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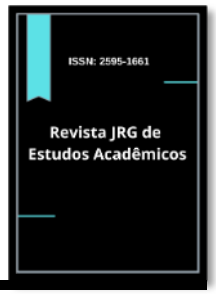

Alto consumo de alimentos ultraprocessados entre crianças e jovens nos Estados Unidos: desafios e soluções

High consumption of ultra-processed foods among children and young people in the United States: challenges and solutions

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Resumo

O consumo de alimentos ultraprocessados (AUP) entre crianças e adolescentes nos Estados Unidos tornou-se uma preocupação crítica de saúde pública. Esses produtos altamente industrializados representam mais de 60% da ingestão calórica diária nessa faixa etária, sendo associados a uma série de doenças crônicas como obesidade, diabetes tipo 2 e hipertensão. O aumento expressivo na disponibilidade, conveniência e apelo publicitário desses alimentos tem contribuído para hábitos alimentares pouco saudáveis, especialmente entre populações de baixa renda e com menor escolaridade. Este artigo é uma revisão narrativa da literatura e discute os principais desafios relacionados ao alto consumo de (AUP) por jovens norte-americanos, destacando fatores sociais, econômicos, culturais e ambientais. Além disso, explora os impactos nutricionais, psicológicos e metabólicos decorrentes da ingestão frequente desses produtos. São apresentadas estratégias e políticas públicas para mitigar o problema, incluindo programas escolares, regulamentação da publicidade infantil, intervenções comunitárias e reformas na rotulagem nutricional. A responsabilidade compartilhada entre famílias, escolas, indústria alimentícia e governos é enfatizada como fundamental para a construção de ambientes alimentares mais saudáveis. Por fim, propõe-se uma abordagem sistêmica e intersetorial para reduzir o consumo de (AUP) e promover a saúde integral de crianças e adolescentes.

Palavras-chave: Ultraprocessados. Crianças. Jovens. Saúde

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Abstract
The consumption of ultra-processed foods (UPF) among children and adolescents in the United States has become a critical public health concern. These highly industrialized products represent more than 60% of the daily caloric intake in this age group, being associated with a number of chronic diseases such as obesity, type 2 diabetes and hypertension. The significant increase in the availability, convenience and advertising appeal of these foods has contributed to unhealthy eating habits, especially among low-income populations with lower schooling. This article is a narrative review of the literature and discusses the main challenges related to the high consumption of (UPF) by young Americans, highlighting social, economic, cultural and environmental factors. In addition, it explores the nutritional, psychological and metabolic impacts resulting from frequent intake of these products. Strategies and public policies to mitigate the problem are presented, including school programs, regulation of children's advertising, community interventions and reforms in nutrition labelling. The shared responsibility between families, schools, food industry and governments is emphasized as fundamental for building healthier food environments. Finally, it is proposed a systemic and intersectoral approach to reduce the consumption of (UPF) and promote the integral health of children and adolescents.

Keywords: *Ultraprocessed. Children. Young people. Health*

1. Introdução

In the United States, childhood obesity has become a public health crisis. In the last three decades, childhood obesity prevalence has tripled, contributing to increased rates of type 2 diabetes, dyslipidemia, hypertension, and psychosocial problems. Rates of obesity among 2- to 5-year-olds have increased by 40%, among 6- to 11-year-olds by 34%, and among 12- to 19-year-olds by 50%, making it arguably one of the most difficult public health challenges currently facing the nation. From 1976 to 1980, the overall childhood obesity prevalence was approximately 6 percent. The latest obesity prevalence estimates indicate that 18.5 percent of children and adolescents aged 2 to 19 years and older are obese (NG et al., 2024).

Such high obesity rates are often attributed to a change in lifestyle resulting from rapid industrialization, including environmental changes, cultural changes, and dietary changes (LIVINGSTON et al., 2021). Advances in food manufacturing, characterized by ever-greater availability and consumption of ultra-processed foods (UPFs), have altered Americans' diets and accelerated obesity and other adverse health outcomes. People often find foods convenient, portable, inexpensive, and tasty when they are ultra-processed. Yet despite these advantages, UPFs tend to be energy dense, low in protein, dietary fiber, and micronutrients, and high in free sugars, sodium, and saturated fat. The effect of naturalness on food choice is not only at play when consumers choose to eat. The basis for biochemistry, chemical engineering, and neuroscience allows biologists and food engineers to develop ways to manipulate food's physics and chemistry in ways not intuitively understood or appreciated by consumers for food reformulation (MATOS; ADAMS; SABATÉ, 2021).

1.2. Understanding Ultra-Processed Foods

Ultra-processed foods (UPFs) are foods that have undergone several levels of industrial processing such that few to no whole foods are present in the final product. They include calorically dense and nutrient-poor processed foods with ingredients not used in home cooking (i.e., cosmetic additives) that make the foods highly palatable,

such as sweeteners, preservatives, colors, flavorings, emulsifiers, and texturizers (LIVINGSTON et al., 2021). Common examples include sodas, sweetened breakfast cereals, packaged snacks, frozen pizzas, and instant noodles. UPFs do not include minimally processed packaged foods like frozen fruits or ready-made salads. Whereas in the last few decades there was a rapid increase in UPF production and consumption around the world, it is a relatively recent phenomenon in the United States (US). In the 1980s, UPFs accounted for about 25% of US food energy intake. Nowadays, children and adolescents consume more than 60% of their daily calories from UPFs (MESCOLOTO; PONGILUPPI; DOMENE, 2024).

While convenience, some UPFs are ready to eat with little time required for meal preparation, cooks, and cleaning. Such foods can help time-pressed working parents feed their children. Nevertheless, UPFs are usually energy dense, high in energy and/or added sugar, high in sodium, low in protein, low in fiber, low in micronutrients, and offer a suboptimal nutrition profile. Nutrition-related chronic diseases, such as obesity, type 2 diabetes, and hypertension, have increased dramatically over the last several decades, particularly among children and adolescents. A recent randomized controlled trial provided causal evidence that consuming an ad libitum ultra-processed food (high-UPF) diet led to increased calorie intake and weight gain among healthy young adults (McCLEMENTS,2024).

Ultra-processed food (UPF) consumption is associated with other unhealthy diet patterns, including increased dietary energy density and consumption of added sugar, fat, and sodium, and lower intake of health-promoting foods, such as whole grains, fruits, vegetables, legumes, nuts, dairy, and red/processed meat. UPF consumption is associated with low diet quality, particularly low adherence to the Recommended Dietary Allowance (RDA) for a variety of micronutrients, greater likelihood of self-reported poor diet quality and overeating, greater perceived dieting difficulty, and higher prevalence of self-reported obesity in both US adults and children (VERNARELLI; RUBENSTEIN, 2022).

1.3. Definition and Characteristics

Ultra-processed foods (UPFs) are formulated mostly or entirely from industrial processes and contain a broad range of ingredients that typically include preservatives, emulsifiers, stabilizers, colors, flavors, and sweeteners (PEREIRA et al., 2022). UPFs have a high energy density, high glycemic index, and low physical and chemical complexity, which leads to excessive energy intake. UPFs are widely available in stores, advertisements, and product placements in schools, programs, and in-app purchases, and they are marketed as trendy and cutting-edge. As of 2022, the Daily Food Tracker has 57 additional UPF products in addition to last year's 115 products. Food manufacturers have formulated better-for-you alternatives (mostly UPFs) to market the better for you claim.

(UPF) consumption is associated with lower diet quality in US children and adults (VERNARELLI; RUBENSTEIN, 2022). UPF consumption by children is positively associated with the price of UPFs. (UPF) consumption by children negatively impacts diet quality and is associated with greater effective calories. Consumption of UPFs is higher among children and youth from lower SES and is linked to an increase in food coping mechanisms in the COVID-19 pandemic. (UPF) consumption is highest among adolescents, impacting diet quality, and is associated with a larger weight increase during the COVID-19 pandemic. Food waste is a major global challenge that has important resource and environmental consequences. (UPFs) have a higher level

of inedibility and landfill disposal compared with non-processed foods (LIU et al., 2022).

2. Methodology

This study is a narrative bibliographic review of the literature, performed through searches in official documents and scientific articles available on the platforms Web of Science, Scopus, PubMed, PubMed Central, Google Scholar, DOAJ and SAO/NASA ADS. In the search was carried out the application of the filter in the English language for country/ region of the subject, then held the clipping on full text of publications with the theme ultraprocessed food; childhood obesity and sedentary lifestyle.

3. Results and Discussion

3.1. Prevalence in the Diets of Children and Young People

Recent population-based studies have shown that ultra-processed food consumption among children, adolescents, and the general population is high. Children and adolescents in the USA consume more than 60% of daily calories from ultra-processed foods. From 2007 to 2012, the contribution of ultra-processed foods to the total daily energy intake increased about 55 kcal/day and is higher among the children than the adults. Fast food accounted for 17% or more of total daily energy intake among adolescents. Many American children and adolescents do not follow dietary recommendations regarding sugar-sweetened beverages. Moreover, child consumption of fast food, commercially bought cakes, and cookies is also notable. Ultra-processed food consumption is high among the population (GALASTRI et al., 2018). Data from the 2017–2018 National Health and Nutrition Examination Survey revealed that adolescents consume over 60% of energy from ultra-processed food sources. Populations consume ultra-processed foods because they are proportionately cheaper than unprocessed or minimally processed foods. However, recent studies have shown an overall significantly higher likelihood of ultra-processed food consumption with higher household income compared with lower income groups. Age differences in the likelihood of ultra-processed food purchase by sociodemographic groups have been noted. Children are often purchased ready-to-eat and heat products; for adults, low-cost, ready-to-heat products are the preferred items. Ultra-processed food purchase increased across all levels of household food security. Meanwhile, ultra-processed food purchase declined across all parental education levels except for those with some college education (LIVINGSTON et al., 2021).

Ultra-processed foods are products made mostly or entirely from substances derived from food and often undergo several industrial processes. Their formulations include ingredients not commonly found in kitchens, such as sugar, bread, and substances extracted from foods. The number of industrial processes which transform these ingredients and consequently the add-on of several cosmetic additives are capable of leading to final products purposely designed to be hyper-palatable, energy-dense, ready-to-eat or drink, and highly resistant to spoilage or perishability. Most ultra-processed food products are sugar-sweetened, thus contributing almost half of sugar intake in the USA, and, similarly, most ready-to-eat meals, ready-to-heat products, confectionery ends, and pretzels are ultra-processed. Ultra-processed snacks are energy-dense, salty and fatty, and rich in sugar and sodium, but lack whole food ingredients. Globally, governments and public health organizations recommend limiting the following: sugar sweetened beverages, sweet, salty and fatty snacks, sweet

bakery products, and processed fruits and vegetables (PEREYRA-GONZÁLEZ; MATTEI, 2023).

3.2. Health Implications of Ultra-Processed Foods

High ultra-processed food (UPF) consumption is a major risk factor for obesity and diet-related chronic diseases, which disproportionately affects children and young adults. UPFs are manufactured industrial formulations that contain five or more of the zero or minimum degree of food processing ingredients and risk factors (additives, thickeners, sweeteners, acids, etc.) unknown to home cooking. (UPFs) comprise an estimated 56% of total energy in the US diet compared to 25% internationally, making them the highest consumers. These products often contain little whole foods, rich in energy, fat, sugars, and sodium, and poor in beneficial dietary components such as fiber, vitamins, minerals, and antioxidants (LIVINGSTON et al., 2021).

The increase in UPF consumption and concomitant deterioration in diets is one major driver of the most recent rise in obesity and chronic diseases. (UPF) consumption is associated with an increased risk of obesity in children and adolescents. Substituting 5% of energy from UPFs with unprocessed or minimally processed foods is associated with a 0.26 reduction in zBMI (BMI z-score) among US children and adolescents. The adverse health effects of (UPFs) stem from their production process and their high energy density. Children and adolescents have increased sensitivity to the addictive properties of sugar- and fat-rich UPFs because of shorter consumption experiences and more tolerant behavioral responses and reward systems (LIVINGSTON et al., 2021).

Consumption of UPFs among children is increasing significantly across the United States. Early-life exposure to UPFs is associated with later obesity among children. Short-term random assignment to a UPF diet increases calorie intake and weight gain compared with a non-UPF diet among adults. Using a novel time-varying exposure analysis approach, UPF consumption among children aged 2–18 years is modeled between 2003 to 2026 in the US. In addition, interventions to reduce UPF consumption are assessed, including lower UPF reformulation and added sugar taxes on UPFs (LIVINGSTON et al., 2021).

3.3. Nutritional Deficiencies

In general, many children and adolescents in the United States will not meet recommended daily values. Many children and adolescents will consume less than the recommended number of daily servings of grains, vegetables, fruits, and milk. Others may consume more than the recommended number of daily servings of meat and beans, sweetened beverages, and other high-fat and high-sugar foods. Children and adolescents 2 to 19 years of age in the U.S. consume too many calories from foods high in added sugars and saturated fats but not enough calcium, potassium, fiber, and magnesium. Caloric intake is positively associated with saturated fat but negatively associated with fiber, potassium, and magnesium intake, in children and adolescents ages 9-18 years. The high purchase of UPF can also yield nutritional deficiencies among children in the U.S. by limiting nutrient intake or replacing lesser nutrient-dense food (FALCÃO et al., 2019). UPF is defined by chemical composition that includes common ingredients not normally found in kitchen. UPF consumption is positively associated with lower diet quality and micronutrient adequacy and negatively associated with higher intake of grain, dairy, and low-sugar or low-fat foods among children and adolescents. The synthetic element in the UPF may be limited or displaced the essential nutrient occurrence. UPF is the most frequently consumed food

products by children and adolescents over the world, constituting a nutritional risk group associated with lower diet quality and higher levels of macronutrient and nutrient inadequacies (VERNARELLI; RUBENSTEIN, 2022).

3.4. Obesity and Related Health Issues

Childhood obesity is a major public health problem in the USA. The obesity rate among children has more than tripled in the past 30 years. In 2001-2002, a national survey showed that approximately 19% of 2-19 year-olds were obese. By 2017-2018, it had risen to nearly 20%, with severe obesity increasing from 1.9 to 6.1%. This trend is particularly evident among minority children and those living in lower-income households. Unhealthy eating habits, notably high levels of sugar-sweetened beverage consumption and overeating fast food, are believed to be largely responsible for the childhood obesity epidemic. To date, the majority of US states and localities have instituted interventions to improve dietary consumption among children. To assist states, localities, and the private sector in efforts to improve dietary consumption, recent evaluation studies have established a evidence-base related to youth food and beverage consumption and their relationship with obesity. American diets have changed over the past 30 years to include a large amount of highly processed foods, contributing to the obesity epidemic. Ultra-processed foods (UPFs) have been defined as industriais formulations of processed foods that contain five or more (often dozens) of ingredients, mostly of industrial use. They undergo several levels of processing and contain few to no whole foods, as opposed to minimally processed foods, which are unaltered or then mildly altered for purposes of preservation, hygiene, safety, and/or cooking. (UPFs) often contain emulsifiers, artificial colors, flavorings, sweeteners, and other cosmetic additives, which are permitted by food safety authorities to make foods highly palatable (LIVINGSTON et al., 2021). (UPFs) are usually energy dense, high in added sugar and sodium, and low in protein, fiber, and both vitamin and mineral micronutrients. In the past decade, food industry deregulation and practices have led to a rise in production and marketing of UPFs. A recent study conducted a randomized controlled feeding trial showing that consuming a diet high in (UPFs) led to increased calorie intake and weight gain among adults. Observation studies, including both prospective cohort and cross-sectional studies in children, suggest that high consumption of (UPFs) contributes to high levels of body fat. Children aged 2-19 years in the USA consume on average more than 60% of daily calories from (UPFs). If a significant proportion of children can consume fewer calories from (UPFs), it is expected that this would have a large impact on reducing childhood obesity in the USA.

3.5. Psychological Effects

Ultra-processed food consumption is associated with an increased risk of developing chronic diseases and mental health disorders such as anxiety, depression, attention deficit hyperactivity disorder and stress. Unique to children and adolescents, these adverse health effects are associated with disability, loss of productivity, school exclusion, increased risk of violence, online bullying and early deaths. Child and adolescent obesity is becoming increasingly common in Iran, where children are overconsuming ultra-processed food, leading to increased concern among health officials about the impact of nutrition on student health. There is evidence linking various child and adolescent morbidities to the consumption of ultra-processed foods (PAGLIAI et al., 2021).

Despite the progress and increased emphasis on research into the association between ultra-processed food consumption and mental well-being in adults, equivalent

empirical work in children and adolescents is needed. A robust understanding of 0to18 year olds' consumption of ultra-processed foods and its association with mental well-being is necessary for the prevention of an epidemic of associated childhood morbidities. A review of the literature identified factors associated with child and adolescent obesity. This paper presents an analysis of the association between excess consumption of ultra-processed foods and psychological morbidities among children and adolescents in Iran, conducted with parents' consente (LOUZADA et al., 2021).

The initial question was whether the consumption of ultra-processed foods affected the mental health of Iranian adolescents. Even though a large amount of data was obtained from child and adolescent questionnaires and the links between ultra-processed food consumption and the psychological questions were available for analysis, it was assumed from the outset that young children would have difficulty understanding the questions. In addition, parents' consent to participate in the research was also an important factor, as many divided families reported that they could not answer on behalf of their children. In addition, many parents had difficulty finding appropriate words to convey the ideas of the psychological impacts of ultra-processed food consumption on their children (LOUZADA et al., 2021).

3.6. Socioeconomic Factors Influencing Consumption

Socioeconomic factors associated with ultra-processed food (UPF) consumption in Brazil and the United States (US) have similar directions (level of education and family income). Assessing the differences between countries can complement the knowledge about the socioeconomic factors influencing (UPF) consumption, especially because of differences in their demographic characteristics (age and race), geographic and developmental regions, income distribution, and time trend of (UPF) consumption. For instance, Americans generally consumed a greater percentage of calories from UPF than Brazilians. It happens because the per capita domestic production in the USA was greater than in Brazil, due to greater investments by the food industry in the USA and less government control, which reduced the relative cost of (UPF). Thus, farm subsidies, which are inversely related to processing degree, were greater for sugar, corn starch, and fats than for grains. Nonetheless, the consumption of (UPF) by children and adolescents in Brazil is approaching the levels observed in the USA (GALASTRI et al., 2018).

In the USA, despite the higher UPF consumption, the DHS index adjusted by age group, sex, and race/ethnicity presented lower coefficients. This adjustment shifted the slope of the DHS index in the US towards the right, which may be due to the fact that education and income inequalities are greater in this country than in Brazil. In the USA, adults attained a greater personal educational status, and households were more likely as they moved along monthly family income as compared to Brazil, which likely attenuated the more detrimental effect of UPF consumption on the DHS index among wealthier education groups. Thus, policies promoting a healthy food environment, fewer socioeconomic inequalities, and healthier lifestyles should be strengthened (JHA et al., 2022).

According to the linear regression models, the food availability significantly predicted the type of food elasticities in a sample of U.S. children aged 2–11 years in the last decade. For UPF elasticity, dollar-type food availability in the same group was positively significant while household food spending was negatively significant. For non-UPF elasticity, however, dollar-type food availability in U.S. grocery stores and specialty nutrition stores was negatively significant. Relative prices on food types were likewise significant for each elasticity type (GALASTRI et al., 2018).

3.7. Income Levels and Food Accessibility

Importantly, income levels are a social determinant that have been consistently shown to be associated with food accessibility in the US (GALASTRI et al., 2018). For example, a national prevalence of ultra-processed foods consumption was assessed among youth aged 2-19y in the US across racial/ethnic groups and county income level quintiles. Similar to studies conducted in other contexts, the highest proportion of their daily energy intake from ultra-processed foods was observed for boys, for youth aged 12-19. The varied profiles of white non-Hispanic youth last, suggest more systemic, structural, economic and ecological factors driving these inequalities. California children were shown to be at lower risk. However, either the county, neighborhood socioeconomic disadvantage or the perceived community safety did not significantly moderate the associations with ultra-processed foods consumption. These indicators of social adversity also showed varying associations with total energy intake from ultra-processed foods by age group.

Besides, several child-oriented community-level programs were developed to address food accessibility barriers in low-income areas, early selection, adjustment, and implementation of a child rights instrument to guarantee children's right to health. The area-level disadvantaged medium-of-exchange and large retail were negatively associated with children's dietary constraint, and consumption of ultra-processed snacks. Gentrification effect was larger for ultra-processed snacks which were less fruit and healthy diet oriented than ultra-processed drinks. An ecological model to promote healthy dietary intake and reduce ultra-processed food consumption among children should incorporate parental monitoring and broader systemic, cultural, economic, and built environment factors surrounding food accessibility (VEDOVATO et al., 2021).

3.8. Marketing and Advertising Strategies

Minimizing marketing and advertising of ultra-processed food (UPF) is necessary to reduce UPF consumption during childhood (GARTNER, 2007). Most food and beverage consumption by children occurs during the time when young people are in school or before or after school. Outside the home, food consumption at retailers occurs where food is owned by someone else or prepared elsewhere. Data on food purchase from retailers by young people under age 18 is limited in the United States. This absence is a reality check. The United States is a country dominated by corporations. In children's lives, corporations are often the most powerful profit-makers. Corporations use media systems, corporate facilities, and corporate sprawl to enable health-damaging consumption of harmful goods among children. In response, obesity prevention researchers, public health researchers, and advocates have begun to understand a dire unmet research agenda of immense public health importance: how is food purchased outside the home by children and young people in the United States? On a model driven by commercial potential, the food industry or its agents should spend around $50 billion marketing food to children and youth. Industrial marketing of food reaches children in an intensely competitive media environment. The amount children are exposed to advertising, the availability of food to purchase when they are away from home, and the amount of money they are given or earn to spend on food influence purchases. Marketing on the web, school, and in venues children frequent is aggressively pursued. When marketing works as intended, children request and influence food purchases at the level of their home or school. Marketing determines how food types are selected for purchase; more nutrition-conscious foods are less promoted and purchased. The model's five interrelated components tend to

be pursued aggressively, with modest regulatory and policy responses (BURKART et al., 2022).

Children receive ~12 minutes of food and beverage advertising on television daily and additional exposure on programming directed toward them. Food advertisements slower depict (UPF) that are energy-dense and micronutrient-poor. Promotion of these foods yields requests and purchases, more so in vulnerable populations. Advertisers actively collaborate with Hollywood, major sporting leagues and events, social media platforms, and venues near children. The US is one of few high-income countries in which the food industry self-regulates with its basis-only policy in which requests to re-broadcast less healthful advertising are self-regulated. Even if regulations and policies are enacted, this environment is expected to become ever more challenging, changing nature and pace of content delivery, targeting, tracking, and ad effectiveness (JHA et al., 2022).

3.9. Cultural Influences on Food Choices

The role of cultural influences in shaping food choices is evident in many settings, albeit in different ways (PEREIRA et al., 2022). Key elements include perspectives on weight control and health; culinary knowledge, skills, and practices; knowledge and attitudes toward nutritional information; cultural beliefs and values; food habits including family meals; and the cultural meanings and attachment of food. However, many of these elements are discussed in broad terms without sufficiently theorizing how these influences operate in particularized socio-political contexts. Variations in federal food assistance programs and the relevant policies across states have created uneven terrain for families seeking to procure food for healthy diets. Cultural influences on food choices are mediated and transformed by the ways in which cultural discourses on food and health interplay with regulations in particular setting and are transformed into social practices situated within specific material, nutritional, and socio-economic environmental contexts.

Current anti-hunger policies often focus on food access and affordability. In 2022, food insecurity remained a towering issue in the US, disproportionately affecting children and BIPOC families. The newly expanded federal child tax credit increased monthly cash benefits, alleviating hunger for many, especially families that recently immigrated to the US. However, these benefit enhancements in the COVID-19 relief legislation are set to expire, with children at heightened risk of hunger and associated health impacts. Food insecurity is often viewed as a problem of behavioral choices, tasking individual families with budgets and skill sets to procure healthy diets (VERNARELLI; RUBENSTEIN, 2022). Hunger ultimately translates into less access to healthy foods, exacerbating poor health. Addressing food insecurity thus entails focusing on food access and affordability through price- and income-lever intervention strategies. However, hunger is not simply about access to food; it is also viewed as a bodily experience. Although many households face barriers in procuring food, healthy eating is a context-bound cultural activity informed by families' history and socio-political conditions, shaping dietary decisions.

3.10. The Role of Schools in Food Consumption

Schools play an important role in food consumption, especially among adolescents. Most school-aged children spend 5 of 7 days at school, where they have access to a large portion of food intake. Schools can provide or sell food in the school lunchroom or cafeteria, as well as allow for a variety of local, commercial vendors outside of school, all of which can contribute to food consumption. Food consumption

in schools can take place in a few ways after the beginning of classes. Students can bring food from home or have food provided at school. Since the COVID-19 pandemic, many schools have also sold food at the beginning of classes (SILVA et al., 2022). In schools where food is sold, the food is typically sold in both the lunchroom/cafeteria and outside of the lunchroom/cafeteria, sometimes in cooperation with local businesses. The products sold in schools can include nutritious ones, such as fruit and milk, but also less nutritious foods, such as soft drinks and chips.

The wide availability of ultra-processed foods in schools, especially from commercial vendors, raises concern because the consumption of these foods is associated with a greater risk of overweight, obesity, and related diseases such as hypertension and diabetes (LIVINGSTON et al., 2021). The School Health Promotion Program recommends that, in order to contribute to the promotion of healthy eating, schools must restrict the availability of ultra-processed foods in schools and improve access to and the consumption of fresh and minimally processed foods. In Brazil, the health risks associated with unsafe food in schools are recognized due to the results of the National School Health Survey. School food consumption is therefore an important public health issue that should be considered in health. The weight of new policies aimed at improving the availability of better food in schools has now shifted toward market-oriented policies to stimulate the production and consumption of healthy food among agricultural producers. Such food consumption will lead to better health among the young and the population in general, thus reducing health risks and associated health care costs. In Port Vila, the capital of Vanuatu, policy efforts to improve school food consumption are underway.

3.11. School Meal Programs

The National School Lunch Program (NSLP) began in 1946 and focuses on the nutrition of children through schools by providing nutritious lunches to students. NSLP meal plans must meet specific calorie and nutrient-based standards. Unfortunately, some common food products at schools violate policies regarding the maximum calorie content. Specifically, whole-grain pizza crusts are the highest calorie item, contributing about 208 calories to the total meal energy content. Common food products that follow the food policies, including grapes, an orange, fresh vegetables, and lettuce, provide less energy compared to frozen pizza crusts and bagels. This should be noted, as current analysis focuses on improving the affordability and effect of reducing common products. Despite the overall large percentage decreases among common foods, a persistently high amount of food products are those with high calorie content and energy dense (LIVINGSTON et al., 2021).

Schools implementing federal assistance school meal programs need to develop nutrition standards based on the latest Dietary Guidelines for Americans and other evidence-based recommendations. Local agencies need to monitor and evaluate K–12 school districts, their schools and childcare centers, and the schools directly engaging with children and teenagers. Ongoing and continual evaluation needs to be administered to smart consumer school meal programs. In addition, it is essential to utilize different channels of media, such as flyers and school mornings raising awareness of its advantages, both short- and long-term. This includes lunchboxes/containers from home, vending machine foods in schools that offer foods to students, and any student or club-run activities selling foods in schools. Food scored for nutrition criteria must not be sold at elevated prices, thus making smart meals more affordable to children, teenagers, and caregivers questioning menus, food vendors, or the FSFS.

3.12. Food Policies and Regulations

Reducing the availability and marketing of unhealthy foods to children through strategies such as taxation of ultraprocessed foods, limiting the density of unhealthy foods, and marketing bans can contribute to reductions in childhood obesity (LIVINGSTON et al., 2021). Younger children can benefit from increased regulation of food marketing, including media and online marketing regulations, stricter limits on product placement in movies and schools, and the elimination of promotional items such as toys. Legislation to increase healthy food availability in schools, vending machines, daycare centers, and sponsoring environments, as well as improved food supply chains for restaurants and supermarkets in low-income neighborhoods, can improve access to healthy food. Local governments can assist by providing funds, tax grants, and permits for healthier food outlets to open and grow in areas with a high concentration of unhealthy food outlets. Many government agencies and organizations at the federal, state, and local levels are involved in an ecological approach to better food access. An example includes partnerships between government institutions and university faculty and students to achieve healthier food promotion at institutions such as housing authorities, clinics, government buildings, and schools. Printed media campaigns in Latino communities to increase the number of healthy food options in stores have been successful, and the local government monitors healthy food store developments and provides resources on healthy eating.

Around 50% of household food purchases are processed, with just 20% of the food market selling fresh. An example of proposed policy measures includes hefty taxes on sugar-sweetened sodas and unhealthy foods, an increase in the number of healthy food establishments in underserved areas, and policies that limit the density and portion of junk food advertising in terms of saturation, ownership, and hours of operation. A four-year effort in a Latino community in Los Angeles resulted in many supermarkets and fresh food vendors opening due to community pressure. Redemption successes include healthier shopping programs in malls and stores as an incentive for healthier foods. Active community outreach in low-income neighborhoods supports health policy campaigns with “real” baseline data collection (HASSEN et al., 2021).

3.12. Nutrition Education Initiatives

Nutrition education initiatives intend to enhance food knowledge and skills through the incorporation of healthy eating lessons into the curricula of schools or educational institutions. The majority of school-based programs occur during or after school hours, utilizing a range of methods for delivery, such as lectures or hands-on cooking demonstrations. All settings and approaches, school-based or family-based, show a modest, but significant effect on lowering SSB consumption. Research studies have shown a variety of school-based nutrition education initiatives, some of which are discussed as follows. One study was done among children in out of school childcare settings. The efficacy of a comprehensive nutrition education program was assessed among preschool children enrolled in 12 out-of-school childcare settings in a low socioeconomic área (DAUENHAUER et al.2022).

4. Conclusion

Ultra-processed food guidelines in children and adolescents are an important public health priority due to their alarmingly high consumption. The proactive role that food manufacturers and retailers must play in addressing (UPF) consumption by children and adolescents comprises improving nutrient composition, reformulating

food products and decreasing marketing. In developing and monitoring ultra-processed food guidelines in children, researchers across disciplines should engage industries, community groups, charities, healthcare professionals, governments, non-governmental organizations, international organizations, academia, educators, scholars, and other stakeholders. Ideally, all actors should be integrated into a consultative and transparent engagement process to transparently shape and continuously refine a whole-of-system approach to addressing (UPF) guidelines. There is broad agreement that nutrition-related, whole-of-system interventions are necessary to effectively reduce ultra-processed food consumption in children and adolescents (Livingston et al., 2021). In addition, proposals focusing on agriculture, food production, food and drink manufacture, safety, quality and labelling, health and nutrition education, and food environments must be complemented by neglected policy areas including food literacy, media regulation, and nutrition science.

International organizations, academia, and philanthropic foundations must support the next generation of research capacity to develop and evaluate the effectiveness of cost-effective population-wide initiatives to mitigate the negative impact of ultra-processed foods in children and adolescents. A consultative and transparent engagement process with industries, community groups, charities, healthcare professionals, governments, non-governmental organizations, and other stakeholders must be established to continuously scope, monitor and refine proposed policies. With the gravity of the situation evident and evidence-based approaches to redress UPF consumption by children and adolescents established, it is now time for action. Critically, given the extremely alarming levels of (UPF) consumption by children and adolescents, the initial focus must be on those strategies most difficult for individuals to conceptualize, measure, and act upon across sectors, and those strategies that involve the greatest cost to governments. While academics, non-governmental organizations, and salient stakeholders can take a leadership role, such a system-level approach must be spearheaded by political leaders though legislative change at the national level.

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