ACTA
STOMATOLOGICA
CROATICA
www.ascro.hr

Acta stomatol Croat. 2025;59(3):262-275.
DOI: 10.15644/asc59/3/4

ORIGINAL SCIENTIFIC PAPER
IZVORNI ZNANSTVENI RAD

Sanja Kolarić[1†], Sanja Vučković Hrkač[2,4†], Luka Šimunović[4*], Dubravka Negovetić Vranić[1,3], Željko Verzak[1,3], Marjeta Majer[5]

A Cross-Sectional Study of Parental Knowledge, Practices, and Predictors of Child Oral Health Behaviors and Fear in Zagreb, Croatia

Presječno istraživanje roditeljskog znanja, praksi i čimbenika kojima se predviđaju oralno-zdravstveno ponašanje i strah djece u Zagrebu, Hrvatska

[1] University Hospital Center Zagreb, Department of Dentistry, Department of Pediatric and Preventive Dentistry, Zagreb, Croatia
Klinički bolnički centar Zagreb, Klinika za stomatologiju, Klinički zavod za dječju i preventivnu stomatologiju, Zagreb, Hrvatska
[2] University Hospital Center Zagreb, Department of Dentistry, Department of Orthodontics, Zagreb, Croatia
Klinički bolnički centar Zagreb, Klinika za stomatologiju, Klinički zavod za ortodonciju, Zagreb, Hrvatska
[3] University of Zagreb School of Dental Medicine, Department of Pediatric and Preventive Dentistry, Zagreb, Croatia
Sveučilište u Zagrebu Stomatološki fakultet, Zavod za dječju i preventivnu stomatologiju, Zagreb, Hrvatska
[4] University of Zagreb School of Dental Medicine, Department of Orthodontics, Zagreb, Croatia
Sveučilište u Zagrebu Stomatološki fakultet, Zavod za ortodonciju, Zagreb, Hrvatska
[5] University of Zagreb School of Medicine, School of Public Health "Andrija Štampar", Department of Social Medicine and Organization of Health Care, Zagreb, Croatia
Sveučilište u Zagrebu, Medicinski fakultet, Škola narodnoga zdravlja Andrija Štampar, Katedra za socijalnu medicinu i organizaciju zdravstvene zaštite, Zagreb, Hrvatska
[†] These authors contributed equally to this work.
Ovi autori jednako su pridonijeli ovom radu.

Abstract

Objective: This study aimed to evaluate parental knowledge, behaviors, and sociodemographic predictors influencing children's oral hygiene practices, dental visitation patterns, and dental fear in Croatia. **Materials and Methods:** A cross-sectional study involving 100 parents of children aged 0–7 years was conducted at the Department of Pediatric and Preventive Dentistry, School of Dental Medicine, University of Zagreb. A structured, validated questionnaire assessed parental knowledge, dietary habits, brushing frequency, fluoride use, dental visit reasons and frequency, and child dental fear. Statistical analyses included chi-square tests, ANOVA, Spearman correlations, and logistic regression to identify predictors of inadequate oral hygiene, irregular dental attendance, and dental fear. **Results:** Only 68% of children brushed their teeth twice a day; 66% consumed sweets daily, and 33.3% drank sweetened beverages daily. Logistic regression revealed that brushing once per day or less—classified as inadequate brushing—was significantly predicted by daily consumption of snacks (OR = 2.91, p = 0.025) and low parental oral health knowledge (OR = 2.58, p = 0.043). Irregular dental visits were more likely in children with a history of dental pain (OR=3.42, p=0.019). Child dental fear (41.4%) was predicted by previous trauma (OR=26.4, p=0.001), frequent check-ups (OR=27.4, p=0.009), and parental education (OR=10.0, p=0.049), while trauma management knowledge was protective (OR=0.067, p=0.002). Fluoridated toothpaste use was positively associated with regular dental attendance. **Conclusions:** Children's oral health behaviors and fear are significantly influenced by parental knowledge, education, dietary patterns, and trauma experiences. Educational interventions targeting caregivers, particularly regarding trauma response and oral hygiene, are warranted to improve pediatric oral health outcomes.

Received: April 4, 2025
Accepted: July 23, 2025

Address for correspondence
Luka Šimunović
University of Zagreb School of Dental Medicine
Gundulićeva 5, 10 000 Zagreb, Croatia
Department of Orthodontics
lsimunovic@sfzg.unizg.hr

MeSH Terms: Oral Health; Oral Hygiene; Child; Parent-Child Relations; Health Knowledge Attitudes Practice; Parents
Author Keywords: Pediatric Dentistry; Dental Caries; Dental Anxiety; Parental Knowledge

Sanja Kolarić: https://orcid.org/0009-0009-7288-1357
Sanja Vučković Hrkač: https://orcid.org/0009-0009-2967-2007
Luka Šimunović: https://orcid.org/0000-0003-2848-6041
Dubravka Negovetić Vranić: https://orcid.org/0000-0001-7632-2004
Željko Verzak: https://orcid.org/0000-0002-5875-517X
Marjeta Majer: https://orcid.org/0000-0001-5494-8719

Introduction

Dental caries remains one of the most prevalent chronic diseases affecting children globally, significantly impacting their overall health, quality of life, and overall development

Uvod

Karijes je i dalje jedna od najraširenijih kroničnih bolesti djece u svijetu i značajno utječe na njihovo opće zdravlje, kvalitetu života i cjelokupni razvoj (1, 2). Unatoč velikom na-

(1, 2). Despite substantial advancements in preventive dentistry, such as fluoride treatments, improved dental hygiene practices, and enhanced educational programs, caries prevalence among children continues to pose a significant public health challenge. This persistent prevalence is influenced by numerous factors, including behavioral practices, dietary habits, socioeconomic status, and broader social determinants of health (3). A deeper understanding of these contributing factors, particularly from the perspective of parental behaviors, knowledge, and attitudes, is vital for developing effective interventions and preventive strategies targeted specifically toward pediatric oral health. Parental influence, comprising oral health knowledge, attitudes toward dental care, and daily oral hygiene practices, substantially shapes children's oral health behaviors and dietary patterns. Parents or caregivers who demonstrate informed, consistent, and proactive oral health behaviors are more likely to positively influence their children's oral hygiene practices and dietary choices, thus reducing caries risk (4). Conversely, inadequate oral hygiene practices, frequent consumption of sugary foods and beverages, and inconsistent use of fluoride-based preventive measures significantly elevate the risk of developing dental caries in pediatric populations (5). Numerous studies consistently link high sugar intake, suboptimal brushing frequency, and infrequent fluoride use with increased caries incidence among children (6,7). Moreover, evidence suggests that improved parental oral health literacy directly correlates with enhanced oral hygiene practices and preventive behaviors among children, reinforcing the critical role of educating and empowering caregivers to optimize pediatric oral health outcomes (4).

Regular dental visits play a crucial role in the early detection, prevention, and effective management of oral diseases in children. Early and routine dental care facilitates timely intervention, reduces the incidence of complex dental treatments, and helps foster positive dental experiences. However, patterns of dental attendance among children vary considerably, driven by numerous factors including parental education, economic status, cultural attitudes toward dental health, and prior experiences with dental treatment (8, 9). Irregular dental visits, particularly symptom-driven attendance, frequently lead to delayed diagnosis, prolonged untreated oral health conditions, more severe clinical outcomes, and increased dental anxiety among pediatric patients (10, 11). Additionally, dental anxiety and fear represent significant barriers to regular dental attendance. These emotions often stem from previous negative experiences, parental dental anxiety, or inadequate behavioral management techniques during dental care provision (12-14).

The onset of the COVID-19 pandemic further complicated pediatric oral health management, causing substantial disruptions to routine dental care delivery, altering dietary behaviors, and impacting oral hygiene practices among children globally. Many families experienced reduced access to dental services, which contributed to increased consumption of cariogenic diets and less stringent adherence to oral hygiene routines (15, 16). Although some studies documented negative impacts of the pandemic on children's oral health

pretku u preventivnoj stomatologiji, poput primjene fluorida, poboljšanih higijenskih praksi i unaprijeđenih edukativnih programa, prevalencija karijesa među djecom i dalje je ozbiljan javnozdravstveni izazov. Ova trajna prisutnost bolesti posljedica je niza čimbenika, a obuhvaća načine ponašanja, prehrambene navike, socioekonomski status te šire društvene determinante zdravlja (3). Dublje razumijevanje tih čimbenika, osobito iz perspektive roditeljskog ponašanja, znanja i stajališta, ključno je za razvoj učinkovitih intervencija i preventivnih strategija usmjerenih na oralno zdravlje djece.

Roditeljski utjecaj, koji uključuje znanje o oralnom zdravlju, stajališta o dentalnoj skrbi i svakodnevne higijenske navike, uvelike oblikuje oralno-zdravstveno ponašanje i prehrambene navike djece. Roditelji ili skrbnici koji dosljedno provode informirane i proaktivne navike oralne higijene vjerojatnije će pozitivno utjecati na oralno zdravlje i prehrambene izbore svoje djece, čime smanjuju rizik od nastanka karijesa (4). Suprotno tomu, nedostatna higijena, česta konzumacija slatke hrane i pića te neredovita primjena preventivnih mjera temeljenih na fluoridu, znatno povećavaju rizik od pojave karijesa kod djece (5). U mnogobrojnim istraživanjima dosljedno se povezuje visoka konzumacija šećera, nedovoljna učestalost pranja zuba i rijetka upotreba fluorida s povećanom učestalošću karijesa kod djece (6, 7). Dodatno, nalazi pokazuju da viša razina roditeljske zdravstvene pismenosti o oralnom zdravlju izravno korelira s boljim higijenskim navikama i preventivnim ponašanjem djece te tako potvrđuje ključnu ulogu edukacije i osnaživanja roditelja u optimizaciji oralnog zdravlja djece (4).

Redoviti posjeti stomatologu presudni su u ranom otkrivanju, prevenciji i učinkovitom liječenju oralnih bolesti djece. Rana i redovita dentalna skrb omogućuje pravodobnu intervenciju, smanjuje potrebu za složenim zahvatima te potiče pozitivna iskustva pri odlasku stomatologu. Ipak, obrasci posjećivanja stomatologa kod djece značajno variraju i pod utjecajem su niza čimbenika, uključujući roditeljsko obrazovanje, ekonomski status, kulturna stajališta prema oralnom zdravlju i ranija iskustva sa stomatološkim liječenjem (8, 9). Neredoviti, simptomima uvjetovani posjeti često rezultiraju odgođenom dijagnozom, dugotrajnim neliječenim stanjem, težim kliničkim ishodima i povećanom dentalnom anksioznošću kod djece (10, 11). Nadalje, dentalna anksioznost i strah značajne su prepreke kad je riječ o redovitim posjetima stomatologu. Ti osjećaji često proizlaze iz ranijih negativnih iskustava, roditeljske dentalne anksioznosti ili nedovoljno učinkovitih tehnika upravljanja ponašanjem tijekom dentalne skrbi (12 – 14).

Mijenjajući prehrambene navike i utječući na higijensku praksu djece diljem svijeta, početak pandemije bolesti COVID-19 dodatno je otežao skrb o njihovu oralnom zdravlju te je prouzročio znatne poremećaje u pružanju redovite dentalne skrbi. Mnoge su obitelji imale smanjen pristup dentalnim uslugama, što je pridonijelo povećanoj konzumaciji kariogenih namirnica i slabijem održavanju higijenskih rutina (15, 16). Iako je u nekim istraživanjima dokumentiran negativan utjecaj pandemije na oralno-zdravstvene navike djece, nalazi se znatno razlikuju među populacijama i kontekstima, što upućuje na to da su potrebna dodatna longitudinal-

behaviors, findings have varied considerably across populations and contexts, highlighting the need for further longitudinal research to better understand and address the long-term consequences of pandemic-related disruptions (16, 17).

Given these critical considerations, the present study aimed to comprehensively investigate parental knowledge, attitudes, and practices relating to pediatric oral health, focusing on oral hygiene behaviors, dietary habits, fluoride utilization, dental visitation patterns, and the influence of various socio-demographic factors.

Although numerous international studies have examined the influence of parental factors on children's oral health, few have addressed this issue in Southeastern Europe. No studies, to our knowledge, have comprehensively evaluated the combined role of parental oral health knowledge, behavioral practices, and dental trauma awareness on oral health behaviors and fear among Croatian children. This study aimed to bridge this gap by providing context-specific insights to inform future preventive strategies in this region.

Furthermore, this research examined predictors of inadequate oral hygiene, irregular dental visitation patterns, and dental fear among children. The findings intend to inform future targeted educational interventions, enhance caregiver awareness, and ultimately improve oral health outcomes among pediatric populations, aligning with the overarching goals of preventive pediatric dentistry.

Materials and methods

Study Design and Setting

This cross-sectional study was conducted at the Department of Pediatric and Preventive Dentistry, School of Dental Medicine, University of Zagreb. The study included a convenience sample of 100 parents and their children who were patients at the department during the data collection period. Convenience sampling was chosen due to the practical feasibility of recruiting participants within a clinical setting during routine appointments. Eligible participants were parents or legal guardians of children aged 0 to 7 years, who provided informed consent. The chosen age range was selected to encompass key developmental stages in early childhood during which parental influence on oral health behaviors is particularly pronounced. This classification aligns with age categories commonly used in public health research and WHO definitions. Moreover, it allows for the exploration of behavioral differences across early childhood and school-age periods, especially regarding tooth brushing practices, dietary habits, and dental fear development. Participation was entirely voluntary and anonymous.

Data Collection

Data were collected using a structured, self-administered questionnaire completed by the parents in paper format while waiting for their child's dental examination in which dental status was evaluated. The questionnaire gathered information on the child's demographic characteristics, including

na istraživanja kako bi se bolje razumjele i ublažile dugoročne posljedice pandemija (16, 17).

Uzimajući u obzir navedene čimbenike, cilj ovog istraživanja bio je sveobuhvatno ispitati roditeljsko znanje, stajališta i prakse vezane za oralno zdravlje djece, s naglaskom na higijenske navike, prehrambene navike, korištenje fluorida, obrasce posjećivanja stomatologa te utjecaj različitih sociodemografskih čimbenika.

Iako su autori mnogobrojnih međunarodnih istraživanja ispitivali utjecaj roditeljskih čimbenika na oralno zdravlje djece, malo ih se bavilo tom temom u jugoistočnoj Europi. Prema našim saznanjima, u Hrvatskoj do sada nije provedeno istraživanje kojim bi se sveobuhvatno istražila ulogu roditeljskog znanja o oralnom zdravlju, navike ponašanja i svijesti o dentalnim traumama u kontekstu oralno-zdravstvenih navika i straha djece. Ovim istraživanjem nastoji se ispuniti taj jaz pružanjem spoznaja prilagođenih lokalnom kontekstu, sa svrhom oblikovanja budućih preventivnih strategija u ovoj regiji.

Uz to, u ovom istraživanju ispituju se prediktori nedostatne oralne higijene, neredovitih posjeta stomatologu i dentalne anksioznosti i straha kod djece. Dobiveni nalazi mogu poslužiti za oblikovanje ciljano usmjerenih edukativnih intervencija, povećanje svijesti skrbnika te poboljšanje oralnog zdravlja djece, u skladu s temeljnim ciljevima preventivne dječje stomatologije.

Materijali i metode

Dizajn studije i okruženje

Ovo presječno istraživanje provedeno je u Zavodu za dječju i preventivnu stomatologiju Stomatološkog fakulteta Sveučilišta u Zagrebu. U istraživanje je bio uključen prikladan uzorak od 100 roditelja i njihove djece koji su tijekom prikupljanja podataka bili pacijenti u tom zavodu. Prigodno uzorkovanje odabrano je zbog praktične izvedivosti regrutiranja sudionika u kliničkom okruženju tijekom redovitih stomatoloških pregleda.

Kriteriji za uključivanje obuhvaćali su roditelje ili zakonske skrbnike djece u dobi od 0 do 7 godina koji su dali informirani pristanak za sudjelovanje. Odabrani raspon dobi obuhvaća ključne razvojne faze ranog djetinjstva u kojima je roditeljski utjecaj na oralno-zdravstvene navike posebno izražen. Ta je klasifikacija usklađena s dobnim kategorijama koje se uobičajeno koriste u javnozdravstvenim istraživanjima i definicijama Svjetske zdravstvene organizacije (WHO). Uz to, omogućuje istraživanje razlika u ponašanju između ranog djetinjstva i predškolskog razdoblja, osobito kad je riječ učestalosti pranja zuba, prehrambenim navikama i pojavi dentalnoga straha. Sudjelovanje u istraživanju bilo je potpuno dobrovoljno i anonimno.

Prikupljanje podataka

Podatci su prikupljeni s pomoću strukturiranog upitnika koji su roditelji ispunjavali u papirnatom obliku dok su čekali stomatološki pregled svojeg djeteta na kojemu mu je procijenjen dentalni status. Upitnik je sadržavao podatke o demografskim obilježjima djeteta, uključujući dob i spol,

ing age and gender, dietary habits such as the frequency of sugary food and beverage consumption, oral hygiene practices including brushing frequency and use of fluoride toothpaste, utilization of dental services such as the timing and reason for the last dental visit, and parental awareness and knowledge related to oral health. The questionnaire (Supplementary Table 1) was adapted from previously validated instruments. Items on oral health behaviors, including tooth brushing frequency and daily sugar intake, were based on the common framework used in pediatric oral health behavior surveys (18). Determinants of parental behavior—such as attitudes, social norms, and perceived control—were informed by validated Theory-of-Planned-Behavior scales for preschool children (19). It was reviewed by two pediatric dental experts for face and content validity. A small pilot test (n=10) was conducted to assess clarity, and necessary linguistic adjustments were made. The study protocol was approved by the Ethics Committee of the University Hospital Center Zagreb (Class: 8.1-22/32-2, No.: 02/013) and the Ethics Committee of the School of Medicine, University of Zagreb (Class: 641-01/22-02/01, No.:380-59-10106-22-111/61).

Parental Knowledge Assessment

Parental knowledge regarding pediatric oral health was assessed using a dedicated section within the structured questionnaire, comprising both objective and self-report-

prehrambenim navikama poput učestalosti konzumacije slatke hrane i zaslađenih napitaka, oralno-zdravstvenim navikama kao što su učestalost pranja zuba i upotreba paste za zube s fluoridom, korištenju stomatoloških usluga (vrijeme i razlog posljednjeg posjeta stomatologu) te razini roditeljske osviještenosti i znanja vezanih uz oralno zdravlje.

Upitnik (suplementna tablica 1) prilagođen je prema prethodno validiranim instrumentima. Pitanja o oralno-zdravstvenim navikama, uključujući učestalost pranja zuba i dnevni unos šećera, temeljila su se na zajedničkom okviru korištenom u anketama o oralnom zdravlju djece (18). Odrednice roditeljskog ponašanja – poput stajališta, društvenih normi i percipirane kontrole – oblikovane su prema validiranim ljestvicama teorije o planiranom ponašanju za djecu predškolske dobi (19). Upitnik su pregledala dva stručnjaka iz područja dječje stomatologije radi procjene jasnosti i sadržajne valjanosti. Provedeno je i pilot-istraživanje na malom uzorku (n = 10) kako bi se ispitala razumljivost, a zatim je obavljena potrebna jezična prilagodba.

Protokol istraživanja odobrilo je Etičko povjerenstvo Kliničkoga bolničkog centra Zagreb (Klasa: 8.1-22/32-2, Urbroj: 02/013) te Etičko povjerenstvo Medicinskog fakulteta Sveučilišta u Zagrebu (Klasa: 641-01/22-02/01, Urbroj: 380-59-10106-22-111/61).

Procjena roditeljskog znanja

Roditeljsko znanje o oralnom zdravlju djece procijenjeno je s pomoću posebnog dijela strukturiranog upitnika koji je uključivao objektivna i samoprocijenjena pitanja. Objek-

Table 1 Sample characteristics
Tablica 1. Karakteristike uzorka

Category • Kategorija	Subcategory	N (%)	Mean • Srednja vrijednost (SD)	Median • Medijan (IQR)
Parent/Caregiver • Roditelj/Skrbnik	Gender • Spol			
	- Male • Muški	24 (24)		
	- Female • Ženski	76 (76)		
	Age • Dob		38 (6)	
	Education level • Razina obrazovanja			
	- Primary • Osnovno	0 (0)		
	- Secondary • Srednje	55 (55.6)		
	- High • Viša škola	12 (12.1)		
	- University • Fakultet	26 (26.3)		
	- Doctorate • Doktorat	6 (6.1)		
Child • Dijete	Gender • Spol			
	- Male • Muški	49 (50.5)		
	- Female • Ženski	48 (49.5)		
	Age • Dob			5 (4–6)
	Age at the first dental visit • Dob pri prvom posjetu stomatologu			3 (2–4)
	Reason for first dental visit • Razlog prvog posjeta stomatologu			
	- Caries • Karijes	33 (33.7)		
	- Caries and pain • Karijes i bol	2 (2)		
	- Pain • Bol	9 (9.2)		
	- Psychological adaptation • Psihološka adaptacija	9 (9.2)		
	- Preventive check-up • Preventivni pregled	37 (37.8)		
	- Dental trauma • Dentala trauma	4 (4.1)		
	- Other • Ostalo	4 (4.1)		

ed items. The objective knowledge domain consisted of five closed-ended questions addressing critical aspects of child oral health: (1) the appropriate age for the first dental visit, (2) recommended daily brushing frequency, (3) the caries-preventive role of fluoride, (4) identification of cariogenic foods and drinks, and (5) appropriate response to dental trauma. These items were adapted from previously published oral health literacy questionnaires used in similar pediatric settings, including those by Kaushik and Sood (4) and Minervini et al. (9), and refined based on content relevance to the Croatian population.

Two pediatric dental experts independently reviewed the knowledge items to ensure face and content validity. A pilot test was conducted with a subsample of 10 parents to evaluate clarity and internal consistency, resulting in minor linguistic adjustments. The internal reliability of the knowledge domain in the pilot group was acceptable (Cronbach's alpha = 0.72), supporting the coherence of the construct being measured.

Each correct response was awarded one point, yielding a total possible score of 0 to 5. This scoring approach has been applied in prior studies evaluating parental oral health knowledge in pediatric dentistry contexts (20). In line with previous literature and considering the high level of knowledge required to effectively influence child oral health behaviors, a score of ≥4 was classified as "adequate knowledge", while scores ≤3 were categorized as "inadequate knowledge." This binary classification was also cross-validated with a self-perceived knowledge question ("Do you feel sufficiently informed about maintaining your child's oral health?"), which served as a subjective indicator of confidence.

Sample size

The required sample size for this cross-sectional study was estimated using G*Power software (version 3.1.9.7), targeting binary logistic regression as the primary analysis method. Based on a moderate effect size (odds ratio = 2.5), an alpha level of 0.05, and 80% power, with up to five predictors included in the model, the minimum recommended sample size was 95 participants.

Statistical Analysis

Statistical analyses were conducted using IBM SPSS Statistics (version 29.0) and Microsoft Excel. Prior to analysis, the distribution of continuous variables was assessed using the Shapiro–Wilk test. As the majority of variables deviated from normality, non-parametric tests were primarily employed. Descriptive statistics, including frequencies, percentages, means, standard deviations, medians, and interquartile ranges, were used to summarize the data.

Comparisons between categorical variables were performed using the chi-square test or Fisher's exact test, depending on expected cell counts. For comparisons involving continuous or ordinal variables across two independent groups, the Mann–Whitney U test was used. When comparing more than two groups, the Kruskal–Wallis test was applied. Despite the predominance of non-parametric methtivni dio znanja sastojao se od pet zatvorenih pitanja koja su obuhvaćala ključne aspekte oralnog zdravlja djece: (1) preporučenu dob za prvi stomatološki pregled, (2) preporučenu dnevnu učestalost pranja zuba, (3) ulogu fluorida u prevenciji karijesa, (4) prepoznavanje kariogene hrane i pića (5) i odgovarajuću reakciju na dentalnu traumu. Ta su pitanja prilagođena prema onima iz ranije objavljenih upitnika za procjenu oralno-zdravstvene pismenosti korištenih u sličnim pedijatrijskim kontekstima, uključujući one Kaushika i Sooda (4) te Minervinija i suradnika (9), uz dorade prema sadržajnoj relevantnosti za hrvatsku populaciju. Dva stručnjaka iz područja dječje stomatologije neovisno su pregledala pitanja radi procjene jasnoće i sadržajne valjanosti. Pilot-istraživanje provedeno je na poduzorku od 10 roditelja da bi se ispitala razumljivost i unutarnja konzistentnost, što je rezultiralo manjim jezičnim prilagodbama. Unutarnja pouzdanost ljestvice znanja u pilot-skupini bila je zadovoljavajuća (Cronbachova alfa = 0,72), što potvrđuje koherentnost mjerenog konstrukta.

Za svaki točan odgovor dodjeljivao se jedan bod, a ukupni rezultat mogao je iznositi od 0 do 5 bodova. Takav sustav bodovanja primjenjivan je i u ranijim istraživanjima procjene roditeljskog znanja o oralnom zdravlju u kontekstu pedijatrijske stomatologije (20). U skladu s ranijom literaturom te uzimajući u obzir visoku razinu znanja potrebnu za učinkovito oblikovanje oralno-zdravstvenih navika djece, rezultat ≥ 4 smatrao se "adekvatnim znanjem", a rezultati ≤ 3 svrstani su u kategoriju "neadekvatnog znanja". Ta binarna klasifikacija dodatno je provjerena pitanjem samoprocjene (Smatrate li da ste dovoljno informirani o održavanju oralnog zdravlja vašeg djeteta?) koje je služilo kao subjektivni pokazatelj razine sigurnosti u vlastito znanje.

Veličina uzorka

Potrebna veličina uzorka za ovo presječno istraživanje procijenjena je korištenjem softvera G*Power (verzija 3.1.9.7), uz binarnu logističku regresiju kao primarnu metodu analize. Na temelju umjerenog učinka (omjer izgleda = 2,5), razine značajnosti α = 0,05 i snage testa od 80 %, te s najviše pet prediktora uključenih u model, minimalna preporučena veličina uzorka iznosila je 95 sudionika.

Statistička analiza

Statistička analiza provedena je u programu IBM SPSS Statistics (verzija 29.0) i Microsoftovu Excelu. Prije analize je distribucija kontinuiranih varijabli provjerena Shapiro–Wilkovim testom. Budući da je većina varijabli odstupala od normalne raspodjele, uglavnom su korišteni neparametrijski testovi. Deskriptivna statistika, uključujući frekvencije, postotke, srednje vrijednosti, standardne devijacije, medijane i interkvartilne raspone, korištena je za opis podataka. Usporedbe između kategorijskih varijabli provedene su s pomoću hi-kvadrat testa ili Fisherova egzaktnog testa, ovisno o očekivanim veličinama. Za usporedbe kontinuiranih ili ordinalnih varijabli između dviju neovisnih skupina korišten je Mann–Whitneyjev U test, a za usporedbe između više od dviju skupina primijenjen je Kruskal–Wallisov test. Unatoč prevladavajućim neparametrijskim metodama, jednosmjerna

ods, one-way ANOVA was used in select instances where data met the assumptions of homogeneity of variance and approximate normal distribution, as confirmed by Levene's test and visual inspection of Q-Q plots.

Spearman rank correlation coefficients were used to assess associations between continuous and ordinal variables. To identify predictors of selected outcomes such as inadequate oral hygiene, irregular dental visits, and dental fear, both binary and multinomial logistic regression models were constructed. Predictor variables were selected based on theoretical relevance, prior literature, and significant univariate associations ($p < 0.10$). The following variables were considered for inclusion: child's age, frequency of sugary snack and beverage consumption, parental age, parental education level, perceived and objective oral health knowledge, trauma experience, and brushing supervision. Final models were refined to avoid overfitting and multicollinearity, which was assessed using variance inflation factors (VIF < 2.5 across models).

Odds ratios (ORs) with 95% confidence intervals (CIs) were reported. Model adequacy was assessed using Hosmer–Lemeshow goodness-of-fit tests, Nagelkerke pseudo R^2 values, and classification accuracy (sensitivity and specificity). For multinomial logistic regression models, the likelihood ratio test was used to assess model significance. All regression models were performed with listwise exclusion of cases with missing data. The overall proportion of missing data was less than 5% and met the criteria for missing completely at random (MCAR), as assessed using Little's MCAR test. A two-tailed p-value less than 0.05 was considered statistically significant.

Results

The study included 100 parents, the majority of whom were mothers (76%). Most parents had either a secondary (55%) or higher education level (26%), with an average age of 38.36 years. Children had their first dental visit most commonly at the age of 3 (median), and all respondents confirmed that their child had visited a dentist at least once. The main reasons for the first visit were preventive check-ups (37.8%) and caries (33.7%) (Table 1). Although most children visit the dentist regularly—most often once a month (33.3%) or every three months (14%)—as many as 67.7% have experienced toothache due to caries, and 78.4% currently have carious teeth. Nevertheless, most children (81.8%) also have restored (treated) teeth. Dental trauma was reported in 23.2% of children, yet only 37.1% of parents reported knowing how to appropriately respond in such situations. Alarmingly, 66% of children consume sweets and snacks daily, and 33.3% drink sweetened beverages every day. While 68% of children brush their teeth twice a day, 28% do so only once, and just 27% brush their teeth independently. Half of the children use fluoride toothpaste, although 29% of parents are unsure whether the toothpaste contains fluoride. Only 19.4% of children use additional caries-preventive products, most commonly fluoride gels and mouth rinses. Most par-

ANOVA korištena je u odabranim slučajevima kada su podatci zadovoljavali pretpostavke homogenosti varijance i približne normalne distribucije, što je potvrđeno Leveneovim testom i vizualnom inspekcijom Q – Q dijagrama. Spearmanov koeficijent rang korelacije korišten je za procjenu povezanosti između kontinuiranih i ordinalnih varijabli. Za identifikaciju prediktora odabranih ishoda, poput neadekvatne oralne higijene, neredovitih posjeta stomatologu i dentalnoga straha, konstruirani su binarni i multinomijalni logistički regresijski modeli. Varijable prediktori odabrane su prema teorijskoj relevantnosti, dostupnoj literaturi i značajnim univarijatnim povezanostima ($p < 0,10$). Za uključivanje su razmatrane sljedeće varijable: dob djeteta, učestalost konzumacije slatkih grickalica i zaslađenih napitaka, dob roditelja, razina obrazovanja roditelja, percipirano i objektivno znanje o oralnom zdravlju, iskustvo traume te nadzor pranja zuba. Završni modeli dorađeni su radi izbjegavanja prekomjernog prilagođavanja i multikolinearnosti koja je provjerena s pomoću faktora inflacije varijance (VIF < 2,5 u svim modelima).

Omjeri izgleda (OR) s 95-postotnim intervalima pouzdanosti (CI) su prikazani. Prilagođenost modela procijenjena je Hosmer–Lemeshowim testom ispravnosti prilagodbe, Nagelkerkeovim pseudo R^2 vrijednostima i točnošću klasifikacije (osjetljivost i specifičnost). Za multinomijalne logističke regresijske modele, značajnost modela procijenjena je testom omjera vjerojatnosti. Svi regresijski modeli provedeni su s isključivanjem slučajeva s nedostajućim podatcima metodom brisanja s popisa (engl. *listwise deletion*). Ukupni udio nedostajućih podataka bio je manji od 5 % i zadovoljio je kriterije za potpuno slučajno nedostajuće podatke (MCAR), što je potvrđeno Littleovim testom MCAR. Dvosmjerni $p < 0,05$ smatran je statistički značajnim.

Rezultati

U istraživanju je sudjelovalo 100 roditelja i to uglavnom majke (76 %). Većina roditelja imala je srednju (55 %) ili visoku stručnu spremu (26 %), a prosječna dob iznosila je 38,36 godina. Prvi posjet stomatologu djeca su najčešće imala u dobi od tri godine (medijan), a svi ispitanici potvrdili su da je njihovo dijete barem jedanput posjetilo stomatologa. Pritom su glavni razlozi za prvi posjet bili preventivni pregled (37,8 %) i karijes (33,7 %) (tablica 1.).

Iako većina djece redovito posjećuje stomatologa — najčešće jedanput na mjesec (33,3 %) ili svaka tri mjeseca (14 %) — čak njih 67,7 % iskusilo je zubobolju prouzročenu karijesom, a 78,4 % trenutačno ima zube zahvaćene karijesom. Ipak, većina djece (81,8 %) ima sanirane (liječene) zube. Dentalna trauma zabilježena je kod 23,2 % djece, no samo 37,1 % roditelja izjavio je da zna kako pravilno reagirati u takvim situacijama. Zabrinjava to što 66 % djece svaki dan konzumira slastice i grickalice, a 33,3 % svaki dan pije zaslađene napitke. Iako 68 % djece pere zube dva puta na dan, 28 % to čini samo jedanput, a samo 27 % zube pere samostalno. Polovina djece koristi se pastom za zube s fluoridom, a 29 % roditelja nije sigurno sadržava li pasta koju upotrebljava njihovo dijete taj mineral. Dodatnim proizvodima za prevenciju karijesa koristi se samo 19,4 % djece, najčešće su to fluo-

ents (68.8%) believe they are sufficiently informed about oral health maintenance. The COVID-19 pandemic did not significantly affect children's oral hygiene habits, with 80% of parents reporting no change in oral health care during this period.

ANOVA results revealed that parental age differed significantly across categories of dental visitation frequency ($F(7.84) = 2.606$, $p = 0.017$, $\eta^2 = 0.178$). Younger parents were more likely to bring their children to the dentist regularly. Additionally, parental age varied significantly depending on whether children used fluoridated toothpaste ($F(2.\ 96) = 3.379$, $p = 0.038$, $\eta^2 = 0.066$), with younger parents more likely to report its use.

A total of 38% of respondents reported that the COVID-19 pandemic negatively affected their family's oral health habits. However, this variable was not significantly associated with either brushing frequency or dental visitation patterns ($p > 0.05$ for both outcomes).

Factors associated with Inadequate Oral Hygiene, Irregular Dental Visits and Child Dental Fear

Binary logistic regression models were constructed to explore predictors of three outcomes: inadequate oral hygiene, irregular dental visits, and child dental fear. Predictor variables were selected based on their theoretical relevance, significant univariate association ($p < 0.10$), and multicollinearity was assessed via VIF (< 2.5). Continuous variables were evaluated for normality using Shapiro–Wilk, and non-normal distributions were handled accordingly.

In the first model, brushing once daily or less—defined as inadequate oral hygiene—had a Nagelkerke R^2 of 0.217. Frequent consumption of sweets or salty snacks was associated with nearly threefold increased odds of inadequate brushing (OR = 2.91, 95% CI: 1.14–7.40, p = 0.025); daily snacking may reflect broader habits that deprioritize twice-daily brushing. Additionally, low parental oral health knowledge predicted inadequate brushing (OR = 2.58, 95% CI: 1.03–6.49, p = 0.043). Parental education and fluoride-use knowledge were included in the model but did not retain statistical significance.

The second model, assessing predictors of irregular dental visits (attendance only when symptomatic), showed moderate fit (Nagelkerke $R^2 = 0.266$). Children with a history of dental pain were more than three times as likely to attend irregularly (OR = 3.42, 95% CI: 1.22–9.61, p = 0.019), while each additional year of child age was linked to more regular attendance (OR = 0.78 per year, 95% CI: 0.63–0.96, p = 0.019), probably reflecting increased autonomy and scheduling consistency in older children.

Child dental fear and anxiety were assessed using the parent-proxy Children's Fear Survey Schedule–Dental Subscale (CFSS-DS), validated for Croatian children (21). The third model performed strongly ($\chi^2(19) = 45.99$, $p < 0.001$; Nagelkerke $R^2 = 0.561$), correctly classifying 83.7% of cases (sensitivity 73.5%, specificity 90.4%) (Table 2). Older parental age was associated with lower reported fear in their child, whereas higher parental education increased the odds

ridni gelovi i tekućine za ispiranje usta. Većina roditelja (68,8 %) smatra da su dovoljno informirani o održavanju oralnog zdravlja. Pandemija bolesti COVID-19 nije znatno utjecala na navike kad je riječ o oralnoj higijeni djece, a 80 % roditelja izjavilo je da u tom razdoblju nije bilo promjena u skrbi o oralnom zdravlju.

Rezultati analize ANOVA pokazali su da se dob roditelja značajno razlikovala među kategorijama učestalosti posjeta stomatologu ($F(7,84) = 2,606$, $p = 0,017$, $\eta^2 = 0,178$), pri čemu su mlađi roditelji češće redovito vodili djecu stomatologu. Također, dob roditelja značajno se razlikovala ovisno o tome koristi li se dijete pastom za zube s fluoridom ($F(2,96) = 3,379$, $p = 0,038$, $\eta^2 = 0,066$), pri čemu su mlađi roditelji češće navodili da njihovo dijete upotrebljava takvu pastu.

Ukupno 38 % ispitanika izjavilo je da je pandemija bolesti COVID-19 negativno utjecala na oralno-zdravstvene navike njihove obitelji. No ta varijabla nije bila statistički značajno povezana ni s učestalošću pranja zuba, ni s učestalošću posjeta stomatologu ($p > 0,05$ za oba ishoda).

Čimbenici povezani s nedostatnom oralnom higijenom, neredovitim posjetima stomatologu i dentalnim strahom kod djece

Za ispitivanje prediktora triju ishoda — nedostatne oralne higijene, neredovitih posjeta stomatologu i dentalnog straha kod djece — izrađeni su binarni logistički regresijski modeli. Prediktorske varijable odabrane su na temelju njihove teorijske važnosti i značajne povezanosti u univarijatnoj analizi ($p < 0,10$), a multikolinearnost provjerena je putem VIF-a (< 2,5). Normalnost distribucije kontinuiranih varijabli ispitana je Shapiro-Wilkovim testom, a za nenormalne distribucije korišteni su odgovarajući statistički pristupi.

U prvom modelu, pranje zuba jedanput na dan ili rjeđe, definirano kao nedostatna oralna higijena, imalo je Nagelkerke R^2 od 0,217. Učestala konzumacija slastica ili slanih grickalica bila je povezana s gotovo trostruko većim izgledima za nedostatno četkanje zuba (OR = 2,91; 95 % CI: 1,14 – 7,40; p = 0,025). Takvo svakodnevno grickanje može odražavati šire životne navike koje potiskuju praksu pranja zuba dva puta na dan. Također, niska razina roditeljskog znanja o oralnom zdravlju predviđala je nedostatno četkanje (OR = 2,58; 95 % CI: 1,03 – 6,49; p = 0,043). Razina obrazovanja roditelja i poznavanje upotrebe fluorida bili su uključeni u model, ali nisu zadržali statističku značajnost.

Drugi model, kojim su analizirani prediktori neredovitih posjeta stomatologu (posjeti samo u slučaju simptoma), pokazao je umjerenu prilagodbu modela (Nagelkerke $R^2 = 0,266$). Djeca koja su imala iskustvo sa zuboboljom imala su više od tri puta veće izglede za neredovite posjete (OR = 3,42; 95 % CI: 1,22 – 9,61; p = 0,019), a svaka dodatna godina djetetove dobi bila je povezana s većom redovitošću posjeta (OR = 0,78 po godini; 95 % CI: 0,63 – 0,96; p = 0,019), što vjerojatno odražava veću autonomiju i bolju organizaciju kod starije djece. Dentalni strah i anksioznost kod djece procijenjeni su s pomoću ljestvice Children's Fear Survey Schedule–Dental Subscale (CFSS-DS), validirane za hrvatsku populaciju (21).

Treći model imao je vrlo dobru prilagodbu (χ^2

tenfold. Children attending dental check-ups every three months were nearly 27 times more likely to exhibit dental fear, and those with previous dental trauma had 26-fold higher odds. In contrast, parents possessing knowledge of trauma management were significantly less likely to report child dental fear (OR = 0.067).

Use of Fluoridated Toothpaste and Brushing Frequency

A multinomial logistic regression model was fitted to examine factors associated with regular use of fluoridated toothpaste (never/rarely, sometimes, regularly). Predictor variables were selected based on theoretical relevance, univariate associations ($p < 0.10$), and checked for multicollinearity using VIF (< 2.5). The resulting model showed moderate explanatory power (Nagelkerke $R^2 = 0.484$). Children who attended routine dental check-ups (defined as preventive visits rather than symptom-driven) were significantly more likely to use fluoridated toothpaste regularly ($p < 0.05$), indicating a link between proactive dental care and preventive oral hygiene habits. While higher parental age, brushing supervision, and parental oral health knowledge were positively associated with regular fluoride toothpaste use, these did not reach statistical significance but followed expected behavioral trends.

A second multinomial logistic regression model assessed toothbrushing frequency (once-daily/less, twice-daily, more than twice-daily). Again, predictors were chosen based on theoretical framework and univariate screening, with continuous variables checked for normality and correlations (none exceeding r = 0.30) and categorical predictors screened for redundancy. The model achieved moderate explanatory value (Nagelkerke $R^2 = 0.416$). Higher parental age and active brushing supervision emerged as significant predictors of children brushing twice daily (vs once-daily or less). Parental self-reported oral health knowledge also increased the odds of more frequent brushing, although this effect was not statistically significant.

(19) = 45,99; $p < 0,001$; Nagelkerke $R^2 = 0,561$), s točnošću klasifikacije od 83,7 % (osjetljivost 73,5 %, specifičnost 90,4 %) (tablica 2). Starija dob roditelja bila je povezana s manjim prijavljenim strahom kod djece, a viša razina obrazovanja roditelja povećavala je izglede za pojavu dentalnoga straha čak deset puta. Djeca koja su dolazila na stomatološke preglede svaka tri mjeseca imala su gotovo 27 puta veće izglede za prisutnost straha, a ona koja su doživjela dentalnu traumu imala su 26 puta veće izglede. Nasuprot tomu, roditelji koji su znali kako postupiti u slučaju dentalne traume imali su značajno manju vjerojatnost da će prijaviti dentalni strah kod svojeg djeteta (OR = 0,067).

Upotreba fluoridirane paste za zube i učestalost četkanja

Za ispitivanje čimbenika povezanih s redovitom upotrebom fluoridirane paste za zube (nikad/rijetko, katkad, redovito) primijenjen je multinomijalni logistički regresijski model. Prediktorske varijable odabrane su na temelju teorijske važnosti i značajnih povezanosti u univarijatnoj analizi ($p < 0,10$), a multikolinearnost je provjerena putem VIF-a (< 2,5). Dobiveni model pokazao je umjerenu objašnjavajuću moć (Nagelkerke $R^2 = 0,484$). Djeca koja su redovito odlazila na preventivne stomatološke preglede (za razliku od pregleda izazvanih simptomima) mnogo su češće upotrebljavala fluoridiranu pastu ($p < 0,05$), što upućuje na povezanost proaktivne skrbi o oralnome zdravlju s preventivnim higijenskim navikama. Starija dob roditelja, nadzor pri četkanju i viša razina roditeljskog znanja o oralnom zdravlju također su bili pozitivno povezani s redovitom upotrebom fluoridirane paste, iako ta povezanost nije dosegnula statističku značajnost, ali je slijedila očekivane obrasce ponašanja.Drugim multinomijalnim logističkim regresijskim modelom ispitana je učestalost četkanja zuba (jedanput na dan ili rjeđe, dva puta na dan, više od dva puta na dan). Prediktori su odabrani prema teorijskom okviru i rezultatima univarijatne analize, pri čemu su kontinuirane varijable provjerene na normalnost i međusobne korelacije (nijedna nije prelazila r = 0,30), a kategorijske varijable na redundantnost. Model je pokazao umjerenu objašnjavajuću vrijednost (Nagelkerke $R^2 = 0,416$). Viša dob roditelja i aktivni nadzor pri četkanju pokazali su se značajnim prediktorima za pranje zuba dva puta na dan (u odnosu na jedanput na dan ili rjeđe). Samoprocijenjeno roditeljsko znanje o oralnom zdravlju također je povećavalo vjerojatnost učestalijeg četkanja, iako taj učinak nije bio statistički značajan.

Table 2 Binary logistic regression predicting child dental fear
Tablica 2. Binarna logistička regresija za predviđanje dentalnog straha kod djece

Variable • Varijabla	B	p-value • p-vrijednost	Exp(B)	95% CI for Exp(B) (Lower – Upper) • (donja – gornja)
Parental age • Dob roditelja	–0.205	0.020	0.815	0.685 – 0.968
Parental education level (Higher vs. Secondary) • Razina obrazovanja roditelja (viša vs. srednja)	2.304	0.049	10.015	1.014 – 98.867
Frequency of dental visits (Every 3 months vs. once a month) • Učestalost stomatoloških posjeta (svaka 3 mjeseca vs. jedanput na mjesec)	3.312	0.009	27.434	2.278 – 330.380
Previous dental trauma • Prethodna dentalna trauma	3.275	0.001	26.445	3.631 – 192.616
Parental knowledge about dental trauma • Znanje roditelja o postupanju u slučaju dentalne traume	–2.703	0.002	0.067	0.012 – 0.380

Supplementary Table 1 The questionnaire used in the study
Suplementna tablica 1. Upitnik korišten u istraživanju

1	Respondent's gender • Spol ispitanika
2	Respondent's age (in years) • Dob ispitanika (u godinama)
3	Respondent's level of education • Razina obrazovanja ispitanika
4	Child's age (in years) • Dob djeteta (u godinama)
5	Child's gender • Spol djeteta
6	Has the child ever visited a dentist? • Je li dijete ikada posjetilo stomatologa?
7	At what age did the child first visit a dentist? • U kojoj dobi je dijete prvi put posjetilo stomatologa?
8	Reason for the child's first dental visit • Razlog prvog posjeta stomatologu
9	Frequency of dental visits • Učestalost posjeta stomatologu
10	Is the child afraid of the dentist? • Boji li se dijete stomatologa?
11	Has the child ever experienced dental pain due to caries? • Je li dijete ikada imalo zubobolju zbog karijesa?
12	Is dental care sought only when the child is in pain? • Traži li se stomatološka skrb samo kada dijete osjeća bol?
13	Does the child currently have carious teeth? • Ima li dijete trenutačno karijesne zube?
14	Does the child have any filled teeth? • Ima li dijete sanirane zube?
15	Has the child ever experienced dental trauma? • Je li dijete ikada doživjelo dentalnu traumu?
16	Does the parent know how to manage dental trauma? • Zna li roditelj kako postupiti u slučaju dentalne traume?
17	Does the child consume 5 meals per day? • Konzumira li dijete 5 obroka na dan?
18	Does the child eat sweets and snacks daily? • Jede li dijete svakodnevno slatkiše i grickalice?
19	Does the child drink sweetened beverages daily? • Pije li dijete svakodnevno zaslađene napitke?
20	How many times per day does the child brush their teeth? • Koliko puta na dan dijete pere zube?
21	Does the child brush alone or with help? • Pere li dijete zube samostalno ili uz pomoć?
22	Does the child use toothpaste with fluoride? • Koristi li se dijete pastom za zube s fluorom?
23	Does the child use any additional product for caries prevention? • Koristi li se dijete nekim dodatnim proizvodom za prevenciju karijesa?
24	If yes, what product is used? • Ako da, kojim se proizvodom koristi?
25	Does the parent feel sufficiently informed about oral health measures? • Osjeća li se roditelj dovoljno informiranim o mjerama oralnoga zdravlja?
26	Source of information on oral health measures for children • Izvor informacija o mjerama oralnoga zdravlja za djecu
27	Has the COVID-19 pandemic affected oral health care routines? • Je li pandemija bolesti COVID-19 utjecala na rutinu oralne higijene?
28	How important is your own oral health (1–5 scale)? • Koliko je vama osobno važno vlastito oralno zdravlje (ljestvica 1–5)?

Objective Knowledge Items on Pediatric Oral Health Assessed in the Questionnaire • Objektivna pitanja o znanju iz područja dječje oralne higijene procijenjena u upitniku No. • Br.	Knowledge Item • Pitanje o znanju	Response Options • Mogućnosti odgovora
1	At what age should a child have their first dental visit? • U kojoj dobi bi dijete trebalo prvi put posjetiti stomatologa?	A. As soon as the first tooth erupts • Čim nikne prvi zub B. At 2 years of age • S dvije godine C. Before starting school • Prije polaska u školu D. Only when the child has pain • Samo kada dijete ima bolove
2	How often should children brush their teeth? • Koliko često djeca trebaju prati zube?	A. Once daily • Jedanput na dan B. Twice daily • Dva puta na dan C. After every meal • Nakon svakog obroka D. Only before bed • Samo prije spavanja
3	What is the main benefit of fluoride in toothpaste? • Koja je glavna korist od fluora u pasti za zube?	A. It makes teeth whiter • Čini zube bjeljima B. It prevents tooth decay • Sprječava karijes C. It removes stains • Uklanja mrlje D. It freshens breath • Osvježava dah
4	Which of the following is most likely to cause tooth decay in children? • Koja od navedenih namirnica najvjerojatnije uzrokuje karijes kod djece?	A. Cheese • Sir B. Apples • Jabuke C. Sugary soft drinks • Zaslađeni gazirani napitci D. Nuts • Orašasti plodovi
5	If a child's permanent tooth is knocked out, what should be done immediately? • Ako se djetetu izbije trajni zub, što treba odmah učiniti?	A. Rinse it and place it in milk, then see a dentist • Isprati ga i staviti u mlijeko, zatim otići stomatologu B. Discard the tooth • Baciti zub C. Wait to see if it stops bleeding • Pričekati da prestane krvarenje D. Replant it yourself without cleaning • Vratiti ga sami odmah na njegovo mjesto bez čišćenja

Discussion

This study provides valuable insights into the oral health behaviors of children and highlights several significant predictors associated with adverse oral health outcomes. One of the most alarming findings is that 28% of the children reported brushing their teeth only once per day or less. Such infrequent oral hygiene practices are strongly correlated with a heightened risk of developing dental caries, as inadequate removal of dental plaque facilitates the accumulation of cariogenic bacteria and the prolonged exposure of tooth surfaces to acidic by-products of carbohydrate metabolism (22, 23). Moreover, more than half of the children consumed sweets daily, and 42% consumed sweetened beverages daily, both well-established risk factors for dental caries (24,25). Logistic regression analyses revealed daily consumption of sweets significantly increased inadequate brushing (OR=2.91, p=0.025). High-frequency snacking can disrupt oral hygiene routines: children who snack more often may brush less consistently or only after meals, allowing plaque acids from snacking to act unchecked for longer periods (26). Furthermore, frequent sugary intake has been associated with greater caries risk, particularly when brushing is inconsistent (27). Additionally, parental knowledge significantly influenced children's brushing habits; parents who felt poorly informed were more likely to have children with inadequate oral hygiene (OR=2.58, p=0.043), which is consistent with previous studies linking better parental knowledge to improved oral hygiene practices in children (28,29).

Notably, brushing frequency was also positively associated with parental age and brushing supervision, both of which were significant predictors of twice-daily brushing in multinomial regression models. This suggests that more experienced or engaged parents may be more consistent in implementing and monitoring oral hygiene routines at home (30).

Irregular dental visits were significantly more frequent among children who experienced dental pain (OR=3.42, p=0.019), a pattern that aligns with research indicating symptomatic dental attendance often leads to delayed care and worsened dental outcomes (31). Older children were more likely to attend dental visits regularly, potentially reflecting increased parental awareness of preventive dental care over time.

ANOVA analyses further revealed that younger parents were significantly more likely to ensure regular dental checkups and fluoride toothpaste use. These findings may indicate a generational shift in attitudes toward proactive dental care and awareness of preventive practices (9,32,33).

Regarding dental fear, older parental age, higher parental education, and past dental trauma were significant predictors, which corroborates earlier findings that both parental characteristics and traumatic dental experiences contribute significantly to dental anxiety in children (34,35). Interestingly, parental knowledge about trauma management was associated with decreased child dental fear, emphasizing the critical role of parental guidance in mitigating anxiety (36). This aligns with recent retrospective data from Croatia, which revealed that over 50% of acute and 41% of subacute

Rasprava

U ovom istraživanju nalaze se vrijedni uvidi u oralnozdravstvene navike djece te se ističe nekoliko značajnih prediktora povezanih s nepovoljnim ishodima oralnog zdravlja. Jedan od najalarmantnijih nalaza jest da je 28 % djece izjavilo da peru zube samo jedanput na dan ili rjeđe. Tako rijetka higijena usne šupljine snažno je povezana s povećanim rizikom od pojave zubnog karijesa zato što nedovoljno uklanjanje zubnog plaka pogoduje nakupljanju kariogenih bakterija i produljenoj izloženosti zubnih površina kiselim nusproizvodima metabolizma ugljikohidrata (22, 23). Nadalje, više od polovine djece konzumiralo je slastice svaki dan, a 42 % svaki dan je pilo zaslađena pića — i jedno i drugo dobro su poznati čimbenici rizika za karijes (24, 25). Analiza logističke regresije pokazala je da svakodnevna konzumacija slastica znatno povećava vjerojatnost nedovoljne oralne higijene (OR = 2,91, p = 0,025). Učestalo grickanje može narušiti higijensku rutinu: djeca koja češće konzumiraju međuobroke mogu rjeđe prati zube ili ih prati samo poslije glavnih obroka, čime se kiselinama iz plaka omogućuje dulje djelovanje bez kontrole (26). Nadalje, učestali unos šećera povezuje se s većim rizikom od karijesa, osobito kada je četkanje zuba nedosljedno (27).

Znanje roditelja također je imalo značajan utjecaj na navike četkanja kod djece; roditelji koji su smatrali da su nedovoljno informirani imali su veću vjerojatnost da im djeca održavaju nedovoljnu oralnu higijenu (OR = 2,58, p = 0,043), što je u skladu s dosadašnjim istraživanjima koja povezuju bolje znanje roditelja s poboljšanim higijenskim praksama kod djece (28, 29). Posebno je uočeno da je učestalost četkanja pozitivno povezana s dobi roditelja i nadzorom pranja zuba, pri čemu su oba čimbenika bila značajni prediktori četkanja dva puta na dan u modelima multinomijalne regresije. To sugerira da iskusniji ili angažiraniji roditelji dosljednije provode i nadziru higijensku rutinu kod kuće (30).

Neredoviti odlasci stomatologu bili su znatno češći kod djece koja su iskusila zubobolju (OR = 3,42, p = 0,019), što se podudara s istraživanjima u kojim se ističe da simptomatski odlasci stomatologu često dovode do odgođene skrbi i lošijih ishoda (31). Starija djeca češće su redovito posjećivala stomatologa, što može pokazivati porast svijesti roditelja o važnosti preventivne skrbi s vremenom. Dodatna analiza pokazala je da su mlađi roditelji češće osiguravali redovite stomatološke preglede i uporabu paste s fluorom. Ti rezultati mogu upućivati na generacijsku promjenu u stajalištu prema proaktivnoj dentalnoj skrbi i svjesnosti o preventivnim praksama (9, 32, 33).

Kad je riječ o dentalnome strahu, starijoj dobi roditelja, višoj razini obrazovanja roditelja i doživljenoj dentalnoj traumi, to su bili značajni prediktori, što potvrđuje ranija istraživanja prema kojima i osobine roditelja i traumatska iskustva u stomatološkoj ordinaciji značajno pridonose dentalnoj anksioznosti kod djece (34, 35). Zanimljivo, znanje roditelja o postupanju u slučaju dentalne traume bilo je povezano sa smanjenim strahom djece od stomatologa, što ističe ključnu ulogu roditeljske edukacije u ublažavanju anksioznosti (36). To je u skladu s nedavnim retrospektivnim podatcima iz Hrvatske

traumatic dental injuries were not treated on time, emphasizing the urgent need for caregiver education on the importance of timely intervention following dental trauma (37).

Multinomial regression analyses further highlighted that regular dental visits significantly increased fluoride toothpaste use, consistent with extensive evidence demonstrating fluoride's effectiveness in caries prevention (38). Younger parents were more likely to report regular dental attendance and fluoride toothpaste use, suggesting generational differences in parental behaviors and possibly greater receptiveness to contemporary oral health guidelines among younger caregivers (39).

In addition, only 19.4% of children in this sample used supplementary caries-preventive products such as fluoride gel or Tooth Mousse®, despite their established benefits in remineralization and caries management (40). This underutilization points to a gap in preventive care practices that could be addressed through increased parental education and professional recommendation.

Despite 38% of respondents reporting negative impacts from the COVID-19 pandemic on their family's oral health habits, no significant association was found in this study, differing from some previous research that indicated disruptions to oral health routines and reduced dental service utilization during the pandemic period (16). It is possible that families attending the university dental center were more health-literate and proactive, thus minimizing the impact of pandemic-related disruptions.

Interestingly, 41.4% of children in our sample were reported to have dental fear, and more frequent dental visits—particularly every three months—were unexpectedly associated with higher levels of fear. This counterintuitive result may stem from repeated exposure to stressful dental procedures or prior negative experiences that heighten anxiety over time. Alternatively, it is possible that children who are already fearful are brought to the dentist more frequently for monitoring or follow-up. These findings suggest the need for further qualitative research and highlight the importance of implementing child-centered, trauma-informed behavioral management strategies in pediatric dental settings (41).

This study has several noteworthy limitations that should temper the interpretation of its findings. First, the small sample size and convenience sampling from a single urban dental center greatly restrict the generalizability of results; the sample cannot credibly represent the entire Croatian population, particularly in rural or socioeconomically diverse areas. This introduces substantial sampling bias and threatens external validity. Second, as a cross-sectional design, causal inferences cannot be drawn. Relationships identified here indicate associations at a single point in time and may suffer from reverse causality or omitted confounders. Third, reliance on self-reported data—particularly regarding brushing frequency, dietary habits, dental visits, and fluoride use—introduces substantial recall bias and social desirability bias, which may lead to systematic over-reporting of positive behaviors and under-reporting of negative ones. Fourth, we did not employ fully validated instruments for critical constructs, notably parental knowledge and child dental fear. While moderkoji su pokazali da više od 50 % akutnih i 41 % subakutnih traumatskih ozljeda zuba nije bilo pravodobno zbrinuto, što ističe hitnu potrebu za edukacijom skrbnika o važnosti pravodobne intervencije nakon dentalne traume (37).

Analize multinomijalne regresije dodatno su pokazale da su redoviti stomatološki pregledi bili značajno povezani s uporabom paste s fluorom, što je u skladu s opsežnim dokazima o učinkovitosti fluora u prevenciji karijesa (38). Mlađi roditelji češće su izvješćivali o redovitim dentalnim pregledima i uporabi paste s fluorom, što sugerira generacijske razlike u ponašanju roditelja i veću otvorenost mlađih skrbnika prema suvremenim smjernicama oralnoga zdravlja (39). Unatoč dokazanim koristima dodatnih preventivnih proizvoda kad je riječ o karijesu, poput fluoridnog gela ili Tooth Moussea®, iz ovog uzorka samo ih je primjenjivalo 19,4 % djece (40). Ta nedovoljna primjena upućuje na prazninu u preventivnim praksama koju bi se moglo nadomjestiti povećanom edukacijom roditelja i jačim preporukama stomatologa.

Iako je 38 % ispitanika izjavilo da je bolest COVID-19 negativno utjecala na oralno-zdravstvene navike u njihovoj obitelji, u ovom istraživanju nije utvrđena značajna povezanost, što se razlikuje od pojedinih ranijih studija čiji su autori upozorili na poremećaje oralno-zdravstvenih rutina i smanjenu dostupnost stomatoloških usluga tijekom pandemije (16). Možda su obitelji koje posjećuju sveučilišni dentalni centar bile zdravstveno pismenije i proaktivnije, čime su ublažile utjecaj poremećaja povezanih s pandemijom. Zanimljivo, 41,4 % djece iz ovog uzorka imalo je dentalni strah, a učestaliji posjeti stomatologu — osobito svaka tri mjeseca — bili su neočekivano povezani s višim razinama straha. Taj naizgled paradoksalni rezultat mogao bi se objasniti ponovljenim izlaganjem stresnim stomatološkim zahvatima ili ranijim negativnim iskustvima koja s vremenom pojačavaju anksioznost. Također je moguće da se djeca koja već imaju izražen strah češće dovode na kontrole ili praćenje. Ti nalazi upućuju na potrebu za daljnjim kvalitativnim istraživanjima te ističu važnost provedbe pristupa usmjerenih na dijete, temeljenih na načelima skrbi informirane o traumi u pedijatrijskoj dentalnoj praksi (41).

Ovo istraživanje ima nekoliko važnih ograničenja koja treba uzeti u obzir pri interpretaciji rezultata. Prvo je da mali uzorak i prigodan odabir ispitanika iz jednoga urbanog dentalnog centra značajno ograničavaju mogućnost generalizacije; uzorak ne može vjerodostojno predstavljati cjelokupnu populaciju djece u Hrvatskoj, posebno ne u ruralnim ili socioekonomski različitim sredinama. To uvodi pristranost uzorka i umanjuje vanjsku valjanost.

Drugo je ograničenje da se presječnim istraživanjem ne mogu utvrditi uzročno-posljedične veze; pronađene povezanosti upućuju na odnose u jednom vremenskom trenutku i mogu biti podložne obrnutom uzročnom slijedu ili neuzimanju u obzir određene čimbenike. Treće ograničenje jest oslanjanje na samoprocjenu — posebno kod učestalosti četkanja, prehrambenih navika, posjeta stomatologu i uporabe fluora — zato što može dovesti do pristranosti u prisjećanju i pristranosti u društvenoj poželjnosti, što može rezultirati sustavnim precjenjivanjem pozitivnih ponašanja i podcjenjivanjem onih negativnih.

ate proxies were used, the absence of standardized measures (e.g., CFSS-DS for anxiety or validated oral health literacy scales) weakens the measurement validity of these variables. Finally, although predictors were screened for collinearity (VIF < 2.5), the small sample size combined with multiple predictors introduces risk of model overfitting and inflated effect estimates, particularly for high odds ratios observed (e.g., dental trauma and fear). This issue is well documented in small-sample cross-sectional studies (42). In light of these limitations, our findings should be interpreted cautiously. Future research should employ larger, population-based samples, utilize longitudinal or experimental designs, and implement validated psychometric tools to more accurately assess dental fear, knowledge, and behaviors. This approach would improve both the internal and external validity of insights into pediatric oral health in Croatia.

Conclusion

This study underscores the pivotal role of parental knowledge, behaviors, and sociodemographic characteristics in shaping children's oral health outcomes. Inadequate oral hygiene, irregular dental attendance, and dental fear were significantly associated with modifiable parental and behavioral factors, including snack consumption, perceived oral health literacy, supervision during brushing, and trauma management knowledge. Notably, children of younger and less-informed parents were more likely to exhibit suboptimal oral hygiene, while dental trauma and frequent dental visits were linked to higher fear levels. These findings support the integration of trauma-informed, family-centered educational strategies within routine pediatric dental care. Specifically, structured caregiver workshops, digital oral health literacy tools, and school-based outreach could improve preventive behaviors and reduce dental anxiety. Future longitudinal, multi-center research is recommended to validate these associations and guide evidence-based health policy development.

Conflict of interest: The authors declare no conflicts of interest regarding this manuscript.

Ethics approval and consent to participate: The study protocol was approved by the Ethics Committee of the University Hospital Center Zagreb (Class: 8.1-22/32-2, No.: 02/013) and the Ethics Committee of the School of Medicine, University of Zagreb (Class: 641-01/22-02/01, No.:380-59-10106-22-111/61).

Author's contribution: S.K. - contributed to conception, design, data acquisition, analysis and interpretation, drafted and critically revised the manuscript; **S.V.H.** - contributed to conception, design, data acquisition and critically revised the manuscript; **L.Š.** - analysis and interpretation, drafted and critically revised the manuscript; **D.N.V.** - contributed to conception, design and critically revised the manuscript; **Ž.V.** - contributed to conception, design and critically revised the manuscript; **M.M.** - contributed to conception, design, drafted and critically revised the manuscript. All authors gave their final approval and agreed to be accountable for all aspects of the work.

Četvrto, nisu korišteni potpuno validirani instrumenti za neka ključna mjerila, posebno za znanje roditelja i dentalni strah djece. Iako su korišteni umjereno pouzdani zamjenski pokazatelji, izostanak standardiziranih mjera (npr. CFSS-DS za anksioznost ili validirane ljestvice zdravstvene pismenosti) umanjuje mjernu valjanost tih varijabli. Konačno, iako je provjerena multikolinearnost prediktora (VIF < 2,5), mali uzorak u kombinaciji s većim brojem prediktora povećava rizik od prekomjernog prilagođavanja modela i precijenjenih vrijednosti učinaka, osobito kod visokih omjera izgleda (npr. trauma i strah), što je dobro poznat problem u presječnim istraživanjima s malim uzorcima (42).

U buduća istraživanja trebalo bi uključiti veće, populacijski reprezentativne uzorke, primjenjivati longitudinalne ili eksperimentalne dizajne te koristiti se validiranim psihometrijskom alatima kako bi se preciznije procijenili dentalni strah, znanje i ponašanja, čime bi se poboljšala i unutarnja i vanjska valjanost spoznaja o oralnom zdravlju djece u Hrvatskoj.

Zaključak

U ovom istraživanju ističe se ključna uloga znanja roditelja, njihovih ponašanja i sociodemografskih obilježja u oblikovanju ishoda oralnog zdravlja djece. Neodgovarajuća oralna higijena, neredoviti odlasci stomatologu i dentalni strah značajno su bili povezani s promjenjivim roditeljskim i ponašajnim čimbenicima, uključujući konzumaciju grickalica, percipiranu zdravstvenu pismenost, nadzor pranja zuba i znanje o postupanju u slučaju traume. Posebno se ističe da su djeca mlađih i manje informiranih roditelja imala veću vjerojatnost za lošiju oralnu higijenu, a dentalna trauma i učestali stomatološki posjeti bili su povezani s višom razinom straha. Ti nalazi podupiru potrebu za integracijom skrbi informirane o traumi i obiteljski usmjerenih edukacijskih strategija u rutinsku pedijatrijsku dentalnu skrb. Strukturirane radionice za roditelje, digitalni alati za jačanje oralno-zdravstvene pismenosti te školski preventivni programi mogli bi poboljšati preventivna ponašanja i smanjiti dentalnu anksioznost. Buduća longitudinalna, višecentrična istraživanja preporučuju se da bi se potvrdile ove povezanosti i oblikovale javnozdravstvene politike utemeljene na dokazima.

Sukob interesa: Autori nisu bili u sukobu interesa.

Etičko odobrenje i pristanak na sudjelovanje: Protokol istraživanja odobrilo je Etičko povjerenstvo Kliničkoga bolničkog centra Zagreb (Klasa: 8.1-22/32-2, Urbroj: 02/013) te Etičko povjerenstvo Medicinskog fakulteta Sveučilišta u Zagrebu (Klasa: 641-01/22-02/01, Urbroj: 380-59-10106-22-111/61).

Doprinos autora: S. K. – koncept, dizajn, prikupljanje podataka, analiza i interpretacija, pisanje teksta i kritička revizija rada; **S. V. H.** – koncept, dizajn, prikupljanje podataka te kritička revizija rada; **L. Š.** – analiza i interpretacija, izrada i kritička revizija rada; **D. N. V.** – koncept, dizajn te kritička revizija rada; **Ž. V.** – koncept, dizajn te kritička revizija rada; **M. M.** – koncept, dizajnu, izrada i kritička revizija rada. Svi autori dali su svoje konačno odobrenje za tekst i složili se da snose odgovornost za sve aspekte rada.

Sažetak

Cilj: Cilj ovog istraživanja bio je procijeniti roditeljsko znanje, ponašanje i sociodemografske prediktore koji utječu na oralno-zdravstvene navike djece, obrasce posjeta stomatologu te dentalni strah djece u Hrvatskoj. **Materijali i metode:** Provedeno je presječno istraživanje koje je obuhvatilo 100 roditelja djece u dobi od 0 do 7 godina u Zavodu za dječju i preventivnu stomatologiju Stomatološkog fakulteta Sveučilišta u Zagrebu. Validiranim strukturiranim upitnikom procjenjivalo se roditeljsko znanje te prehrambene navike, učestalost pranja zuba, uporaba fluorida, razlozi i učestalost posjeta stomatologu te dentalni strah kod djece. Statističke analize uključivale su hi-kvadrat test, analizu ANOVA, Spearmanove korelacije i logističku regresiju kako bi se identificirali prediktori nedostatne oralne higijene, neredovitih posjeta stomatologu i dentalnoga straha. **Rezultati:** Samo 68 % djece pralo je zube dva puta na dan, 66 % konzumiralo je slastice svakodnevno, a 33,3 % svakodnevno je pilo zaslađene napitke. Logistička regresija pokazala je da je pranje zuba jedanput na dan ili rjeđe (klasificirano kao nedostatno pranje) značajno predviđeno / uglavnom određeno svakodnevnom konzumacijom grickalica (OR = 2,91; p = 0,025) i niskom razinom roditeljskog znanja o oralnom zdravlju (OR = 2,58; p = 0,043). Neredoviti posjeti stomatologu bili su vjerojatniji kod djece s anamnezom dentalne boli (OR = 3,42; p = 0,019). Dentalni strah kod djece (41,4 %) bio je predviđen prethodnom traumom/na temelju ranijih tretmana (OR = 26,4; p = 0,001), čestim kontrolnim pregledima/čestih kontrolnih pregleda (OR = 27,4; p = 0,009) i razinom roditeljskog obrazovanja (OR = 10,0; p = 0,049), a poznavanje postupaka zbrinjavanja traume imalo je zaštitni učinak (OR = 0,067; p = 0,002). Uporaba paste za zube s fluoridom bila je pozitivno povezana s redovitim posjetima stomatologu. **Zaključak:** Oralno-zdravstvene navike i dentalni strah djece značajno su pod utjecajem roditeljskog znanja, obrazovanja, prehrambenih navika i iskustava s traumom. Edukativne intervencije usmjerene na skrbnike, posebno o postupanju u slučaju dentalne traume i održavanju oralne higijene, opravdane su radi poboljšanja oralnog zdravlja djece.

Zaprimljen: 4. travnja 2025.
Prihvaćen: 23. srpnja 2025.

Adresa za dopisivanje
Luka Šimunović
Sveučilište u Zagrebu Stomatološki fakultet
Zavod za ortodonciju
Gundulićeva 5, 10 000 Zagreb, Hrvatska
lsimunovic@sfzg.unizg.hr

MeSH pojmovi: oralno zdravlje; oralna higijena; dijete; odnosi roditelj-dijete; zdravstvene spoznaje stavovi i praksa; roditelji
Autorske ključne riječi: dječja stomatologija; zubni karijes; dentalna anksioznost; roditeljsko znanje

References

1. Pitts NB, Zero DT, Marsh PD, Ekstrand K, Weintraub JA, Ramos-Gomez F, Tagami J, Twetman S, Tsakos G, Ismail A. Dental caries. Nat Rev Dis Primers. 2017 May 25;3:17030.
2. Ferizi L, Bimbashi V, Kelmendi J. Dental caries prevalence and oral health status among 15-year-old adolescents in Kosovo. Acta Stomatol Croat. 2022;56(1):42–49.
3. Almajed OS, Aljouie AA, Alharbi MS, Alsulaimi LM. The Impact of Socioeconomic Factors on Pediatric Oral Health: A Review. Cureus. 2024 Feb 4;16(2):e53567.
4. Kaushik M, Sood S. A Systematic Review of Parents' Knowledge of Children's Oral Health. Cureus. 2023 Jul 6;15(7):e41485.
5. Putri TN, Indriyanti R, Setiawan AS. A descriptive study on oral hygiene practice and caries increment in children with growth stunting. Front Oral Health. 2023 Nov 6;4:1236228.
6. Salama F, Alwohaibi A, Alabdullatif A, Alnasser A, Hafiz Z. Knowledge, behaviours and beliefs of parents regarding the oral health of their children. Eur J Paediatr Dent. 2020 Jun;21(2):103–108.
7. Buunk-Werkhoven YAB, Tamulienė R, Mačiulienė D. Exploring parental opinions on oral hygiene behavior and knowledge of their young children in Lithuania: a cross-sectional survey study. Front Oral Health. 2025 Apr 29;6:1530265.
8. Shan Z, Liao C, Lu J, Yeung CPW, Li KY, Gu M, Chu CH, Yang Y. Improvement of parents' oral health knowledge by a school-based oral health promotion for parents of preschool children: a prospective observational study. BMC Oral Health. 2023 Nov 6;23:890.
9. Minervini G, Franco R, Marrapodi MM, Di Blasio M, Ronsivalle V, Cicciù M. Children oral health and parents education status: a cross sectional study. BMC Oral Health. 2023 Oct 24;23(1):787.
10. Vu DA, Vu HM, Vu HM, Tran PT, Duong HH, Tran KQ, Nguyen BX, Luong HX. Parental knowledge and practice on childhood caries prevention in northern Vietnam. Front Public Health. 2023 Oct 11;11:1254479.
11. Sohn W, Ismail AI. Regular dental visits and dental anxiety in an adult dentate population. J Am Dent Assoc. 2005 Jan;136(1):58-66; quiz 90-1. doi: 10.14219/jada.archive.2005.0027.
12. Sağlam C, Mojarrab N, Ahlat EM, Şakı Çınarcık B, Ersin N, Ertuğrul F, Çoğulu D. Evaluation of the Effectiveness of Parental Oral Health Education. J Pediatr Res. 2025;12(1):7–13.
13. Doğan GK, Polat Y, Özüdoğru S. Parental awareness and attitudes towards pediatric dentistry and children's oral health. BMC Oral Health. 2025;25:672.
14. Bajrić E, Kobašlija S, Huseinbegović A, et al. Predictors of dental fear and anxiety in 9–12-year-old children in Bosnia and Herzegovina. Acta Stomatol Croat. 2022;56(3):246–256.
15. Hatipoğlu Palaz Z, Aktaş N, Atabek D. The Impact of the COVID-19 Pandemic on the Oral Hygiene Status of Children with High Caries Risk and Their Parents. COVID. 2024; 4(12):1897-1907.
16. Lyu W, Wehby GL. Effects of the COVID-19 pandemic on children's oral health and oral health care use. J Am Dent Assoc. 2022 Aug;153(8):787-796.e2.
17. Brondani B, Knorst JK, Tomazoni F, Cósta MD, Vargas AW, Noronha TG, Mendes FM, Ardenghi TM. Effect of the COVID-19 pandemic on behavioural and psychosocial factors related to oral health in adolescents: A cohort study. Int J Paediatr Dent. 2021 Jul;31(4):539-546.
18. Phanthavong S, Nonaka D, Phonaphone T, Kanda K, Sombouaphan P, Wake N, Sayavong S, Nakasone T, Phongsavath K, Arasaki A. Oral health behavior of children and guardians' beliefs about children's dental caries in Vientiane, Lao People's Democratic Republic (Lao PDR). PLoS One. 2019 Jan 25;14(1):e0211257.
19. Van den Branden S, Van den Broucke S, Leroy R, Declerck D, Hoppenbrouwers K. Measuring determinants of oral health behaviour in parents of preschool children. Community Dent Health. 2013 Mar;30(1):19-25. PMID: 23550502.
20. Ghaffari M, Rakhshanderou S, Ramezankhani A, Noroozi M, Armoon B. Oral Health Education and Promotion Programmes: Meta-Analysis of 17-Year Intervention. Int J Dent Hyg. 2018;16(1):59-67.
21. Leko J, Škrinjarić T, Goršeta K. Reliability and Validity of Scales for Assessing Child Dental Fear and Anxiety. Acta Stomatol Croat. 2020 Mar;54(1):22-31.
22. Thornton-Evans G, Junger ML, Lin M, Wei L, Espinoza L, Beltran-Aguilar E. Use of Toothpaste and Toothbrushing Patterns Among Children and Adolescents - United States, 2013-2016. MMWR Morb Mortal Wkly Rep. 2019 Feb 1;68(4):87-90.
23. Boustedt K, Dahlgren J, Twetman S, Roswall J. Tooth brushing habits and prevalence of early childhood caries: a prospective cohort study. Eur Arch Paediatr Dent. 2020 Feb;21(1):155-159.
24. Valenzuela MJ, Waterhouse B, Aggarwal VR, Bloor K, Doran T. Effect of sugar-sweetened beverages on oral health: a systematic review and meta-analysis. Eur J Public Health. 2021 Feb 1;31(1):122-129.
25. Laniado N, Sanders AE, Godfrey EM, Salazar CR, Badner VM. Sugar-sweetened beverage consumption and caries experience: An examination of children and adults in the United States, National Health and Nutrition Examination Survey 2011-2014. J Am Dent Assoc. 2020 Oct;151(10):782-789.
26. Duijster D, de Jong-Lenters M, Verrips E, van Loveren C. Establishing oral health promoting behaviours in children - parents' views on barriers, facilitators and professional support: a qualitative study. BMC Oral Health. 2015 Dec 10;15:157.
27. Chi DL, Scott JM. Added Sugar and Dental Caries in Children: A Scientific Update and Future Steps. Dent Clin North Am. 2019 Jan;63(1):17-33.
28. Adugna A, Abebe GF, Girma D, Alie MS. Dental caries and associated factors among preschool children in Southwest Ethi-

opia: a cross-sectional study. BMJ Paediatr Open. 2024 Feb 14;8(1):e002319.
29. Zaborskis A, Razmienė J, Razmaitė A, Andruškevičienė V, Narbutaitė J, Bendoraitienė EA, Kavaliauskienė A. Parental Attitudes towards Child Oral Health and Their Structural Analysis. Children (Basel). 2024 Mar 11;11(3):333.
30. Lamba G, Thosar NR, Khandaitkar S, Khondalay S. Evaluation of the Behavioral Determinants of Infant Oral Hygiene Practices in a Rural Area. Cureus. 2023 Jun 17;15(6):e40550.
31. Üstün N, Akgöl BB, Bayram M. Influence of COVID-19 pandemic on paediatric dental attendance. Clin Oral Investig. 2021 Nov;25(11):6185-6191.
32. Kumthekar SS, Hugar SM, Bhusari BN, Sahai VV, Patil VH, Patil AA. New Age Parenting and Its Impact on Child's Oral Health: Cross-sectional Questionnaire Study. J Sci Soc. 2024 Oct–Dec;51(4):616-624.
33. Liu, SM., Xin, YM., Wang, F. et al. Parental health belief model constructs associated with oral health behaviors, dental caries, and quality of life among preschool children in China: a cross-sectional study. BMC Oral Health 24, 1497 (2024).
34. Kvesić AJ, Hrelja M, Lovrić Ž, Šimunović L, Špiljak B, Supina N, Vranić L, Vranić DN. Possible Risk Factors for Dental Fear and Anxiety in Children Who Suffered Traumatic Dental Injury. Dent J (Basel). 2023 Aug 9;11(8):190.
35. Panda S, Quadri MFA, Hadi IH, Jably RM, Hamzi AM, Jafer MA. Does Dental Fear in Children Predict Untreated Dental Caries? An Analytical Cross-Sectional Study. Children (Basel). 2021 May 12;8(5):382.
36. Šimunović L, Špiljak B, Radulović M, Vlahovljak A, Ostojić M, Krlev J, Ibrahimpašić A, Vranić L, Negovetić Vranić D. Relationship between Children's and Parents' Dental Anxiety: A Cross-Sectional Study on the Six European Countries. Dent J (Basel). 2022 Nov 4;10(11):209.
37. Šimunović L, Špiljak B, Vranić L, Negovetić Vranić D. Treatment priorities and arrival time of traumatic dental injuries-An 8-year retrospective study. Dent Traumatol. 2024 Feb;40(1):11-21.
38. dos Santos AP, Nadanovsky P, de Oliveira BH. A systematic review and meta-analysis of the effects of fluoride toothpastes on the prevention of dental caries in the primary dentition of preschool children. Community Dent Oral Epidemiol. 2013 Feb;41(1):1-12.
39. Luo H, Wu B, Wu Y, Moss ME. Dental Caries and Preventive Dental Visits Among Children in the U.S.: The Impact of Race/Ethnicity and Immigration. AJPM Focus. 2024 Apr 19;3(4):100230.
40. Sowmiya Sree RA, Louis CJ, Eagappan AS, Srinivasan D, Natarajan D, Dhanalakshmi V. Effectiveness of Parental Participation in a Dental Health Program on the Oral Health Status of 8-10-year-old School Children. Int J Clin Pediatr Dent. 2022 Jul-Aug;15(4):417-421.
41. Pinge, Sujata Dinkar; More, Saudamini G; Savant, Suyog; Komble, Rajani; More, Sayali1. Assessment of Parents' Involvement and the Awareness of Oral Hygiene Practices among 10–12-Year-Old Schoolchildren in Pune City. Advances in Human Biology 2023;13:65-68.
42. Mirzaei Salehabadi S, Sengupta D, Ghosal R. Estimating menarcheal age distribution from partially recalled data. Biostatistics. 2020 Oct 1;21(4):876-894.