Bine Devjak, Sanja Berčnik, PhD

The Importance of Health Education and Prevention in the Fight against Caries in the Preschool Period

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KLJUČNE BESEDE: predšolski otrok, vrtec, karies, ustna higiena, preventiva, zobozdravstvo

POVZETEK – Avtorja se osredinjata na vpliv različnih dejavnikov, ki povzročajo karies pri predšolskih otrocih. Analizirata pravno-formalne pravice na področju osnovnega zobozdravstvenega varstva, medicinsko in pedagoško preventivo kariesa ter vpliv strokovnih delavcev v vrtcu in družine na zmanjševanje kariesa. S pomočjo podatkov Zavoda za zdravstveno zavarovanje Slovenije (ZZZS) ugotavljata vpliv epidemije covida-19 na obseg preventivnih in kurativnih zobozdravstvenih storitev v skupini predšolskih otrok po posameznih statističnih regijah v Sloveniji in razmerje med vplivom epidemije na obseg zobozdravstvenih storitev v skupini predšolskih otrok in gospodarskim razvojem posamezne regije. Ugotavljata, da je bil izpad zobozdravstvenih storitev v času epidemije tako obsežen, da bodo posledice vidne več let. Preventivne storitve so sestavni del pravic iz obveznega zdravstvenega zavarovanja, saj je ozaveščanje in poučevanje otrok o zdravih temeljih življenja zelo pomembno.

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KEYWORDS: preschool child, kindergarten, caries, oral hygiene, prevention, dentistry

ABSTRACT – The paper focuses on the influence of various factors causing caries in preschool children. The legal-formal rights in the field of primary dental care and medical and pedagogical caries prevention are analysed, as is the influence of professionals in the kindergarten and the family on the reduction of caries. With the help of data from the Health Insurance Institute of Slovenia (ZZZS), the impact of the COVID-19 epidemic on the scope of preventive and curative dental services is determined in a group of preschool children according to individual statistical regions in Slovenia, as is the relationship between the impact of the epidemic on the scope of dental services in the group of preschool children in relation to the economic development of an individual region. The interruption of dental services during the epidemic was so extensive that the consequences will last several years. Preventive services are an integral part of the rights derived from compulsory health insurance; therefore, raising awareness and teaching children about the healthy foundations of life is important.

1 Introduction

Oral health is an integral part of systemic health, is a decisive factor in the quality of life, and is related to general health. Primary dentistry for preschool children comprises the basic care for the health of the teeth and oral cavity in children aged 0 to 6 years. It includes the prevention and treatment of dental diseases and the education of children and their parents about oral hygiene and a healthy lifestyle. Caries in the preschool period is one of the most common chronic diseases. In Slovenia, dental prevention for preschool children is free and financed by the state. The programme is implemented within the framework of the Health Insurance Institute of Slovenia (ZZZS). Since more than 90 % of

all preschool children in Slovenia are enrolled in kindergartens, preschool teachers play an important role in preventing dental diseases. The paper aims to indicate the importance of fighting caries and explain the roles of parents, preschool teachers, and dentists. By analysing the data from the Health Insurance Institute of Slovenia, we will also determine:

- the impact of the COVID-19 epidemic on the scope of dental services in the group of preschool children;
- the impact of the COVID-19 epidemic on the scope of curative dental services in the group of preschool and primary school children; and
- the difference in the impact of the COVID-19 epidemic on the scope of dental services in the group of preschool children in relation to the economic development of the region.

2 Theoretical Background

Oral Health as an Important Component of Overall Health

Health and the promotion of a healthy life is an increasingly important field (Devjak & Devjak, 2013; Nagelj, 2006). Health is defined as a comprehensive and dynamic system that represents an adaptive function for the individual and enables them to perform all biological, social, and professional functions while simultaneously helping to defend the body against diseases, weakness, and premature death (WHO, 2024). As Sadar and Erjavec (2021, p. 94) point out, experts in health and health policy over the past two decades have emphasised that "even children, and certainly adolescents, must be health literate, because, with more knowledge about health, they have a greater chance of taking an active role and control in making decisions about their health and the health of their peers and others". Oral health is an integral part of systemic health, is a decisive factor in the quality of life, and is related to general health (WHO, 2024; Ranfl et al., 2015). The law determines the right to health care from public funds (Devjak et al., 2019).

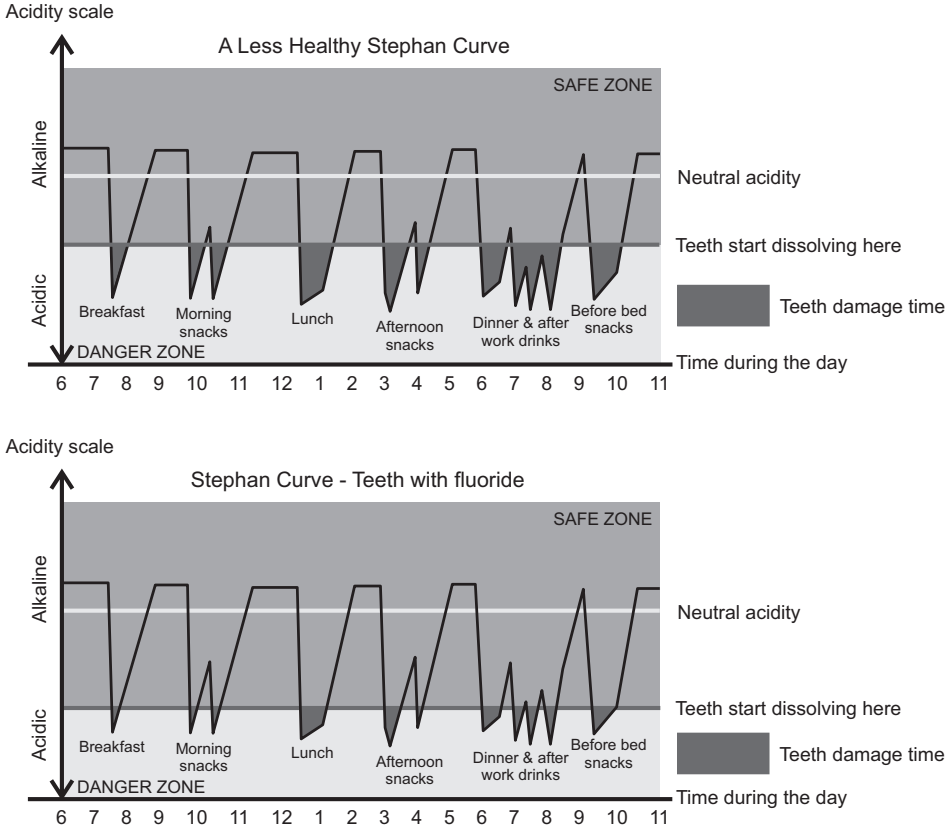
Caries is a chronic infection of teeth with cariogenic bacteria (Rathee, 2023). It is caused by bacteria that form dental plaque and is one of the most common chronic diseases in children. To show the prevalence of dental caries, experts most often use the KEP index, which tells us the average number of caries-affected (K), extracted (E) and repaired (P) permanent teeth in an individual. For primary and secondary dentition, we also consider primary teeth, whereby variables are denoted by lowercase letters (kep). An important indicator showing the development of preventive dental care is also the proportion of people without carious, chipped, or filled teeth. For international comparability, oral health indicators are usually calculated for 5- (or 6-), 12-, 15-, and 18-year-olds (Artnik, 2010).

Caries in preschool children is called "early childhood caries" (ECC) or "bottle caries". According to the American Academy of Pediatric Dentistry (AAPD), the classification of ECC is defined as the presence of one or more primary teeth affected by caries, missing due to caries or treated in children under six years of age. The classification also distinguishes S-ECC (severe early childhood caries), which is diagnosed in children under the age of 3 at any sign of dental caries (Drury et al., 1999). ECC is the decay of the

upper primary teeth, especially the incisors, which occurs because of night feeding from a bottle containing a sweet drink. At night, the flow of saliva decreases and, therefore, washes the teeth less well; the bacteria thus receive more sugar and produce more acid (Bencze et al., 2021; Šavli, 2022). Pihlar (2016) states that tooth decay is caused by the dissolution of tooth substances due to acids produced by bacteria in our mouths from dietary carbohydrates. The rate of dissolution depends on the amount and structure of dental plaque, the amount and, more importantly, the frequency of carbohydrate intake, and the presence of fluorides around the teeth. Since tooth decay is an infectious disease, it is important to know that the bacteria that cause tooth decay can be passed from parent to child in early childhood.

Figure 1

Stephan Curve: Display of Fluctuation of pH in the Oral Cavity



Note. Retrieved from https://supadental.com.au/how-to-protect-your-teeth-from-tooth-decay-part-1/.

According to the Global Burden of Disease Study, the prevalence of caries in children under the age of 5 is 43.39 % worldwide, 37.2 % in the EU, and 56.53 % in Slovenia

(Global Burden of Disease Collaborative Network, 2021). Due to ECC, the child loses primary teeth too quickly, which is why there are abnormalities in the development of the jaw and later in the eruption of permanent teeth. In addition, the child has problems chewing harder food and pronouncing some sounds (M. F., 2010).

The aetiology of ECC has long been known (Schmoeckel et al., 2020). High sugar intake and poor or absent oral hygiene lead to the appearance of carious lesions on the smooth exposed surfaces of the teeth. It is important to reduce the consumption of foods between main meals. The importance of the frequency of consumption of intermediate sweet meals can be shown with the Stephan Curve (Figure 1), which shows the fluctuation of the pH in the oral cavity. It takes at least 3 hours between meals for the pH in the mouth to rise to a healthy level; otherwise, the acidic environment in the mouth is maintained, and the teeth dissolve. Therefore, we should only drink water between meals (Colombo et al., 2019; Tušek et al., 2020; Nota et al., 2020; Bencze et al., 2021).

The first graph shows a slightly less healthy Stephan Curve, which results from frequent oral intake of nutrients. The pH in the mouth is often very acidic, and the teeth dissolve. The second graph shows the effect of fluorides on the same curve. The critical pH at which dissolution begins is lowered, so the time of critical acidity in the mouth is cumulatively shorter during the day, and the consequences are milder.

Symptoms, Psychosocial Aspects, and Treatment of Caries

The main symptom of caries is pain, which affects the quality of life. Children can miss school or find it harder to study because of the pain; they can develop feeding problems and consequent weight loss, sleep problems, changes in behaviour, a decline in school performance, and an increased likelihood of caries in adulthood (Abanto et al., 2011). The Bangkok Declaration of the International Association of Paediatric Dentistry (IAPD), which is also followed in Slovenia, proposes primary, secondary, and tertiary prevention as a solution to prevent ECC (Pitts, 2019). At the primary level, prevention discovers risk factors that affect the onset of disease. In Slovenia, preventive activities are regulated by the Guidelines for the Implementation of Preventive Health Care at the Primary Level (Pravilnik…, 1998) and provide:

- health care for infants and children up to the age of 6 (performed by a paediatrician), and
- health care for school children and youth up to the age of 19 (performed by a school doctor).

Preschool children have the right to

- a preventive dental examination as an infant aged 6–12 months; the examination takes place during the systematic examination of babies in the presence of one or both parents on the premises of a health institution or a private practice; a qualified dentist or specialist pedontologist performs an examination of the orofacial area and advises on nutrition, oral care, elimination of possible bad habits, and taking fluoride tablets;
- preventive dental examinations in the first, second, and third years of age; a preventive examination takes place once a year in small groups with

parents or individually; the preventive examination and consultation are carried out by a specialist, pedontologist, or qualified dentist in cooperation with a nurse trained in prevention; and

- preventive dental examinations in the fourth, fifth, and sixth years of age; prevention is organised in cooperation with parents, kindergartens, paediatricians, primary schools, and school dispensaries and takes place in the presence of parents; a preventive examination and consultation are carried out once a year by a specialist, pedontologist, or qualified dentist with the participation of a nurse trained in prevention. (Rulebook on Amendments to the Rulebook for the Implementation of Preventive Health Care at the Primary Level, 2015).

Primary prevention, therefore, includes raising awareness of the risk of caries, its causes, the importance of oral health, appropriate eating habits, and the benefits of fluoride for teeth. Secondary prevention takes place in the dental clinic, where the dentist detects and attempts to control the initial carious lesions without interventions on the teeth during regular check-ups. Tertiary prevention continues in the outpatient clinic if the carious lesions progress and become cavitated. At that time, the dentist attempts to maintain tooth health with non-invasive and invasive methods.

In the Rulebook on Amendments to the Rulebook... (2015), prevention includes lectures for educators and parents; practical learning about oral and dental care from the age of 3 (VMS – senior nurse); daily cleaning in the kindergarten (VMS); periodic determination of oral hygiene and the presence of plaque; professional dental plaque cleaning; saliva test for caries-prone children; fluoridation with tablets; individual fluoridation with coatings, solutions, and jellies in children at risk; filling fissures on deciduous and permanent molars.

According to Pihlar (2016), parents should take their child to the dentist when the child's first teeth are growing to receive advice on proper maintenance of oral hygiene and proper nutrition. The use of fluorides is one of the most important preventive measures in dentistry. Fluorides intended for local application are mainly in the form of gels, coatings, mouthwashes, and toothpaste.

The Preventive Role of Kindergarten

The role of kindergartens and preschool teachers is crucial in the prevention of ECC (Menghini et al., 2008). For successful prevention, we need healthy habits of maintaining oral hygiene, a steady rhythm of eating, and limiting sugar intake. All of this can be enforced by preschool teachers during the child's time in kindergarten. They can build on healthy eating habits that children retain throughout their lives (Curriculum for Kindergartens, 1999).

Preschool teachers can teach children about proper tooth brushing, encourage them to floss, and advise them on using mouthwash. Children should get used to brushing their teeth in the presence of an adult twice a day, morning and evening, with the right amount of toothpaste. For children under three years of age, a grain-of-rice-sized amount of toothpaste is recommended, and for older children, a pea-sized amount is

recommended. It is also important for parents to help their child brush their teeth until they are old enough to do it themselves. The kindergarten organises regular brushing after the main meal. Preschool teachers can also encourage healthy eating and advise against the consumption of sugary drinks between meals. They can organise activities that encourage the consumption of fruits, vegetables, and other healthy foods. Food (especially for a child) "must be varied, as no single food can provide all important nutrients in sufficient quantities" (Štemberger et al., 2009, p. 120). Thus, the daily diet should contain enough fruits, vegetables, whole grain products, and legumes but low levels of simple sugars, cholesterol, and saturated fats.

In cooperation with parents, preschool teachers influence and encourage regular visits to the dentist. Some kindergartens, which are a part of elementary schools, carry out preventive examinations of children in school dental clinics. Preschool teachers can also organise lectures on oral hygiene, presentations by dental experts, visits to dental clinics, and other activities that support a healthy family lifestyle. As Hmelak (2017, p. 4) points out, "it is best when preschool teachers and parents work together in a constructive relationship where health, safety and, above all, the development of the child are in the foreground". With joint efforts and educational activities, people will develop not only automatic positive health-hygiene and cultural habits but also certain insights and experiences at a higher cognitive level.

Today, the preschool child's family is involved in the operation of the kindergarten as a place of secondary socialisation; therefore, we believe that the family, in terms of its functionality, "sooner rather than later encounters the question of belonging to a kindergarten to a degree in which they can and want to adapt to the requirements of the educational institution" (Čotar Konrad, 2018, p. 71). The child-educator-parent interaction is a daily process that offers countless possibilities and opportunities for the spontaneous and planned satisfaction of the child's needs for a healthy and happy life (Grubar, 2000).

3 Methodology

The paper aims to determine:

- the impact of the COVID-19 epidemic on the scope of dental services in a group of preschool children;
- the impact of the COVID-19 epidemic on the scope of curative dental services in the group of preschool and primary school children; and
- the difference in the impact of the COVID-19 epidemic on the scope of dental services in the group of preschool children in relation to the economic development of the region.

In the analysis, we included data from the Health Insurance Institute of Slovenia (ZZZS) on dental services provided for children aged 0 to 15 for the period from 2013 to 2021 in the Republic of Slovenia, and data from the Statistical Office of the Republic of Slovenia (SURS). The data were processed using Excel and SPSS statistical software. We performed a time-series analysis of the investigated phenomena and a

correlation analysis between the volume of dental services provided and the economic development of statistical regions in Slovenia.

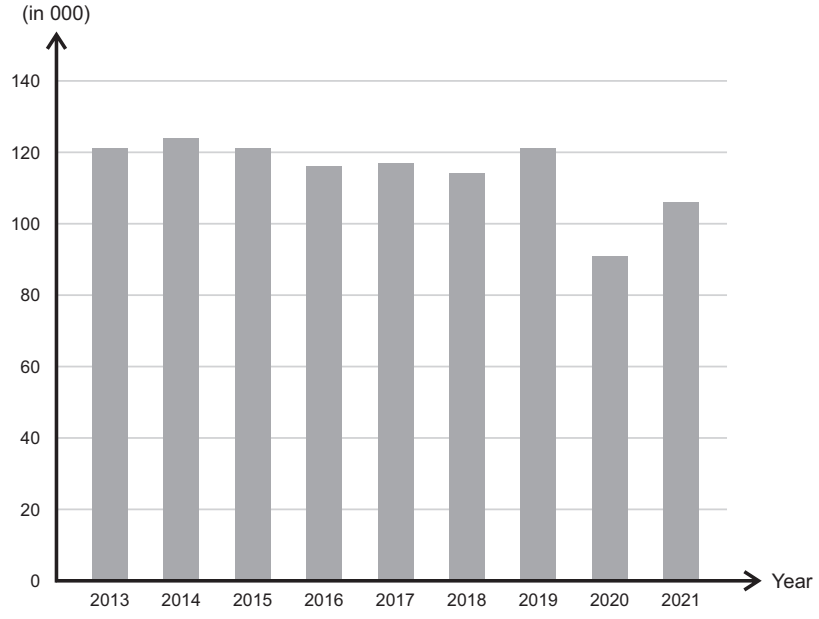
4 Results and Discussion

We started by researching the impact of the COVID-19 epidemic on the scope of dental services in a group of preschool children with the following starting points: we observed preventive examinations of preschool children and fillings of all materials and sizes (if a filling was made, it means that the child had caries). We also assumed that the number of preschool children has been approximately the same over the years since the population of the Republic of Slovenia has been stable. In Slovenia, 15 % of people are aged 0–14, which means approximately 316,000 children (SURS, 2023).

The graph below shows the number of performed selected dental services for preschool children by year from 2013 to 2021.

Figure 2

Number of Performed Selected Dental Services for Preschool Children by Year from 2013 to 2021



Note. From ZZZS (https://www.zzzs.si/).

The average number of selected dental services provided in the period from 2013 to 2019 is 119,152. The index number of services for 2020 to average before 2020: (91067 × 100/119) = 76.4. In the epidemic year of 2020, there was a 23.6 % decline in

services provided compared to the average of previous years. We attribute this to the closure of dental clinics, the failure to carry out systematic examinations, and people's fear of visiting public places. The closure of institutions and restriction of contacts was a measure that was supposed to represent "an important strategy to prevent the increase in morbidity and mortality from COVID-19" (Kerneža & Lepičnik Vodopivec, 2022, p. 66) but has caused other health issues.

Table 1 below shows the number of performed curative dental services (fillings of all materials and sizes) from 2013 to 2021. Our hypothesis was that the reduction in services rendered, which we demonstrated in Figure 2, would show up as an increase in services in the year following the epidemic.

Table 1

Number of Performed Curative Dental Services from 2013 to 2021

	2013	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*
Curative dental services for school children (in 000)	1,047	1,034	1,019	989	971	949	755	602	675
Curative dental services for preschool children (in 000)	121	124	121	116	117	114	121	91	106
Total	1,168	1,158	1,140	1,105	1,088	1,063	876	693	780

Note. From ZZZS (https://www.zzzs.si/).

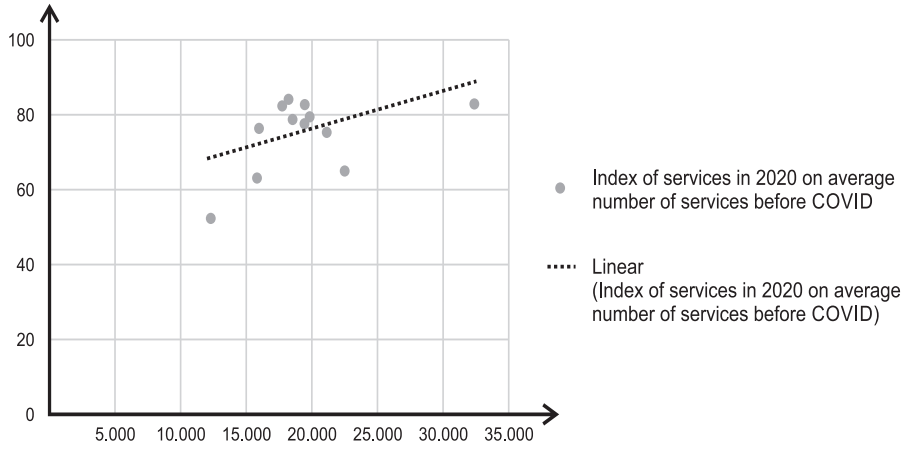
The data reveal no significant increase in the number of services provided in 2021, as would be expected with the downtime brought about by the epidemic. However, we can see that the number of services in the group of schoolchildren had a downward trend in the years before the epidemic: 736,800 dental services were provided in 2020 and 2021, which means a 47% decrease compared to the average of 2013–2019, which amounted to 1,085,400 dental services. In 2020 and 2021, 98,300 dental services were provided to preschool children, which is a 21% decrease compared to the average of 2013–2019, which was 119,200 dental services. In 2020 and 2021, 638,600 dental services were provided to school children, which means a 51% decrease compared to the average of 2013–2019, which was 966,300 dental services. We estimate that the loss of services from the times of the epidemic will take a long time to compensate, as there will not be a sufficient increase in 2021. The damage caused by the epidemic is not only in the lack of services but also in the associated increase in needs brought about by the absence of care, systematic examinations, and education. Moreover, it is most likely that immediate compensation of the shortage is impossible due to the limited capacities of the healthcare system.

We also wanted to verify the correlation between the region's development and the loss of dental services. To indicate the region's development, we used gross domestic product (GDP) per capita. Dental services were observed with preventive examinations and fillings of all materials and sizes. The figure 3 shows the results.

The index of decline in dental services for preschool children for 2020 has a positive regression coefficient (0.001) with GDP per capita. The correlation coefficient is 0.50, which means that regions with a lower GDP tend to have a greater shortage of health services during the COVID-19 epidemic than regions with a higher GDP per capita. Interestingly, in many regions, there is no correlation between the level of work activity and the index of decline in dental services for preschool children (r = 0.08). A similar (non)correlation (r = 0.25) of the decrease in dental services is shown with the average monthly net salary per inhabitant of the region (Statistične regije, 2023).

Figure 3

Correlation of the Index of Dental Services for Preschool Children in 2020 Compared to the Average of Previous Years with GDP by Statistical Region in Slovenia



Note. From ZZZS (https://www.zzzs.si/) and SURS (https://www.stat.si/obcine/sl/Region/Index/12).

5 Discussion

The WHO defines oral health as an important component of overall health and well-being, which should not be considered in isolation from general health and well-being (Ranfl et al., 2015). Caries is caused by bacteria that form dental plaque and is one of the most common chronic diseases of children (Rathee, 2023). According to the Global Burden of Disease Study, the prevalence of caries in children under the age of 5 is 43.39% worldwide, 37.2% in the EU, and 56.53% in Slovenia (Global Burden of Disease Collaborative Network, 2021). Determining the exact prevalence is challenging due to different caries detection and definition methodologies used in the studies. Education and preventive dental health are of utmost importance at preschool age, and the rights to a preventive dental examination for children aged 6–12 months and ages 1 through 6 should not be taken for granted but acted upon (Rulebook on Amendments to the Rulebook for the Implementation of Preventive Health Care at the Primary Level,

2015). Primary prevention includes raising awareness of the risk of caries, its causes, the importance of oral health, appropriate eating habits, and the benefits of fluoride for teeth. The observed lower loss of dental services shows that the epidemiological crisis has affected primary prevention, especially in less developed regions. During the pandemic, most of the initiative and responsibility for examinations shifted to parents. The absence of preventive examinations during the epidemic also affected the further implementation of prevention, as a large deficit arose. Kindergartens can fill this gap with preventive education.

6 Conclusion

In Slovenia, dental prevention for preschool children is free and financed by the state. The programme is implemented within the framework of the Health Insurance Institute of Slovenia (ZZZS), which also takes care of the organisation and coordination of the programme, and ensures the implementation of services. Parents of children must choose a dentist, take the child to regular check-ups, and take care of proper oral hygiene at home. In the case of initial caries, the lesion can be stopped by careful hygiene, topical application of fluorides, and a change in diet. If the caries has progressed, it must be treated with a filling. Healthy teeth are a lifelong journey and the child will carry good hygiene habits into adulthood.

Dental prevention and health education for preschool children are important because, during this period, children learn good habits regarding the care of their teeth, which they will carry with them throughout their lives. It is essential that kindergartens and parents work together to prevent dental diseases in preschool children, as this is a key period in the development of dental hygiene and health.

Bine Devjak, dr. Sanja Berčnik

Pomen zdravstvene vzgoje in preventive v boju proti kariesu v predšolskem obdobju

Zdravje in promocija zdravega življenja postajata vse bolj pomembni področji (Devjak in Devjak, 2013; Nagelj, 2006). Zdravje je opredeljeno kot celovit in dinamičen sistem, ki predstavlja prilagoditveno funkcijo posameznika in mu omogoča opravljanje vseh bioloških, socialnih in poklicnih funkcij, hkrati pa pomaga pri obrambi telesa pred boleznimi, oslabelostjo in prezgodnjo smrtjo (WHO, 2024). Ustna higiena je sestavni del sistemskega zdravja, je odločilen dejavnik kakovosti življenja in je povezana s splošnim zdravjem (WHO, 2024; Ranfl idr., 2015). Osnovno zobozdravstvo za predšolske otroke se nanaša na osnovno skrb za zdravje zob in ustne votline pri otrocih, ki so stari od 0 do 6 let, in vključuje preprečevanje in zdravljenje zobnih bolezni ter izobraževanje otrok in njihovih staršev o ustni higieni in zdravem življenjskem slogu. Karies je kronična okužba zob s kariogenimi bakterijami (Rathee, 2023). Povzročajo jo bakterije, ki tvorijo

zobne obloge, in je ena najpogostejših kroničnih bolezni otrok. Za prikaz razširjenosti zobnega kariesa strokovnjaki najpogosteje uporabljajo indeks KEP, ki nam pove povprečno število s kariesom prizadetih (K), izpuljenih (E) in popravljenih (P) stalnih zob pri posamezniku. Pri mlečnem in sekundarnem zobovju upoštevamo tudi mlečne zobe, pri čemer spremenljivke označujemo z malimi črkami (kep) (Artnik, 2010). Karies pri predšolskih otrocih imenujemo zgodnji otroški karies (ECC). Po Ameriški akademiji za pediatrično zobozdravstvo (AAPD) je klasifikacija ECC opredeljena kot prisotnost enega ali več mlečnih zob, prizadetih s kariesom, manjkajočih zaradi kariesa ali zdravljenih pri otrocih, mlajših od 6 let. Klasifikacija opredeljuje tudi S-ECC (hudi zgodnji otroški karies), ki se diagnosticira pri otrocih, mlajših od 3 let, ob kakršnem koli znaku zobnega kariesa (Drury idr., 1999). ECC je karies zgornjih mlečnih zob, predvsem sekalcev, ki nastane zaradi nočnega hranjenja iz stekleničke s sladko pijačo. Ponoči se pretok sline zmanjša in zato slabše umiva zobe, bakterije pa dobijo več sladkorja in proizvedejo več kisline (Bencze idr., 2021; Šavli, 2022). Po podatkih Global Burden of Disease Study je razširjenost kariesa pri otrocih, mlajših od 5 let, po vsem svetu 43,39-odstotna, v EU 37,2-odstotna in v Sloveniji 56,53-odstotna (Global Burden of Disease Collaborative Network, 2021). Zaradi ECC otrok prehitro izgubi mlečne zobe, zato pride do nepravilnosti v razvoju čeljusti in kasneje pri izraščanju stalnih zob. Poleg tega ima otrok težave z žvečenjem trše hrane, pa tudi z izgovarjavo nekaterih glasov (M. F., 2010).

Glavni simptom kariesa je bolečina, ki vpliva na kakovost življenja. Otroci lahko zaradi bolečin izostajajo od pouka ali se težje učijo, lahko se razvijejo težave s hranjenjem in posledično hujšanje, težave s spanjem, spremembe v vedenju, pride do upada šolske uspešnosti in povečane verjetnosti kariesa v odrasli dobi (Abanto idr., 2011). Kot rešitev za preprečevanje ECC se predlaga primarno, sekundarno in terciarno preventivo (Pitts, 2019). Na primarni ravni preventiva odkriva dejavnike tveganja, ki vplivajo na nastanek bolezni. V Sloveniji je preventivna dejavnost urejena s Smernicami za izvajanje preventivnega zdravstvenega varstva na primarni ravni (Pravilnik…, 1998) in zagotavlja:

- *zdravstveno varstvo dojenčkov in otrok do starosti 6 let (izvaja pediater),*
- *zdravstveno varstvo šolskih otrok in mladine do 19. leta (izvaja šolski zdravnik).*

Predšolski otroci imajo pravico do:

- *preventivnega zobozdravstvenega pregleda dojenčka v starosti od 6 do 12 mesecev,*
- *preventivnega zobozdravstvenega pregleda v prvem, drugem in tretjem letu starosti in*
- *preventivnega zobozdravstvenega pregleda v četrtem, petem in šestem letu starosti (Pravilnik o spremembah in dopolnitvah Pravilnika za izvajanje preventivnega zdravstvenega varstva na primarni ravni, 2015).*

Primarna preventiva torej vključuje ozaveščanje o nevarnosti kariesa, vzrokih zanj, pomenu ustnega zdravja, ustreznih prehranjevalnih navadah in koristih fluora za zobe. Sekundarna preventiva poteka v zobozdravstveni ambulanti, kjer zobozdravnik na rednih pregledih odkrije in skuša obvladati začetne kariozne spremembe brez posegov na zobeh. Terciarna preventiva se nadaljuje v ambulanti, če kariozne lezije napredujejo in se kavitirajo. V Sloveniji je zobozdravstvena preventiva za predšolske otroke brezplačna in jo financira država. Program se izvaja v okviru Zavoda za zdravstveno zavarovanje

Slovenije (ZZZS). Ker je v Sloveniji več kot 90% vseh predšolskih otrok vključenih v vrtce, imajo vzgojitelji pomembno vlogo pri preprečevanju zobnih bolezni.

Vloga vrtcev in vzgojiteljev je ključna pri preprečevanju ECC (Menghini idr., 2008). Za uspešno preventivo potrebujemo zdrave navade vzdrževanja ustne higiene, enakomeren ritem prehranjevanja in omejitev vnosa sladkorja. Vse to lahko izvajajo vzgojitelji v času bivanja otroka v vrtcu. Gradijo lahko na zdravih prehranjevalnih navadah, ki jih otroci lahko obdržijo vse življenje (Kurikulum za vrtce, 1999). Vzgojitelji lahko otroke poučijo o pravilnem ščetkanju zob, jih spodbujajo k uporabi zobne nitke in jim svetujejo uporabo ustne vodice, otroke lahko spodbujajo k zdravemu prehranjevanju in odsvetujejo uživanje sladkih pijač med obroki, lahko organizirajo dejavnosti, ki spodbujajo uživanje sadja, zelenjave in druge zdrave hrane. Organizirajo lahko tudi različna predavanja o ustni higieni, predstavitve zobozdravstvenih strokovnjakov, obiske zobozdravstvenih ambulant in druge dejavnosti, ki podpirajo zdrav življenjski slog družine.

Cilj prispevka je bil ugotoviti:

- *vpliv epidemije covida-19 na obseg zobozdravstvenih storitev v skupini predšolskih otrok;*
- *vpliv epidemije covida-19 na obseg kurativnih zobozdravstvenih storitev v skupini predšolskih in osnovnošolskih otrok in*
- *razliko v vplivu epidemije covida-19 na obseg zobozdravstvenih storitev v skupini predšolskih otrok v povezavi z gospodarskim razvojem regije.*

V analizo smo vključili podatke Zavoda za zdravstveno zavarovanje Slovenije (ZZZS) o opravljenih zobozdravstvenih storitvah za otroke v starosti od 0 do 15 let za obdobje od 2013 do 2021 v Republiki Sloveniji in podatke Statističnega urada Republike Slovenije (SURS).

Podatki so bili obdelani s statističnima programoma Excel in SPSS. Izvedli smo analizo časovnih vrst raziskovanih pojavov in korelacijske analize med obsegom opravljenih zobozdravstvenih storitev in gospodarsko razvitostjo statističnih regij v Sloveniji. Povprečno število opravljenih izbranih zobozdravstvenih storitev v obdobju od 2013 do 2019 je 119.152. Indeksno število storitev v letu 2020 do povprečja pred letom 2020: (91067 × 100/119) = 76,4. V letu epidemije, tj. letu 2020, beležimo 23,6-odstotni upad opravljenih storitev glede na povprečje preteklih let. To pripisujemo zaprtju zobozdravstvenih ambulant, neopravljanju sistematskih pregledov in strahu ljudi pred obiskovanjem javnih mest. Podatki kažejo, da v letu 2021 ni bistvenega povečanja števila opravljenih storitev, kot bi pričakovali ob izpadih, ki jih je povzročila epidemija. Vidimo pa, da je število storitev v skupini šolskih otrok v letih pred epidemijo padalo. V letih 2020 in 2021 je bilo opravljenih 736.800 zobozdravstvenih storitev, kar pomeni 47-odstotno zmanjšanje glede na povprečje 2013–2019, ki je znašalo 1.085.400 zobozdravstvenih storitev. V letih 2020 in 2021 je bilo opravljenih 98.300 zobozdravstvenih storitev za predšolske otroke, kar pomeni 21-odstotno zmanjšanje glede na povprečje 2013–2019, ki je znašalo 119.200 zobozdravstvenih storitev. V letih 2020 in 2021 je bilo opravljenih 638.600 zobozdravstvenih storitev za šolske otroke, kar pomeni 51-odstotno zmanjšanje glede na povprečje 2013–2019, ki je znašalo 966.300 zobozdravstvenih storitev. Ocenjujemo, da se bo izpad storitev iz časov epidemije še dolgo nadomeščal, saj v letu 2021 ni zadostnega povečanja. Škoda zaradi epidemije ni le v pomanjkanju storitev, temveč tudi v s tem povezanem povečanju potreb zaradi odsotnosti oskrbe, sistemat-

skih pregledov in izobraževanja. Prav tako je najverjetneje takojšnja nadomestitev izpada nemogoča zaradi omejenih zmogljivosti zdravstvenega sistema. Indeks upadanja zobozdravstvenih storitev za predšolske otroke za leto 2020 ima pozitiven regresijski koeficient (0,001) z BDP na prebivalca. Korelacijski koeficient je 0,50, kar pomeni, da imajo regije z nižjim BDP v času epidemije covida-19 večji izpad zdravstvenih storitev kot regije z višjim BDP na prebivalca. Zanimivo je, da v številnih regijah ni korelacije med stopnjo delovne aktivnosti in indeksom upada zobozdravstvenih storitev za predšolske otroke (r = 0,08). Podobna (ne)korelacija (r = 0,25) znižanja zobozdravstvenih storitev se kaže s povprečno mesečno neto plačo na prebivalca regije (SURS, 2023). Opaženi manjši izpad zobozdravstvenih storitev kaže, da je epidemiološka kriza prizadela primarno preventivo, predvsem v manj razvitih regijah. V času epidemije je večina iniciativne odgovornosti za preglede prešla na starše. Odsotnost preventivnih pregledov v času epidemije je vplivala tudi na nadaljnje izvajanje preventive, saj je nastal velik primanjkljaj. Vrtci lahko to vrzel zapolnijo s preventivno vzgojo.

V Sloveniji je zobozdravstvena preventiva za predšolske otroke brezplačna in jo financira država. Program se izvaja v okviru Zavoda za zdravstveno zavarovanje Slovenije (ZZZS), ki skrbi tudi za organizacijo in koordinacijo programa ter zagotavlja izvajanje storitev. Starši otrok morajo izbrati zobozdravnika, otroka redno voditi na preglede in doma skrbeti za ustrezno ustno higieno. V primeru začetnega kariesa lahko lezijo zaustavimo s skrbno higieno, lokalno uporabo fluoridov in spremembo prehrane. Če je karies napredoval, ga je treba zdraviti s plombo. Zdravi zobje so vseživljenjskega pomena in dobre higienske navade bo otrok prenesel v odraslost. Zobozdravstvena preventiva za predšolske otroke je pomembna, saj se otroci v tem obdobju naučijo dobrih navad glede nege zob, ki jih bodo nosili s seboj vse življenje. Pomembno je, da vrtec in starši sodelujemo pri preprečevanju zobnih bolezni pri predšolskih otrocih, saj je to ključno obdobje v razvoju zobne higiene in zdravja.

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Bine Devjak, Doctor of dental medicine, Medical center dr. Janeza Oražma Ribnica.
E–mail: bine.devjak@gmail.com

Sanja Berčnik, PhD, Assistant professor of educational theory and pre-school pedagogy at the Faculty of Education in Ljubljana.
E–mail: sanja.bercnik@pef.uni-lj.si