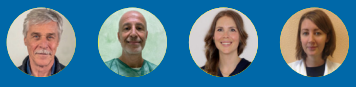
SIOI Policy on Sugar Intake: Limiting Free Sugars from Earliest Days of Life to Prevent Caries, Specific Non-Communicable Diseases, and Tumors

Context

This SIOI Policy provides evidence-based recommendations on the intake of free sugars from early childhood through adulthood. Its goal is to reduce the prevalence of dental caries—the most widespread non-communicable disease (NCD) worldwide—and to prevent other chronic conditions associated with excessive sugar consumption, including obesity, type 2 diabetes, non-alcoholic fatty liver disease (NAFLD), cardiovascular diseases, hypertension, certain cancers, and all-cause mortality. The Policy highlights the critical role of healthcare professionals in educating parents and caregivers, recommending the avoidance of free sugar consumption during the first two years of life and limiting it thereafter to no more than 5% of daily total energy intake (approximately 25 g of sucrose).



L. Paglia[1,*], G. Lombardo[1,*], S. Colombo[1,*], S. Bettocchi[2,*], M. R. Giuca[1], V. Di Taranto[1], M. Moscati[1], S. Bagattoni[1], M. Beretta[1], M. Cadenaro[1,3], S. Caruso[1], S. Cianetti[1], P. De Fabianis[1], R. Del Conte[1], L. Lardani[1], R. Gatto[1], G. Marzo[1], G. Gallusi[1]

[1] Italian Society of Pediatric Dentistry - Societa Italiana di Odontoiatria Infantile (SIOI)
[2] Pediatric Unit, IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy
[3] Institute for Maternal and Child Health—IRCCS "Burlo Garofolo", Trieste, Italy - Department of Medical Sciences, University of Trieste, Trieste, Italy

**These authors equally contributed to this work*

Briefly

Dental caries as a global health issue: Caries is the most prevalent non-communicable disease worldwide, with increasing prevalence across both primary and permanent dentitions, and a high economic impact on health systems.

Free sugars as a major risk factor: Unlike natural sugars, free sugars (especially added sugars and SSBs) are strongly linked to dental caries and several NCDs, including obesity, T2DM, NAFLD, CVD, and certain cancers.

Critical early-life prevention: The first 1,000 days of life are crucial for shaping taste preferences; avoiding free sugar intake during the first two years significantly reduces lifetime risk.

Evidence-based recommendations: International scientific societies (WHO, AAPD, AHA, EFSA) recommend limiting free sugar intake to less than 5% of total daily energy (≈25 g of sucrose) to minimise caries and NCDs.

Role of healthcare professionals: Paediatricians, dentists, dental hygienists, and other health providers are pivotal in educating parents and caregivers—starting from pregnancy—on sugar-free diets and preventive oral health practices.

KEYWORDS: Free sugars, Dental caries, Non-communicable diseases (NCDs), Early-life prevention, Sugar-sweetened beverages (SSBs).

DOI 10.23804/ejpd.2025.26.04.02

PURPOSE The Italian Society of Paediatric Dentistry (SIOI) is committed to encouraging the different health professionals taking care of children (e.g., paediatric dental practitioners, paediatricians, gynecologists, obstetricians, dental hygienists, and dieticians) to educate parents (up to the period of pregnancy) and caregivers to limit their children's consumption of cariogenic sugars.
The purpose of this SIOI policy is to provide quality communication and information, based on the most updated scientific evidence, on the amount of free sugars (those classified as cariogenic) that can be consumed daily in the diet during the first two years of life, and then from childhood throughout life. This Policy communication aims to reduce the prevalence and severity of caries in both childhood and adulthood and, in addition, to prevent the occurrence of other specific non-communicable diseases (NCDs) that share the risk factor of excessive free sugar intake with caries. NCDs related to free sugar intake are obesity, type 2 diabetes mellitus (T2DM), non-alcoholic fatty liver disease (NAFLD), cardiovascular disease (CVD), hypertension, as well as some cancers and all-cause mortality.

METHODS This policy is based on the most updated and methodologically valid evidence, drawing from data found in systematic reviews (with or without meta-analysis) as well as guidelines and policies (or any official statements/documents) promulgated by the most relevant international scientific societies in this field. The references collection was carried out by searching the PubMed®/MEDLINE electronic database using the following keyword terms: sugar, monosaccharide, disaccharide, sucrose, lactose, galactose, fructose, glucose, maltose, sweetened beverage, sweet food, dessert, snack, candy, cookies, chewing gum, chocolate, dairy products, fruit juice, honey, syrup, and molasses. Only studies and statements/documents written in English, available in their full text, and published within the last 10 years were included in this policy. No restrictions were adopted on the age, gender, and provenience of study participants. The interpretation of the literature findings and the subsequent formulation of policy recommendations were based on the consensus of a multidisciplinary expert panel of researchers and clinicians working in this field.

Introduction

Oral diseases (particularly caries) are the most prevalent non-communicable diseases worldwide. In 2022, the global burden of individuals with untreated caries was 2.24 billion, and in the last 30 years its trend had not diminished [GBD, 2021]. In fact, from 1990 to 2022, the global prevalence of individuals with untreated caries in permanent teeth increased by 53.0%; similarly, from 1990 to 2019, the prevalence of children with caries in primary teeth increased by 11.7% [GBD, 2021; Quin et al., 2022]. Therefore, tooth decay is an unresolved and widespread social problem, present at all ages, in both developing and developed countries, with a significant economic impact on national healthcare systems and/or personal and family income [GBD, 2021].
Recent research also suggests a strong interaction between dietary sugars and the composition and activity of both oral and gut microbiota. Frequent sugar intake promotes the growth of acidogenic and aciduric bacteria such as Streptococcus mutans and Lactobacillus species [Kanasi et al., 2010; Liu et al., 2019] in the oral cavity, which in turn leads to enamel demineralisation and caries. At the intestinal level, excessive sugar may alter the gut microbiota, possibly influencing systemic inflammation, metabolic pathways, and immune function, although more research is needed to define causal relationships in children [Paglia et al., 2019]. "Simple sugars" (mono- and disaccharides), particularly sucrose, are cariogenic, while more complex sugars

(polysaccharides), such as starch, are not related to tooth decay. The most widely known disaccharides are sucrose and lactose, while monosaccharides are glucose, fructose, and maltose. Simple sugars can be divided into "natural" and "free sugars". Natural sugars are those present in the cell structure of cereals, fruits, and vegetables or those found in milk, and are not independently responsible for causing caries. Free sugars can be divided into two subgroups: (a) those naturally present in fruit juices, fruit juice concentrates, honey, syrups (e.g., corn and maple syrups), and molasses; (b) those added to foods and beverages by the manufacturer (during processing and packaging procedures), cook, or consumer, so they are also called "added sugars". Unlike natural sugars, free sugars (particularly added sugars) are well-demonstrated risk factors for tooth decay and various other NCDs T2DM, NAFLD, CVD and hypertension [WHO, 2015; WHO, 2023). Moreover, free sugar intake was found also in relationship with specific types of cancer and an increased all-cause mortality [Quin et al, 2020; Li et al., 2021]. Caries, due to its early onset, could be considered a "sentinel event" for several NCDs or specific cancers, and therefore caries prevention (based on limiting free sugar intake) could also be considered a protective intervention for these extraoral mentioned diseases.

However, caries is not only related to dietary factors. Dental caries develops when multiple factors coexist: the presence of cariogenic flora in the oral cavity, a susceptible host, and high sugar consumption, often in association with poor oral hygiene. This means that, beyond limiting sugar intake, caries prevention must also address individual predisposition (which is largely non-modifiable) and promote good oral hygiene (which is modifiable and actionable through education and care). As a consequence, the risk of caries arises when oral hygiene is not performed after feeding, allowing milk sugars to remain in the mouth. In this context, lactose may contribute to caries development, especially when combined with the presence of cariogenic bacteria and a susceptible host. Finally, low-income populations are disproportionately affected by caries and other sugar-related diseases. These communities often face limited access to dental care, lower health literacy, and a higher prevalence of diets rich in free sugars due to cost and availability. Public health strategies should consider supportive interventions such as school-based preventive programs, free dental check-ups, nutritional education campaigns, and subsidies for healthier food options.

Discussion

Limiting free sugar consumption since the first 1000 days of life is crucial to prevent caries as well as several NCDs, specific tumors, and reducing all-cause mortality [Paglia et al., 2022]. The positive effect of this type of prevention begins during childhood and continues throughout life. The role of health professionals who early visit children and precociously contact their parents or caregivers (such as gynecologists, obstetricians, paediatricians, paediatric and general dentists, orthodontists, dental hygienists, dietitians) is crucial in the implementation of this type of prevention. Therefore, this policy is focused on encouraging them, during daily activity, to spend time educating parents (since pregnancy) and caregivers to limit (or prevent in the first two years of life) free sugar consumption [Bettocchi et al., 2024].

Recommendations from International Scientific Societies on the Intake of Free Sugars to Prevent Caries

The American Academy of Pediatric Dentistry (AAPD) together with three other American scientific societies such as the Academy of Nutrition and Dietetics (AND), the American Academy of Pediatrics (AAP), and the American Heart Association (AHA), in a policy published in 2022, provided precise indications on the maximum amount of free sugars that may be consumed through the diet, distinguishing two time steps: the first two years of life and beyond this period throughout life, from childhood to old age [AAPD, 2022a].

First two years of life

The first type of sugar taken by the child is lactose, contained in breast milk or formula. Scientific societies indicate breastfeeding as a protective factor against caries when taken during the first year of life, while it becomes a risk factor when continued beyond this period. In the absence of adequate oral hygiene measures and in the presence of frequent sucklings [Alexaki et al., 2025; Lustosa et al., 2025; Shrestha et al., 2024]. Furthermore, in the first two years of life, the child should not consume free sugars, so as not to steer the taste towards sugar-sweetened foods and drinks.

After two years of life

Beyond 24 months throughout childhood and adolescence (and even later during adulthood), the AAPD in agreement with the AND, the AAP, and the AHA recommended limiting the daily amount of energy provided by free sugars to 5% of total dietary energy intake. In other words, when the sugar added to food or beverages was sucrose (the most used free sugar), its daily amount should not exceed 25 g. To maintain this limit, scientific societies recommend that children do not consume sweetened snacks between the three main meals, and in addition encourage parents and caregivers to carefully check the amount of free sugars in food (especially beverages) consumed by their children [AAPD, 2022a; AAPD, 2022b].

Since 2016, the World Health Organization (WHO) in its guidelines on "Sugar Intake for Adults and Children" indicated to limit the daily intake of free sugars to below 10% of total dietary energy, however through a further "conditional recommendation" (due to a low level of evidence because based only on observational studies) indicated that it was better to limit the intake to 5% of energy to minimise the risk of caries [Moynihan et al., 2017]. In agreement with the previous recommendations of the international scientific societies, the European Food Safety Authority (EFSA) also evidenced a relationship between dietary sugar intake and caries or specific NCDs (obesity, NAFLD, and T2DM). However, EFSA has not indicated a well-defined limit, called "Tolerable Upper Intake Level," below which adverse health events (such as caries or specific NCDs) are not expected. EFSA stated that the risk of adverse health effects (including tooth decay) begins since the first amount of daily sugar intake, in a direct-proportional relationship, according to a linear dose-response curve. This type of curve does not include any threshold value below which the correlation between variables does not occur (e.g., between tooth decay and the amount of free sugar intake). EFSA explains the absence of a Tolerable Upper Intake Level due to the multifactorial nature of caries involving multiple risk factors of which more relevant were frequency and type of free sugars intake, oral hygiene, and fluoride exposure [EFSA, 2022].

In addition to international guidelines, Italian institutions such as SIP (Società Italiana di Pediatria), SIEDP (Società Italiana di Endocrinologia e Diabetologia Pediatrica), and the Istituto Superiore di Sanità (ISS) have emphasised the importance of minimising free sugar consumption during early life. They advocate for preventive dental care starting in pregnancy and for the integration of oral health education into paediatric primary care.

Moreover, the evidence supporting this Policy derived also from systematic reviews found in literature. The selected reviews were based exclusively on observational studies; in fact, no reviews were found that included clinical trials (Randomised or Controlled Clinical Trials). Moreover, in these reviews the excessive intake of free sugars was described only in terms of Sugar Sweetened Beverages (SSBs) consumption. This high interest for SSBs in literature was probably due to the high relevance of this habit worldwide; in fact, in 30.3% of countries general population consumed on average one or more SSBs per day (≥1 portion/day), and this unhealthy dietary practice involved 238 million children-adolescents aged 3-19 years [Lara-Castor et al., 2024].

Caries and free sugar intake

The most recent meta-analysis found in the literature describes excessive intake of SSBs as a relevant risk factor for caries in all three dentitions. Specifically, in the primary dentition high-moderate SSBs consumers (≥1 service per day) compared with low-never consumers are two and a half times more likely to be affected by caries (OR 2.51, 95%CI: 1.77, 3.55; 5 studies, 5570 participants, $I^2 = 35.6$). In addition, in mixed dentition, high SSBs consumers compared to never-low consumers showed more than a twofold increase in the likelihood of caries (OR 2.36, 95%CI: 1.89, 2.95, 1 study, 1194 participants), while in permanent dentition this increase was by 86% (OR 1.86, 95% CI: 1.46, 2.38; 7 studies, 3799 participants; I^2: 56.5%). Finally, in the general population (mixed children and adults), high users showed an increase the decayed-missing-filled-teeth (DMFT/dmft) of almost two units compared to never-low users (WMD 1.91, 95%CI: 0.94, 4.7; 4 studies, 1778 participants) [Valenzuela et al., 2021].

Non-communicable diseases and free sugar

Several NCDs such as obesity, T2DM, NAFLD, CVD, and hypertension share the risk factor of free sugar intake with caries.

Obesity

The two most recent meta-analyses of prospective observational studies, published in 2023 and 2020 respectively, showed an increased risk of obesity in both children and adults with a daily SSBs intake. In particular, for each serving/day increase of 355 ml in SSBs intake (one can) a proportional increase in body mass index (BMI) of 0.07 kg/m² was found (MD 0.07, 95% CI: 0.04, 0.10; 35 studies, 71681 participants; I^2 = 82%) (Nguyen et al., 2023). When this unhealthy habit was maintained into adulthood, each 250ml serving/day increase in SSBs intake (one cup) was associated with a 12% increased risk of obesity (RR=1.12, 95% CI 1.05, 1.19, 7 studies, 56579 participants; I^2=67.7%) [Quin et al., 2020].

Type 2 diabetes mellitus

WHO through a recently updated guideline published in the "electronic-Library of Evidence for Nutrition Actions (eLENA)" recommended to limit free sugar intake from childhood throughout life to prevent several NCDs, including diabetes [WHO, 2023]. Indeed, when this unhealthy habit was maintained until adulthood, for each 250ml serving/day increase (one cup) in SSBs intake a contemporary 20% higher risk of type 2 diabetes was found (RR 1.19, 95% CI: 1.13, 1.25; 19 studies 1,010,392 participants I^2 = 82.4%) [Quin et al., 2020]. In addition, high consumers of SSBs (≥1 serving/day) compared to low consumers (<1 serving/day) showed a 29% increased risk of this type of diabetes (RR: 1.29, 95% CI: 1.23, 1.34; 17 studies 645658, participants; I^2 = 29.9%) [Meng et al., 2021].

Non-alcoholic fatty liver disease

No systematic literature reviews exclusively focused on a child and adolescent population describing the relationship between NAFLD and free sugar intake were found in the literature. However, in a recent meta-analysis carried out in a mixed population of both adolescents and adults, the SSBs consumers in comparison with never-consumers showed a 39% of increased risk of NAFLD (RR 1.39, 95% CI: 1.29, 1.50; 12 studies, 35705 participants; I^2 = 42%) [Chen et al., 2019]. Particularly, in two of four studies performed on adolescents the risk of steatosis was significantly increased, ranging from 69 to 93 %. A further meta-analysis confirmed that when the excessive intake of SSBs from childhood persists into adulthood the risk of NAFLD increases by 40% (OR 1.40; 95% CI: 1.07, 1.82; 4 studies, 6326 participants, I^2 = 31.0%) [Asgari-Taee et al., 2018]. Specifically, two hepatic markers of NAFLD were found to be increased in high consumers of SSBs such as alanine aminotransferase and aspartate aminotransferase [Lee et al., 2022].

Cardiovascular diseases

The AHA recommended that children limit their intake of one SSB (8 ounces= 236 ml) per week to stay below 25 g of free sugars per day to avoid CVD in adulthood (AHA, 2016). Indeed, in adulthood, as reported in a recent meta-analysis, high consumers of SSBs (≥1 serving/day), when compared with low consumers, showed a 17% increased risk of CVD (RR: 1.17; 95% CI: 1.12, 1.23; 10 studies, 582,082 participants I^2 = 14%) [Meng et al., 2021]. These results are in perfect agreement with those described in a previous systematic review conducted almost a decade ago (17%, RR 1.17 CI: 1.07, 1.28; 4 studies, 173753 participants; I^2 = 0%) (Huang et al., 2014).

Hypertension

Evidence supporting the relationship between SSBs intake and hypertension was only found in observational studies conducted in adult populations. However, excessive consumption of free sugars can be considered as an indirect risk factor for childhood hypertension because it leads to childhood obesity, which, in turn, is a direct risk factor for paediatric hypertension [Sorof et al., 2002]. In adults, for each 250ml serving/day (cup) increase in SSBs intake there was evidence of an increased risk of developing arterial hypertension ranging from 7% (RR: 1.07; 95% CI: 1.04, 1.10; I2 = 64%; P = 0.04) to 10% (RR 1.10, 95% CI: 1.06,1.14, I^2=58.4%; 6 studies, 312156 participants) [Schwingshackl et al., 2017; Quin et al., 2020].

Cancer and free sugar intake in accordance with the Evidence Based Medicine

Although sugar restriction should start in childhood, evidence of a relationship between SSBs and cancer was found only in adulthood. Specifically, high adult consumers of SSBs (≥1 serving/day) compared to low consumers increased the risk of developing cancer by 12% (RR = 1.12 95%, CI: 1.06, 1.19, 53 studies; I^2 = 64.9%). When only cohort studies were analysed in the meta-analysis, the risk decreased to 8% (RR = 1.08 95%CI: 1.01, 1.15; 26 studies, 44370 cases, I^2 = 59.3%). Only specific tumors showed a clear relationship with SSBs intake, such as

RECOMMENDATIONS

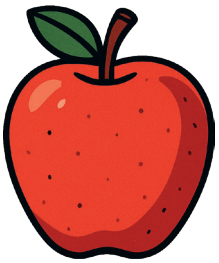
Oral health professionals should be encouraged to educate parents or caregivers to adopt the following habits in their children's diets:

In the first two years of life, prevent children from tasting foods or drinks with free sugars in order not to orient their taste to sweet.

After the first two years and throughout life, limit the intake of free sugars to an amount that does not exceed 5% of the total daily dietary energy intake. In the case of sucrose, the most frequently added sugar in food, the daily intake should not exceed 25 g (equivalent to about one glass of soda, 200 g of fruit-flavored yogurt, two packaged snack cakes, or six level teaspoons of table sugar). This is to prevent tooth decay as well as several non-communicable diseases such as obesity, type 2 diabetes, non-alcoholic fatty liver disease, cardiovascular disease, hypertension, and, in addition, several specific cancers.

Pay particular attention to the intake of sugar sweetened beverages which should not be taken every day, while water should be the thirst quencher. SSBs include soft drinks, sweetened iced teas, fruit juices (even 100% juice), and energy drinks; preferable alternatives are plain water or unsweetened herbal teas.

Replace daily sweet snacks eaten outside main meals with foods not containing free sugars or with natural sugars (e.g., fruit and vegetables, such as a fresh apple with a few almonds, plain yogurt without added sugar, or raw vegetables with hummus).



hepatocellular carcinoma (RR=2.00 95% CI: 1.33-3.03; 2 studies, I^2= 0%), breast cancer (RR=1.21 95% CI: 1.02-1.43; 7 studies ;I^2 =62.5%), recto-colon cancer (RR=1.14, 95% CI: 1.01, 1.27; 9 studies, I^2=66.6%), prostate cancer (RR=1.14, 95% CI: 1.05, 1.24; 8 studies; I^2=0%) [Li et al., 2021].

For all-cause mortality and free sugar intake in accordance with the Evidence Based Medicine

An unhealthy habit of excessive SSBs from childhood leads to an increased risk of mortality. In fact, for each increase of one 250ml serving/day (one cup) in SSBs intake an increase in mortality risk was found ranging from 4% (RR = 1.04, 95% CI: 1.01, 1.07; 10 studies, 1791,055 participants; I^2 = 58.0%) to 7% (RR: 1.07; 95% CI: 0.91, 1.25; 8 studies, 999689 participants I^2 = 76.9%) depending on the meta-analysis considered [Quin et al., 2020; Meng et al., 2021].

Conclusion

Dietary behaviour is influenced by community, family, and individual factors, including food availability and affordability. Preference for sweetness emerges early in life and persists throughout childhood, declining only in mid-adolescence. This predisposition places children at a higher risk of overconsumption of sugars. The "empty calories" of free sugars provide energy without essential nutrients, potentially impairing proper growth and development. The health effects of free sugar consumption remain controversial; however, excessive intake has been linked to increased risk of caries [Paglia et al., 2016 ; Colombo et al., 2019], obesity [Colombo and Paglia, 2024; Costacurta et al., 2014], cardiovascular disease [Vos et al., 2017], type 2 diabetes mellitus, metabolic syndrome, and non-alcoholic fatty liver disease. Moreover, obesity is a key risk factor for the development of sleep-disordered breathing. Inadequate sleep duration and quality in children and adolescents are associated with increased adiposity, decreased insulin sensitivity, hyperglycemia, and higher cardiometabolic risk. These findings have shaped recommendations from authoritative bodies like the AHA, the AAP, and the WHO, which advise limiting free sugar intake to less than 10% of total daily energy, with added benefits seen when reduced to 5% [WHO, 2015]. The first months of life are critical for flavor learning. Early exposure to a variety of tastes is essential for future acceptance of healthy foods. Health professionals and parents should collaborate to support the development of children's taste preferences and eating behaviours, fostering lifelong healthy choices.

Abbreviations

AAP: American Academy of Pediatrics
AAPD: American Academy of Pediatric Dentistry
AHA: American Heart Association
AND: Academy of Nutrition and Dietetics
BMI: Body Mass Index
CVD: Cardiovascular Disease
DMFT/dmft: decayed-missing-filled-teeth
EFSA: European Food Safety Authority
eLENA: electronic-Library of Evidence for Nutrition Actions
NAFLD: Non-Alcoholic Fatty Liver Disease
NCDs: Non-Communicable Diseases
SIOI: Italian Society of Paediatric Dentistry
SSBs: Sugar-Sweetened Beverages
T2DM: Type 2 Diabetes mellitus
WHO: World Health Organization

References

- Alexaki F, Kostopoulou M, Koleventi K, Lygidakis NN. Does breastfeeding increase the risk of early childhood caries (ECC)? A systematic review. Eur Arch Paediatr Dent. 2025 Aug;26(4):645-656. doi: 10.1007/s40368-025-01051-4. Epub 2025 May 30. PMID: 40445533
- American Academy of Pediatric Dentistry (AAPD)_a. Dietary recommendations for infants, children, and adolescents. Policy. 2022. Available from: https://www.aapd.org/media/policies_guidelines/p_recdietary.pdf
- American Academy of Pediatric Dentistry (AAPD)_b. Snacks and sugar-sweetened beverages sold in schools. Policy. 2022. Available from: https://www.aapd.org/globalassets/media/policies_guidelines/p_snacksbeverages.pdf
- American Heart Association. Added sugars and cardiovascular disease risk in children: a scientific statement from the American Heart Association. Circulation. 2016;134(15):e333–e352.
- Asgari-Taee F, Zerafati-Shoae N, Dehghani M, Sadeghi M, Baradaran HR, Jazayeri S. Association of sugar-sweetened beverages consumption with non-alcoholic fatty liver disease: a systematic review and meta-analysis. Eur J Nutr. 2019;58(5):1759-1769.
- Bettocchi S, D'Oria V, De Cosmi V, Scaglioni S, Agostoni C, Paglia L, Paglia M, Colombo S, Braiotta F, Beretta M, Berti C. Preschool children's eating habits and parental nutritional status. Nutrients. 2025;17(3):575.
- Colombo S, Gallus S, Beretta M, Lugo A, Scaglioni S, Colombo P, Paglia M, Gatto R, Marzo G, Caruso S, Paglia L. Prevalence and determinants of early childhood caries in Italy. Eur J Paediatr Dent. 2019;20(4):267-273.
- Colombo S, Paglia L. Childhood obesity, sugar, and early childhood caries: the sweet trap. Eur J Paediatr Dent. 2024;25(4):254-255.
- Costacurta M, DiRenzo L, Sicuro L, Gratteri S, De Lorenzo A, Docimo R. Dental caries and childhood obesity: analysis of food intakes, lifestyle. Eur J Paediatr Dent. 2014;15(4):343-348.
- EFSA Panel on Nutrition, Novel Foods and Food Allergens (NDA); Turck D, Bohn T, Castenmiller J, de Henauw S, Hirsch-Ernst KI, et al. Tolerable upper intake level for dietary sugars. EFSA J. 2022;20(2):e07074.
- European Society for Paediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) Committee on Nutrition. Sugar in infants, children and adolescents: a position paper. J Pediatr Gastroenterol Nutr. 2017;65(6):681–696.
- GBD 2021 Oral Disorders Collaborators. Trends in the global, regional, and national burden of oral conditions from 1990 to 2021: a systematic analysis for the Global Burden of Disease Study 2021. Lancet. 2025;405(10482):897-910.
- Huang C, Huang J, Tian Y, Yang X, Gu D. Sugar-sweetened beverages consumption and risk of coronary heart disease: a meta-analysis of prospective studies. Atherosclerosis. 2014;234(1):11-16.
- Jangda FH, Suominen AL, Lundqvist A, Männistö S, Golkari A, Bernabé E. Starch intake and changes in dental caries among adults: a longitudinal study in Finland. J Public Health Dent. 2025;85(1):29-39.
- Lara-Castor L, Micha R, Cudhea F, Miller V, Shi P, Zhang J, et al. Intake of sugar-sweetened beverages among children and adolescents in 185 countries between 1990 and 2018: population-based study. BMJ. 2024;386:e079234.
- Lee D, Chiavaroli L, Ayoub-Charette S, Khan TA, Zurbau A, Au-Yeung F, et al. Important food sources of fructose-containing sugars and non-alcoholic fatty liver disease: a systematic review and meta-analysis of controlled trials. Nutrients. 2022;14(14):2846.
- Li Y, Guo L, He K, Huang C, Tang S. Consumption of sugar-sweetened beverages and fruit juice and human cancer: a systematic review and dose-response meta-analysis of observational studies. J Cancer. 2021;12(10):3077-3088.
- Lustosa K, Rodrigues LRS, Rocha RM, Prudente TP, Mezaiko E, Silva FPY, Silva BSF. Risk of Early Childhood Dental Caries Associated With Prolonged Breastfeeding: A Systematic Review and Meta-Analysis. Int J Paediatr Dent. 2025 Sep;35(5):964-985. doi: 10.1111/ipd.13313. Epub 2025 Apr 20. PMID: 40254914; PMCID: PMC12332104.
- Meng Y, Li S, Khan J, Dai Z, Li C, Hu X, Shen Q, et al. Sugar- and artificially sweetened beverages consumption linked to type 2 diabetes, cardiovascular diseases, and all-cause mortality: a systematic review and dose-response meta-analysis of prospective cohort studies. Nutrients. 2021;13(8):2636.
- Moynihan P. Sugars and dental caries: evidence for setting a recommended threshold for intake. Adv Nutr. 2016;7(1):149-156.
- Paglia L. The first thousand days of mother and child: a lifelong investment in oral health. Eur J Paediatr Dent. 2022;23(1):5.
- Paglia L, Friuli S, Colombo S, Paglia M. The effect of added sugars on children's health outcomes: obesity, obstructive sleep apnea syndrome, attention-deficit/hyperactivity disorder and chronic diseases. Eur J Paediatr Dent. 2019;20(2):127-132.
- Paglia L, Scaglioni S, Torchia V, De Cosmi V, Moretti M, Marzo G, Giuca MR. Familial and dietary risk factors in early childhood caries. Eur J Paediatr Dent. 2016;17(2):93-99.
- Qin P, Li Q, Zhao Y, Chen Q, Sun X, Liu Y, Li H, Wang T, Chen X, Zhou Q, Guo C, et al. Sugar and artificially sweetened beverages and risk of obesity, type 2 diabetes mellitus, hypertension, and all-cause mortality: a dose-response meta-analysis of prospective cohort studies. Eur J Epidemiol. 2020;35(7):655-671.
- Qin X, Zi H, Zeng X. Changes in the global burden of untreated dental caries from 1990 to 2019: a systematic analysis for the Global Burden of Disease study. Heliyon. 2022;8(9):e10714.
- Shrestha SK, Arora A, Manohar N, Ekanayake K, Foster J. Association of Breastfeeding and Early Childhood Caries: A Systematic Review and Meta-Analysis. Nutrients. 2024 Apr 30;16(9):1355. doi: 10.3390/nu16091355. PMID: 38732602.
- 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;31(1):122-129.
- Vos MB, Kaar JL, Welsh JA, et al. Added sugars and cardiovascular disease risk in children: a scientific statement from the American Heart Association. Circulation. 2017;135(19):e1017-e1034.
- WHO. Guideline: sugars intake for adults and children. Geneva: World Health Organization; 2015. PMID:25905159
- WHO. Reducing free sugars intake in children to reduce the risk of noncommunicable diseases. Guideline. Geneva: World Health Organization; 2023.