лечения кариеса зубов у детей дошкольного возраста // «Tibbiyotda yangi kun» научно - реферативный, культурно - просветительский журнал. - Бухара, 2020. - №4(34). - С. 173-176.

14. Камалова М.К. Медико-социальный и клинико-экономический анализ лечения и профилактики кариеса зубов у детей дошкольного возраста // «Tibbiyotda yangi kun» научно - реферативный, культурно - просветительский журнал. - Бухара, 2020. - №3(33). - С. 79-80.
15. Камалова М.К. Социально-экономический эффективность программ профилактики и лечения кариеса зубов у детей дошкольного возраста // «Образование и наука в XXI веке» международный научно-образовательный электронный журнал. - Россия, 2020. - №9. - Т.3. - С. 149-155.
16. Камалова М.К., Садуллаева Н.А. Современный подход к оперативному лечению переломов скуловерхнечелюстного комплекса // «Журнал Биомедицины и практики» - Ташкент, - 2022. -№ 4. - С. 246-251.
17. Камалова М.К. Оценка результатов внедрения программ профилактики кариеса зубов у детей дошкольного возраста // «Журнал Медицина и инновации». - Ташкент, 2021. - №4. - С. 680-684.
18. Камалова М.К. Сравнительная оценка клинико-экономической эффективности программ профилактики лечения кариозных поражений зубов у дошкольников // «Журнал стоматологии и краниофациальных исследований» междисциплинарный подход по заболеваниям органов головы и шеи. - Самарканд, 2021. - Специальный выпуск, - С. 83-87.
19. Камалова М.К. Организация стоматологической помощи при лечении кариеса зубов у детей дошкольного возраста // «Биология ва тиббиёт муаммолари» международный научный журнал. - Самарканд, 2019. - №4.2 (115). - С. 221-224.
20. Kamalova M.K., Komilov H.P. (2019). Clinical and economic analysis of the optimization of prevention and treatment of dental caries in preschool children. Biologiya va tibbiyot muammolari xalkaro ilmiy jurnali.- № 4.2 (115). 53-56.