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LITERATUR REVIEW: Sugar Intake and Obesity Risk Implications for Health

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ABSTRACT

Excessive sugar consumption is an important factor contributing to the increased risk of obesity across various age groups. High sugar intake, particularly from sugar-sweetened beverages and ultra-processed foods, is associated with increased energy intake, impaired appetite regulation, and fat accumulation. These conditions adversely affect health by increasing the risk of metabolic disorders and reducing overall quality of life. This article aims to review the relationship between sugar intake and obesity risk and its implications for health using a thematic narrative review approach. A literature search was conducted in the PubMed, Google Scholar, and ScienceDirect databases, including articles published in Indonesian and English between 2015 and 2025. The selected literature was analyzed narratively and categorized into themes covering sugar consumption patterns, the relationship between sugar intake and obesity, and behavioral and environmental factors influencing obesity risk. The

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review findings indicate a consistent association between excessive sugar intake and increased obesity risk among children, adolescents, and adults. Obesity risk is influenced by complex interactions between sugar consumption patterns, eating behaviors, and environmental factors. This review highlights the importance of controlling sugar intake and promoting nutrition education as preventive strategies to maintain health and reduce obesity risk.
Keyword : *sugar intake, obesity, health*

ABSTRAK

Konsumsi gula berlebih merupakan faktor penting yang berkontribusi terhadap peningkatan risiko obesitas pada berbagai kelompok usia. Asupan gula tinggi, terutama dari minuman berpemanis dan makanan ultra-proses, berkaitan dengan peningkatan asupan energi, gangguan regulasi nafsu makan, dan penumpukan lemak tubuh. Kondisi ini berdampak negatif terhadap kesehatan dengan meningkatkan risiko gangguan metabolik dan penurunan kualitas hidup.

Artikel ini bertujuan untuk meninjau hubungan antara asupan gula dan risiko obesitas serta implikasinya terhadap kesehatan melalui pendekatan thematic narrative review. Penelusuran literatur dilakukan pada basis data PubMed, Google Scholar, dan ScienceDirect terhadap artikel berbahasa Indonesia dan Inggris yang diterbitkan pada periode 2015–2025. Literatur yang terpilih dianalisis secara naratif dan dikelompokkan ke dalam tema pola konsumsi gula, hubungan asupan gula dengan obesitas, serta faktor perilaku dan lingkungan yang memengaruhi risiko obesitas.

Hasil tinjauan menunjukkan hubungan yang konsisten antara asupan gula berlebih dan peningkatan risiko obesitas pada anak, remaja, dan dewasa. Risiko obesitas

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dipengaruhi oleh interaksi kompleks antara pola konsumsi gula, perilaku makan, dan lingkungan. Tinjauan ini menegaskan pentingnya pengendalian asupan gula dan edukasi gizi sebagai upaya preventif untuk menjaga kesehatan dan menurunkan risiko obesitas.

Kata kunci : asupan gula, obesitas, kesehatan

1. INTRODUCTION

Obesity is one of the major global health problems, with a continuously increasing prevalence across all age groups. The World Health Organization reports that rising obesity rates contribute substantially to the burden of non-communicable diseases and place significant pressure on health systems worldwide (World Health Organization, 2021). Findings from the Global Burden of Disease (GBD) study indicate that overweight and obesity have been associated with increased morbidity and mortality in 195 countries over the past 25 years, highlighting obesity as a global health challenge (Afshin eta., 2017). More recent GBD projections suggest that the prevalence of overweight and obesity among adults will continue to increase until 2050 in the absence of effective interventions (GBD 2021 Adult BMI Collaborators, 2025).

Increased body mass index (BMI) is strongly associated with a higher risk of obesity-related health conditions. Large-scale cohort analyses demonstrate that higher BMI is linked to an increased risk of metabolic and chronic diseases, making obesity an important determinant of overall health status (Haase et al., 2020). In addition, obesity disrupts energy metabolism and contributes to long-term disease risk, including cancer, thereby broadening its implications for health across the lifespan (Camajani et al., 2026).

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One of the key factors contributing to the rising prevalence of obesity is changes in dietary patterns, particularly increased sugar intake. Excess consumption of added sugars, especially from sugar-sweetened beverages, plays a significant role in increasing daily energy intake and subsequent weight gain. Systematic reviews have shown that sugar-sweetened beverage consumption is associated with weight gain and increased obesity risk (Malik et al., 2006), while meta-analyses further confirm that higher sugar intake correlates with weight gain, whereas reducing sugar consumption contributes to weight loss (Te Morenga et al., 2012).

The impact of sugar consumption on obesity is particularly concerning among children and adolescents. Early-life consumption of sugar-sweetened beverages is associated with a higher risk of obesity and the development of unhealthy dietary patterns that may persist into adulthood (Bleich & Vercammen, 2018). In the national context, diets high in sugar and energy have also been identified as contributing factors to the increasing prevalence of obesity in Indonesia (Sudargo et al., 2018). Furthermore, limited knowledge of balanced nutrition may influence food choices and consumption behaviors, ultimately affecting nutritional status and health risks (Hermawati et al., 2025; Zulfaet al.,2025).

From a health perspective, obesity results from complex interactions between dietary intake, behavioral factors, and the surrounding environment. Obesity prevention cannot rely solely on individual behavior change but requires broader strategies, including nutrition education and supportive interventions that promote healthier dietary choices. Community-based nutrition screening and education programs have demonstrated potential in preventing nutritional and metabolic disorders, including obesity (Darifah et

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al., 2025; Adhayati et al., 2025, Rahmaisyah et al., 2025). Therefore, a literature review examining the relationship between sugar intake and obesity risk is essential to support the development of effective and sustainable strategies to reduce obesity risk and improve health outcomes.

2. METHOD

This article employs a thematic narrative review approach to examine the relationship between sugar intake and obesity risk and its implications for health. A literature search was conducted using the PubMed, Google Scholar, and ScienceDirect databases with keywords related to sugar consumption, obesity, and health. The reviewed articles included publications in Indonesian and English published between 2015 and 2025.

Literature meeting the inclusion criteria, original research articles or reviews discussing the relationship between sugar intake and obesity and its health implications was analyzed narratively. Findings from the selected studies were synthesized and organized into key themes, including patterns of sugar consumption, obesity as a health concern, and implications for prevention and health-oriented interventions.

3. RESULT

The results of this thematic narrative review are summarized across key themes that describe current evidence on obesity trends, patterns of sugar consumption, and their association with obesity risk and health outcomes. The findings also highlight the influence of socioeconomic and environmental factors, as well as health-oriented prevention strategies, in shaping sugar intake and obesity risk.

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Table 1. Summary of Key Themes on Sugar Intake, Obesity Risk, and Health Implications

No.	Main Theme	Summary of Findings	Supporting Sources
1	Obesity trends as a major health concern	The literature identifies obesity as a global health priority, with consistently increasing prevalence and projections of continued growth in the coming decades, leading to substantial impacts on disease burden and health systems.	Ng et al. (2024); OECD (2025); Hammami & Alsnag (2026); Chooi et al. (2019); Hruby & Hu (2015); Blüher (2019)
2	Sugar consumption patterns and ultra-processed foods	High sugar intake is primarily derived from sugar-sweetened beverages and ultra-processed foods, which increasingly dominate modern dietary patterns and contribute to higher daily energy intake.	Popkin & Hawkes (2016); Monteiro et al. (2019); Elizabeth et al. (2020); Pagliai et al. (2021); Rich (2018); Maretha et al. (2020)
3	Relationship between sugar intake, obesity, and metabolic risk	Sugar consumption and sugar-sweetened beverages are associated with weight gain, obesity, and increased metabolic risk, which are closely interrelated within the context of non-communicable diseases.	Imamura et al. (2015); Rahmaisyah et al. (2025); Blüher (2019); Chooi et al. (2019); Hruby & Hu (2015); Zulfa et al. (2025)
4	Socioeconomic factors and the food environment	Food cost, affordability of healthy diets, and the surrounding food environment play significant roles in shaping sugar consumption patterns and obesity risk, particularly among lower socioeconomic groups.	Darmon & Drewnowski (2015); Kabisch et al. (2021); Dean et al. (2025); OECD (2025); Popkin & Hawkes (2016); Maretha et al. (2020)
5	Health-oriented prevention implications	Nutrition education, family empowerment, food policies, and community-based programs are reported to have the potential to reduce sugar consumption and prevent obesity in a sustainable manner.	Mozaffarian et al. (2018); Taillie et al. (2020); Bertalina & Mulyani (2020); Salsabila (2023); Wulansari et al. (2025); Trisnasari et al. (2025)

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4. DISCUSSION

Obesity Trends as a Major Health Challenge

Obesity has emerged as a major health priority across countries, characterized by a consistent and widespread increase in prevalence across nearly all age groups. Recent Global Burden of Disease studies indicate that the prevalence of overweight and obesity among adults has continued to rise since 1990 and is projected to increase further until 2050 in the absence of comprehensive and sustained interventions (Ng et al., 2024). These findings underscore that obesity is no longer merely an individual issue but a population-level health challenge with long-term implications for health systems.

Beyond its global scale, international reports highlight the substantial economic burden associated with obesity-related conditions. The OECD (2025) emphasizes increasing healthcare expenditures linked to obesity-related diseases, including cardiovascular disorders and metabolic conditions. This burden is particularly pronounced in low- and middle-income countries, where rapid nutrition transitions occur without adequate preventive infrastructures (Hammami & Alsnag, 2026).

From an epidemiological perspective, obesity is understood as the result of complex interactions among biological, behavioral, and environmental factors. The literature consistently demonstrates that rising obesity prevalence is closely linked to global dietary shifts and the expansion of obesogenic environments that promote excessive energy intake (Chooi et al., 2019; Hruby & Hu, 2015; Blüher, 2019). Consequently, obesity should be positioned as a

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structural health problem requiring population-oriented approaches rather than solely individual-based solutions.

Sugar Consumption Patterns and Ultra-Processed Foods

The synthesis of the literature reveals that increasing sugar intake is strongly associated with the growing dominance of ultra-processed foods in modern diets. These products are typically high in added sugars, fats, and energy density while being low in nutritional value, thereby contributing substantially to excessive daily energy intake (Monteiro et al., 2019; Elizabeth et al., 2020). Such dietary patterns have become increasingly prevalent alongside urbanization and lifestyle changes.

Sugar-sweetened beverages represent a major source of added sugars in contemporary diets. Popkin and Hawkes (2016) describe the "sweetening of the global diet" as largely driven by increased consumption of sugar-sweetened beverages, which are widely available and aggressively marketed. Importantly, intake of these beverages is often not compensated for by reduced energy intake from other food sources, leading to a net increase in total energy consumption.

In addition to food availability, behavioral and technological factors further influence sugar consumption patterns. Studies among university students indicate that the use of food delivery applications is associated with higher eating frequency and poorer dietary quality (Maretha et al., 2020). These findings reinforce evidence that digital food environments and convenience-oriented services accelerate the consumption of sugar- and energy-dense foods (Pagliai et al., 2021; Rich, 2018).

Relationship Between Sugar Intake, Obesity, and Metabolic Risk

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The reviewed literature consistently demonstrates a strong association between excessive sugar intake and increased obesity risk. Sugar consumption, particularly in liquid forms such as sugar-sweetened beverages, contributes to weight gain by increasing total energy intake (Imamura et al., 2015). This relationship has been observed across diverse populations and study designs, strengthening the evidence base.

Obesity driven by high sugar consumption is also closely linked to an elevated risk of metabolic disorders. Review studies indicate that obesity frequently coexists with dyslipidemia, hypertension, and other metabolic abnormalities, collectively worsening health outcomes (Rahmaisyah et al., 2025; Zulfa et al., 2025). These findings highlight that the impact of sugar consumption extends beyond weight gain and is embedded within the broader spectrum of non-communicable diseases.

From an epidemiological standpoint, obesity serves as a critical mediator between dietary patterns and long-term health risks. The literature emphasizes that weight gain resulting from excessive sugar intake increases the risk of chronic diseases, reinforcing the importance of targeting sugar consumption as a key strategy for preventing obesity and its metabolic consequences (Chooi et al., 2019; Hruby & Hu, 2015; Blüher, 2019).

Socioeconomic Factors and the Food Environment

The review findings indicate that sugar consumption patterns and obesity risk are strongly shaped by socioeconomic factors. Food affordability plays a crucial role, as energy-dense and sugar-rich foods are often cheaper and more accessible than healthier dietary options (Darmon & Drewnowski, 2015).

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This disparity contributes to diet-related inequalities that disproportionately affect lower socioeconomic groups.

Research on diet costs further demonstrates that healthier eating patterns generally require higher financial investment, limiting access for economically vulnerable populations (Kabisch et al., 2021; Dean et al., 2025). As a result, sugar-rich foods become a more feasible choice, reinforcing the link between socioeconomic disadvantage, unhealthy dietary patterns, and obesity risk.

The modern food environment also plays a significant role in shaping consumption behaviors. Aggressive marketing strategies, ease of access, and the digitalization of food services increase exposure to sugar-rich foods (Popkin & Hawkes, 2016; Maretha et al., 2020). These findings support the view that obesity should be understood within a broader social and environmental context rather than attributed solely to individual choice.

Health-Oriented Prevention Implications

The literature emphasizes that obesity prevention requires comprehensive, health-oriented strategies. Public food policies, such as regulations on food environments and taxation of unhealthy products, have been reported to reduce sugar consumption and excessive energy intake (Mozaffarian et al., 2018; Taillie et al., 2020). Such approaches are considered more effective than interventions focused solely on individual behavior change.

At the community and family levels, empowerment emerges as a critical strategy for obesity control. Studies demonstrate that family involvement and nutrition education contribute to healthier eating behaviors and improved

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weight management (Bertalina & Mulyani, 2020). Community-based programs also play an important role in increasing awareness and encouraging participation in obesity prevention efforts.

Nevertheless, the sustainability of health programs remains a significant challenge. Evaluations of national obesity control initiatives indicate that long-term success depends on cross-sectoral collaboration, policy consistency, and adaptability to social change (Salsabila, 2023). These findings are reinforced by community engagement studies highlighting the importance of promotive and preventive approaches in sustainably reducing obesity risk (Wulansari et al., 2025; Trisnasari et al., 2025).

5. CONCLUSION

This review demonstrates that high sugar intake plays a significant role in increasing obesity risk as a complex and multidimensional health challenge. Increased sugar consumption, particularly through sugar-sweetened beverages and ultra-processed foods, contributes to excessive energy intake and is influenced by socioeconomic factors and unhealthy food environments. The resulting obesity has broad implications for metabolic health and places a substantial burden on health systems, underscoring the need for population-oriented prevention approaches. Therefore, controlling sugar intake through nutrition education, family and community empowerment, and strengthened food policies that support healthy eating environments represents a key strategy for reducing obesity prevalence and improving health outcomes in a sustainable manner.

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