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# FAST FOOD GENERATION: THE RELATIONSHIP BETWEEN JUNK FOOD CONSUMPTION DUE TO NON-COMPLIANCE AND THE SURGE IN CHILDHOOD DIABETES CASES IN URBAN AREAS

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**Abstract**

*Rapid urbanization in Indonesia's urban areas has changed children's food consumption patterns, shifting from fresh and home-cooked foods to junk foods high in calories, saturated fat, sugar, and sodium. This change is driven by easy access, economic dynamics, and exposure to media and massive marketing, which shape food preferences from an early age. A food environment dominated by junk food narrows opportunities for healthy food consumption, while the busy urban pace of life encourages families to choose fast food as a practical solution. Socioeconomic factors influence the type and frequency of consumption, but dependence on junk food occurs across all levels of society. Low parental nutritional literacy, minimal promotional regulations, and the dominance of digital marketing reinforce this trend. Consequently, the risk of obesity and type 2 diabetes in children has increased significantly, exacerbated by a sedentary lifestyle and low physical activity. Physiologically, a diet high in sugar and trans fats triggers insulin resistance, chronic inflammation, and pancreatic β-cell fatigue. This phenomenon demands evidence-based, multidimensional interventions that include marketing regulations, food environment management, school-based nutrition education, and strengthening the role of families. Cross-sector collaboration and a continuous evaluation system are needed to simultaneously change socio-environmental determinants, so as to suppress the rate of the metabolic disease epidemic in urban youth.*

***Keywords :*** *Childhood diabetes, Junk food, Urbanization*
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## 1. Introduction

Rapid urbanization in Indonesia's urban areas has triggered a significant shift in food consumption patterns, particularly among children. This shift is characterized by a shift in eating preferences from fresh and home-cooked foods to fast food, which is high in calories, saturated fat, added sugar, and sodium. This phenomenon is part of a global nutritional transition accelerated by easy access, economic dynamics, and mass media exposure. The penetration of the fast food industry through massive marketing strategies has made its products available in almost every corner of the city, thereby narrowing the space for healthy food choices. The impact of this junk food-dominated food environment is structural, skewing children's consumption behavior toward less healthy patterns (Andriani et al., 2024). As a result, healthy food choices are increasingly marginalized and shifted to occasional consumption rather than primary consumption.

Amidst this situation, compliance with the principles of balanced nutrition has declined significantly, despite widespread dissemination of official guidelines. The Balanced Nutrition Guidelines emphasize dietary diversity, balanced proportions, and limited consumption of sugar, salt, and fat, but their implementation in urban areas faces practical obstacles. Many families face time constraints due to busy schedules, leading them to rely on fast food as a quick solution to meet their children's nutritional needs. Low nutritional literacy among parents makes them unaware of the long-term consequences of unhealthy eating patterns (Taher et al., 2021). This situation is exacerbated by the lack of strict regulations controlling the promotion and sale of high-calorie foods to children. Thus, the family's social and economic environment is a contributing factor to nutritional non-compliance.

Children's preference for junk food is not a natural habit, but rather the result of a complex behavioral development process from an early age (Rahmawati et al., 2025). Exposure to

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advertisements that utilize animated characters, interactive games, and promotional prizes has created an emotional connection between children and certain brands. The intense savory, sweet, and salty flavors of junk food are designed to stimulate the dopamine system, resulting in feelings of satisfaction and a desire for repeat consumption. This factor makes it more difficult for children to accept natural foods such as vegetables or fruit, which have simpler flavors. Research shows that the earlier children are exposed to junk food, the more likely they are to maintain these preferences into adulthood. Therefore, the formation of eating preferences from childhood is a critical factor influencing long-term health.

The impact of this preference is beginning to be seen in the increasing prevalence of childhood obesity in urban areas. Obesity is not merely a matter of physical appearance but also an indicator of a serious metabolic imbalance. Epidemiological research shows that childhood obesity is strongly correlated with the risk of type 2 diabetes at a young age (Mansyah, 2021). Urbanization, which facilitates a sedentary lifestyle, limited play space, and increased use of digital devices, also exacerbates this situation. In the long term, the combination of poor diet and lack of physical activity creates ideal conditions for insulin resistance. This trend indicates that the problem of malnutrition in urban areas has shifted from undernutrition to unhealthy excess energy intake.

Type 2 diabetes in children, which arises from a combination of these factors, shows a more rapid progression than in adults. Children diagnosed early are more likely to experience metabolic complications such as nephropathy, neuropathy, and cardiovascular disorders before reaching adulthood. This pathological process is exacerbated by low family awareness of the early symptoms of diabetes. The lack of routine screening in primary healthcare facilities means that many cases are detected at a stage that already requires intensive treatment. With complications arising more quickly, the quality of life of children with diabetes will significantly decline. This indicates that early intervention is crucial to breaking the chain of disease progression.

Physiologically, consuming junk food high in simple sugars and trans fats causes repeated spikes in blood glucose, triggering pancreatic beta cell fatigue. When the body's compensatory mechanisms weaken, insulin resistance develops, leading to type 2 diabetes. This diet also triggers chronic low-grade inflammation, which worsens insulin sensitivity. This mechanism is reinforced by a sedentary lifestyle, which reduces the efficiency of glucose metabolism in muscles. The dietary pattern–disease pathway model explains that a combination of dietary, genetic, and lifestyle factors forms a clear pathway to chronic metabolic disease. Thus, the relationship between dietary patterns and childhood diabetes is not merely correlational but also has a strong causal basis (Maharani & Sholih, 2024).

The urgency of research into this phenomenon lies in the need to generate scientific evidence that can inform public policy. Public health nutrition studies emphasize the importance of understanding risk factors, consumption behaviors, and barriers to adopting a healthy diet comprehensively (Amelia & Wihartati, 2025). Research findings can be used to design more targeted interventions, such as school-based nutrition education or parent awareness campaigns. These efforts must take into account the complex socioeconomic context of urban communities. Without a thorough understanding of the determinants of children's eating behavior, policies are at risk of being ineffective. Therefore, targeted research is a crucial component in preventing childhood diabetes in the future.

Ultimately, the "Fast Food Generation" phenomenon is not simply a matter of individual choice, but reflects a multidimensional public health challenge. Its complexity encompasses social, economic, and cultural aspects, including food industry regulations. Addressing this challenge requires cross-sector collaboration involving health, education, and public policy. Limiting the promotion of junk food to children, providing affordable, healthy food alternatives, and strengthening nutritional literacy are strategic steps that must be implemented simultaneously. Without comprehensive intervention, the younger generation will face a heavier burden of chronic disease in the future. The impact will not only impact individuals but also the sustainability of the national health system as a whole.

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## 2. Method

The research method used in this study is a qualitative approach with a literature review design that aims to analyze the relationship between junk food consumption due to non-compliance with the principles of balanced nutrition and the surge in cases of childhood diabetes in urban areas. This approach was chosen because it allows researchers to collect, critique, and synthesize findings from various relevant scientific sources, resulting in a comprehensive picture of the phenomenon being studied. The data collection process was carried out through searching scientific articles, research reports, and official publications from international and national health institutions using databases such as PubMed, Scopus, Google Scholar, and the Garuda Portal. Inclusion criteria included publications in the last five years (2019–2025), in Indonesian and English, and focusing on fast food consumption patterns, compliance with balanced nutrition, and the incidence of childhood diabetes in urban areas.

The data analysis stage was conducted using content analysis techniques, where each selected source was systematically analyzed to identify patterns, themes, and relationships between junk food consumption variables and the risk of childhood diabetes. To ensure the validity of the findings, a critical appraisal process was conducted on the methodological quality of each study using the Joanna Briggs Institute Critical Appraisal Checklist. This approach allows researchers to compare evidence across studies, identify research gaps, and formulate policy implications and appropriate interventions. With this method, it is hoped to obtain a holistic understanding of the determinants of junk food consumption behavior in urban areas and its relevance to the increasing trend of childhood diabetes, as suggested by Creswell & Poth (2018) that qualitative literature reviews are effective for building evidence-based conceptual frameworks in complex public health issues.

## 3. Results and Discussion

Social and Environmental Determinations of Junk Food Consumption in Urban Children

The social and environmental determinants of junk food consumption among urban children are a multidimensional phenomenon shaped by a complex interaction between structural, cultural, and family behavioral factors. Massive urbanization has triggered significant changes in the food landscape, with the availability of junk food increasing through fast-food chains, convenience stores, and app-based delivery services. This situation facilitates children's access to foods high in sugar, fat, and sodium, increasing the likelihood of daily consumption exceeding the recommended daily intake. The food industry's marketing strategies reinforce this phenomenon through advertisements specifically designed to attract children, often using colorful visuals, popular cartoon characters, or narratives of family happiness. This influence extends beyond public spaces to educational settings through sponsorship of school events or the provision of canteens with a predominantly junk food menu (Hateriah et al., 2024). Thus, the process of forming urban children's food preferences begins at an early age through a combination of widespread access and symbolic exposure that influences their perceptions of food.

Changes in the urban lifestyle have also contributed to the rise in junk food consumption among children. Families in large cities often face busy work schedules, high mobility, and time pressures, making cooking nutritious meals at home a challenge. In this situation, junk food is often chosen as a quick, practical, and easily accessible solution that requires no extensive preparation. The emergence of delivery platforms has made junk food increasingly integrated into family routines, even in situations that previously relied on home-cooked meals, such as breakfast or dinner. This phenomenon has indirectly shifted traditional values regarding the importance of consuming fresh, home-cooked food, replacing them with instant eating habits that better suit the fast-paced lifestyle of modern cities. Consequently, children have begun to associate junk food as a normal part of their daily diet, without considering its health implications (Triwahyuningsih et al., 2020).

From a socio-economic perspective, differences in income levels do not actually hinder junk food consumption; they only influence the type and frequency of consumption. Lower-middle-income families tend to choose affordable junk food products sold at local food stalls or convenience stores. Meanwhile, higher-income families often consume junk food as part of recreational activities, such as eating at fast food restaurants, which are seen as a form of family entertainment. In both groups,

price and perceived value are key factors driving consumption choices, with nutritional quality often being undervalued. Exposure to advertising targeting all levels of society narrows the gap in consumption behavior across socio-economic groups, resulting in children's dietary patterns tending to be more uniform in terms of their reliance on junk food (Upreti et al., 2021). This indicates that social determinants of food consumption in urban areas operate beyond economic class boundaries.

Mass media and digital media play a central role in constructing a positive image of junk food among urban children. Television shows, social media content, and streaming platforms often contain advertisements or hidden promotions that subtly shape the perception that junk food is a fun, practical, and relevant choice for modern lifestyles (Ertz & Le Bouhart, 2022). Children who spend hours in front of screens subconsciously absorb visual and audio messages that associate junk food with rewards, pleasure, or social status. Sophisticated digital marketing strategies allow these messages to be personalized based on user preferences, thus increasing their effectiveness. Furthermore, the presence of influencers or celebrities promoting junk food on social media adds social legitimacy to the consumption of these products in the eyes of children. This exposure not only forms a fleeting desire but also creates long-term habits that are difficult to change.

Family eating habits are a cultural factor that strengthens or weakens the environmental influence on junk food consumption. Children tend to imitate the eating behavior of their parents or siblings, so households that frequently serve junk food will develop similar preferences in their children. In some cases, parents use junk food as a means of persuasion or reward, which psychologically reinforces the child's positive association with the food (Imelda & Sartika, 2025). On the other hand, parents' lack of knowledge about balanced nutrition makes them unaware of the long-term negative impacts of such eating patterns. This factor is further exacerbated by time constraints that hinder the consistent implementation of healthy eating patterns at home. As a result, junk food consumption becomes an integral part of the family's eating culture, rather than just an occasional choice.

The long-term implications of these social and environmental determinants are the formation of children's eating patterns that significantly deviate from the principles of balanced nutrition (Mu'tafi et al., 2024). If this trend continues, health risks such as obesity, type 2 diabetes, and metabolic disorders will increase drastically in the future. Moreover, changes in food preferences from an early age will be difficult to reverse because they have been internalized as part of the child's identity and lifestyle. Intervention efforts need to take into account the complexity of these structural and cultural factors, so that nutrition education strategies focus not only on the individual, but also on the social environment and public policy. Organizing the food environment, regulating marketing to children, and improving family nutritional literacy are strategic steps that can break the cycle of junk food consumption. Thus, controlling junk food consumption among children in urban areas requires a systemic approach that can simultaneously change social and environmental determinants.

Biological and Epidemiological Mechanisms of the Relationship Between Junk Food Consumption and Type 2 Diabetes in Children

Junk food consumption patterns high in simple sugars, saturated fats, and excess calories disrupt glucose homeostasis by increasing the metabolic burden on the pancreas and peripheral tissues. Repeated postprandial glucose spikes cause the pancreas to produce large amounts of insulin, triggering chronic compensatory hyperinsulinemia. This condition is exacerbated by excess circulating free fatty acids, which cause lipotoxicity and inhibit insulin receptor phosphorylation in muscle and liver. This molecular mechanism involves inhibition of signal transduction pathways such as insulin receptor substrate (IRS) and phosphoinositide 3-kinase (PI3K), drastically reducing the cell's ability to take up glucose. As a result, insulin resistance becomes increasingly persistent, requiring extra work from pancreatic β-cells to maintain normoglycemia. This sustained metabolic stress is the starting point for progressive metabolic dysfunction in children who consume excessive amounts of junk food (Jebeile et al., 2022).

In addition to insulin resistance, a diet high in trans fats and excess calories triggers intramuscular and intrahepatic lipid accumulation, which impairs mitochondrial oxidation. This decreased mitochondrial efficiency leads to the formation of reactive oxygen species that damage cellular structures, including pancreatic β-cell membranes (Hasan & Yunus, 2023). This condition triggers oxidative stress, which, combined with endoplasmic reticulum stress resulting from high insulin secretion demands, accelerates beta-cell exhaustion. This loss of insulin secretory capacity

marks the transition from insulin resistance to chronic hyperglycemia. In children, this process can progress more rapidly than in adults because their metabolism is more reactive to excess energy surges. Therefore, this disrupted physiological pathway is a critical link between junk food consumption and type 2 diabetes (Tarantino et al., 2022).

Adipose tissue enlarged by obesity acts as an active endocrine organ, producing various proinflammatory cytokines, including TNF-α and IL-6 (Ihdina, 2023). These cytokines trigger low-grade chronic inflammation that disrupts the insulin signaling pathway through the activation of serine kinase enzymes such as JNK and IKKβ. Activation of this inflammatory pathway not only blocks the insulin response but also exacerbates β-cell damage through cytotoxic mechanisms. Furthermore, macrophage infiltration of adipose tissue increases the production of inflammatory mediators, creating a vicious cycle between obesity and insulin resistance. In children, this chronic inflammation often goes undetected clinically until symptoms of hyperglycemia appear. This explains why obesity prevention is a central strategy in breaking the chain of T2D development at an early age.

From an epidemiological perspective, global literature shows a significant upward trend in T2D cases in children over the past two decades, particularly in urban areas. Changing consumption patterns, shifting from nutritious home-cooked meals to processed, ready-to-eat foods, play a significant role in this surge. Prevalence data indicate that most children with T2D have a body mass index above the 95th percentile for their age and sex (Asmasary, 2022). Dense urban environments, limited green space, and high exposure to fast food advertising contribute to the increased risk. The interaction between poor diet and a sedentary lifestyle, such as prolonged screen time, amplifies the obesogenic effects in the pediatric population. Consequently, the childhood T2D epidemic is not only a health issue but also a complex socioeconomic one.

The link between obesity, sedentary lifestyles, and T2D becomes clearer when viewed from the perspective of family lifestyles and access to sports facilities. Children in urban areas often face physical and social barriers to activity, ranging from heavy traffic to a lack of safe sports facilities. This results in physical activity levels far below WHO recommendations, resulting in a persistent energy surplus. Meanwhile, consumption of sugary drinks, high-salt-fat snacks, and large portions of fast food further worsen children's metabolic profiles. Poor adherence to nutritional guidelines, such as low fiber and micronutrient intake, increases the risk of insulin resistance from a young age. Thus, the urban context structurally shapes risk patterns that lead to an increased incidence of T2D in children.

In addition to lifestyle and dietary factors, socioeconomic and cultural dimensions also influence the T2D epidemic in children (Susanti et al., 2024). Low-income families tend to consume more fast food due to its relatively affordable price and widespread availability. Furthermore, extensive exposure to advertising and marketing strategies targeting children shape taste preferences toward foods high in sugar and fat. Unequal access to health services and nutrition education delays early detection of risk factors. Epidemiologically, this explains the uneven distribution of cases, with vulnerable groups experiencing a higher prevalence. A comprehensive intervention approach needs to account for these social determinants to halt the increasing trend of T2D cases in the pediatric population.

Intervention Strategies and Policies for Childhood Diabetes Prevention in Urban Areas

Efforts to prevent childhood diabetes in urban areas require evidence-based and multidimensional intervention strategies, given that children's junk food consumption patterns are influenced by behavioral, environmental, and policy factors. Literature studies show that school-based nutrition education can be an effective entry point, provided it not only conveys theory but also involves participatory learning methods such as healthy shopping simulations, simple cooking practices, and critical assessment of food advertising. Integrating nutrition material into the core curriculum requires support from principals, teachers, and the education office to prevent it from being marginalized by other subjects. Changes to the school environment, such as restricting the sale of high-sugar foods in the cafeteria and providing free drinking water, play a complementary role in the educational process. Global research shows that the combination of education and environmental changes has a more consistent impact on reducing unhealthy food consumption than either intervention alone (Tuzzahra et al., 2024). Therefore, schools must be positioned as centers for behavior change that directly impact children and indirectly affect families.

The role of families in regulating children's eating patterns is as important as interventions at

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school, as most eating decisions are made at home. Parents can act as role models by providing healthy foods, limiting the frequency of fast food purchases, and instilling the habit of eating together as a family. Parenting-based intervention studies have shown that nutrition education coupled with practical strategies such as weekly menu planning and targeted shopping can reduce children's added sugar intake (Hayes et al., 2018). The availability of healthy foods at home can be increased through policy support, such as fruit and vegetable subsidy programs or healthy shopping vouchers for low-income families. Furthermore, risk communication campaigns that adapt language and media to the local cultural context can reinforce educational messages. Thus, the home becomes a reinforcing environment that ensures the impact of school interventions is not lost outside of school hours (Nasution, 2023).

Regulation of unhealthy food promotions to children is a crucial component in protecting against excessive commercial exposure. Television advertisements, digital media, and promotions near schools often influence children's food preferences, so strict restrictions are essential. Evidence from countries that have implemented bans on advertising high in sugar and fat foods shows a significant reduction in children's exposure to such advertising, which has implications for changing demand patterns. Simple, easy-to-read front-of-pack labeling can also help families make healthier decisions. Furthermore, fiscal instruments such as taxes on sugary drinks and price incentives for healthy products can encourage consumption shifts at the population level. These regulations require cross-sector coordination for consistent implementation and effective oversight.

Cross-sector collaboration is a prerequisite for successful interventions to prevent childhood diabetes in urban areas, given the systemic nature of the challenges. Local governments play a role in establishing local regulations, allocating budgets, and ensuring policy integration into regional development plans. Education offices can facilitate teacher training and ensure healthy canteen standards are implemented in all schools. Health workers serve as technical resources, providing everything from risk screening and nutrition counseling to providing accurate epidemiological data for policy planning. The food industry needs to be involved in product reformulation and marketing restrictions targeting children, but this involvement must be regulated through transparent mechanisms to prevent conflicts of interest. With structured collaboration, each sector can contribute according to its mandate and capacity.

The role of non-governmental actors, such as civil society organizations, academics, and community groups, is also crucial for expanding the reach of interventions and enhancing public accountability. Civil society organizations can assist with awareness campaigns, family mentoring, and pro-health policy advocacy. Academics play a role in conducting evaluative research to measure the effectiveness of interventions and provide evidence-based recommendations. Community groups can be the driving force behind local initiatives, such as shared healthy kitchen programs or school gardens. Community involvement not only increases program acceptance but also ensures sustainability as the program becomes part of the local culture. With the active participation of various stakeholders, interventions become more relevant and resilient to changes in policy or leadership.

The success of this prevention strategy is also determined by the existence of a continuous monitoring and evaluation system. Behavioral indicators, such as the frequency of junk food consumption and children's shopping choices, can be complemented by environmental indicators, such as the availability of healthy foods at school and at home. Long-term impact measurements, including body mass index (BMI) and metabolic parameters, provide a clear picture of the intervention's effectiveness. Data from these evaluations should be shared openly among stakeholders to encourage policy adaptation based on field evidence. An adaptive approach ensures programs remain relevant despite changes in food trends or children's consumption patterns in urban areas. With a strong data foundation, intervention strategies and policies can continuously evolve to become more effective, measurable, and sustainable.

## Conclusion

In conclusion, the social and environmental determinants of junk food consumption among urban children are the result of a complex interaction between food availability, marketing strategies, family lifestyle, and mutually reinforcing cultural factors. Urbanization drives easy access to junk food through

a network of outlets, minimarkets, and online services integrated into family routines. Extensive exposure to advertising on television, social media, and in schools creates a positive image of junk food from an early age, thus shaping children's eating preferences without considering health risks. Changes in the fast-paced pace of urban life encourage families to rely on fast food as a practical solution, replacing the tradition of consuming fresh food. Socioeconomic factors influence the type and frequency of consumption, but do not reduce the dependence on junk food across all levels of society. Family eating habits are key to shaping children's eating behavior, with parents often unknowingly reinforcing positive associations with junk food. Biologically, a diet high in sugar, fat, and sodium increases the risk of obesity, insulin resistance, and metabolic disease from a young age. Urban environments with limited physical space and frequent exposure to unhealthy foods accelerate these problems. Prevention requires a multidimensional approach involving marketing regulations, food environment management, school-based nutrition education, and strengthening the role of families. Cross-sector collaboration is crucial to ensure consistent and sustainable interventions. Data-driven evaluation is needed to adapt strategies to the dynamics of urban child consumption. Therefore, significant change can only be achieved if social and environmental determinants are simultaneously addressed through integrated public policies

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