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Global childhood obesity prevention policies: A systematic review and implications for Indonesia

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ABSTRACT

Background: Childhood obesity is a global health problem with rising prevalence that affects children's physical and psychological development. Although many countries have implemented prevention strategies, effectiveness varies across contexts. This study reviews global childhood obesity prevention policies and provides implications for Indonesia.

Methods: A systematic review was conducted on articles published between 2015 and 2025 using PubMed, Google Scholar, and DOAJ databases. Eligible studies included policy briefs, meta-analyses, and government reports addressing childhood obesity prevention. Fourteen studies met the inclusion criteria and were analyzed using a PRISMA-guided process.

Results: A total of 14 studies fulfilled the inclusion criteria and were analyzed in this systematic review. These studies encompassed various intervention approaches, including regulatory, educational, and health system–based policies implemented in different countries. The analysis revealed that the most effective strategies for preventing childhood obesity were regulating unhealthy food marketing, implementing taxes on sugar-sweetened beverages, integrating nutrition education into school curricula, conducting mandatory obesity screenings by health professionals, and promoting nationwide physical activity programs for children. The evidence suggests that regulatory interventions tend to produce faster and more measurable outcomes, whereas education-based approaches foster sustained behavioral change when supported by consistent policy implementation and community participation. **Conclusion:** Indonesia should adopt evidence-based policies proven effective globally while adjusting for local cultural and social contexts. Recommended actions include implementing a sugar-sweetened beverage tax, enforcing strict marketing restrictions, strengthening nutrition literacy in schools, conducting routine childhood obesity screening, and promoting daily physical activity programs in schools to address the rising prevalence of childhood obesity.

Keywords: Obesity; Policy; Prevention; Children.

INTRODUCTION

Childhood obesity is a global health problem that has increased in recent decades. According to a report by the World Health Organization (WHO), the number of overweight and obese children has nearly tripled since 1975. In 2022, WHO estimates that more than 39 million children under the age of 5 years are overweight or obese worldwide, while more than 340 million children and adolescents (aged 5–19 years) experience the same condition(1).Many countries are facing an increasing prevalence of childhood obesity, with variations across geographic regions and income levels. According to the Centers for Disease Control and Prevention (CDC, 2021), around 19.7% of children aged 2–19 years in the United States are obese, with the highest prevalence found in the 12–19 age group (22.2)(2). Data from the European Childhood Obesity Surveillance Initiative (COSI) shows that 1 in 3 children in Europe are overweight or obese,(3).Similarly, the Journal of Global Health reported that the

prevalence of overweight andy obesity among Chinese school-aged children and adolescents has increased significantly, reaching nearly 20% of this population group(4). Meanwhile, a UNICEF regional report stated that in Southeast Asia, the prevalence of childhood obesity has risen fivefold over the past two decades in countries such as Thailand, Malaysia, and Indonesia (5).

In Indonesia, In Indonesia, childhood obesity has become a major concern in recent years. Data from the 2018 Basic Health Research (Riskesdas) show that the prevalence of obesity in children aged 5–12 years reached 9.2%, an increase from 8.8% in 2013(6).In addition, 18.8% of children aged 5–12 years are overweight. The 2021 Indonesian Nutrition Status Survey (SSGI) shows that 11.8% of elementary school-aged children are obese(7).The prevalence of obesity in urban areas is higher than in rural areas, due to the more common fast food consumption patterns and sedentary lifestyles. Economic and social factors also influence the eating patterns and physical activity of children in Indonesia (8).

Childhood obesity causes not only physical health problems, but also serious social and psychological impacts. Obesity increases the risk of type 2 diabetes, hypertension, cardiovascular disease, and other metabolic disorders. Psychologically, children with obesity are more vulnerable to social stigma, bullying, and low self-esteem, which may have long-term effects on mental health(9). Furthermore, obesity increases the economic burden on families and national health systems. A study estimated that annual healthcare costs related to childhood obesity in the United States reached approximately 14 billion USD (10) .

Based on this background, the growing prevalence of childhood obesity globally and in Indonesia highlights the need for more effective prevention policies. Many countries have implemented evidence-based measures designed to reduce future health risks across generations.

These include restricting the advertising of high-sugar and high-fat foods, imposing taxes on sugar-sweetened beverages to lower excessive sugar consumption, integrating nutrition education into school curricula to promote healthy eating habits, and improving access to physical activity by providing better playgrounds and sports facilities for children.

However, in Indonesia, such policies remain limited and should be strengthened through a more comprehensive and coordinated approach. Therefore, this study aims to evaluate childhood obesity prevention policies that have been implemented in various countries and identify strategies that are most relevant for adaptation and implementation in Indonesia.

METHOD

This study is a systematic review that analyzes various childhood obesity prevention policies based on policy briefs and empirical studies that have been published in the last 10 years .

1. Data Selection Criteria (Eligibility Criteria)
   a) Study Types: Policy studies, meta-analyses, and government policy reports related to childhood obesity prevention.
   b) Publication Period: 2015–2025.
   c) Sources: Academic databases such as PubMed, Google Scholar, and DOAJ.
   d) Language: Articles in English.
   e) Exclusion Criteria: Studies that do not discuss policy (policy brief), clinical-based studies without a policy focus, or reports that are not based on empirical data and are not open access.
2. Literature Search Strategy (Information Sources & Search Strategy)
   a) Database: Google Scholar, PubMed, DOAJ, and official sources from the Ministry of Health.
   b) Keywords: Obesity AND “policy brief” AND prevention AND child OR children.
   c) Search Strategy: A combination of Boolean search (AND, OR,

NOT) is used to narrow down relevant search results.

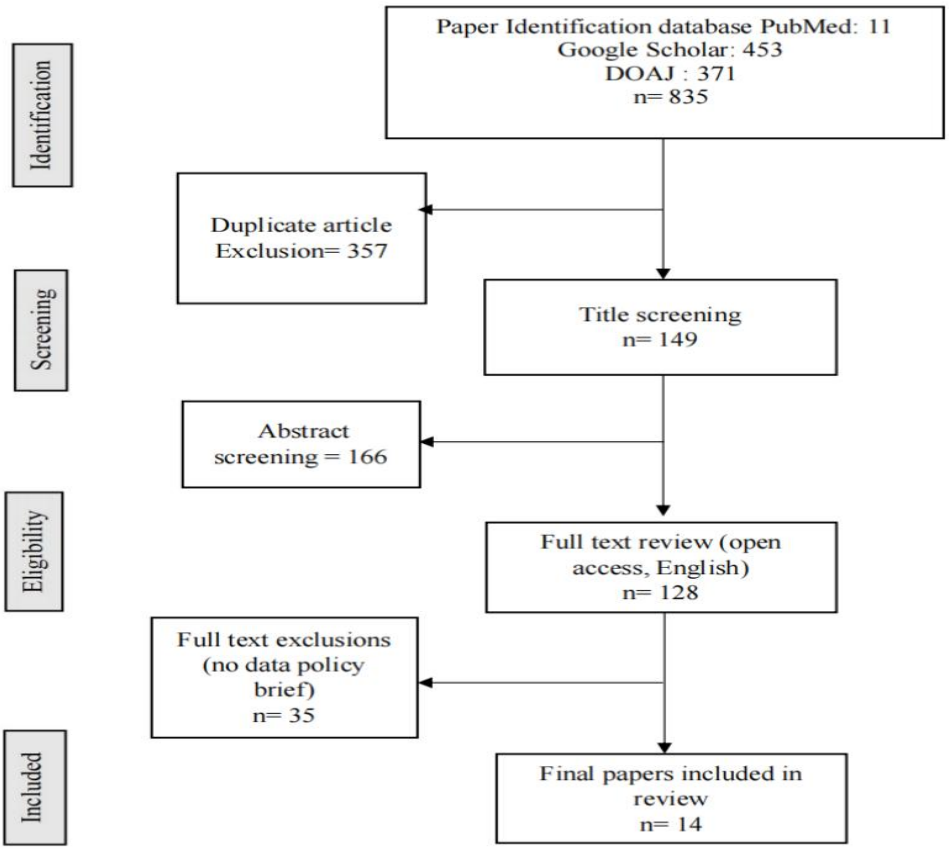

Figure 1. PRISMA Flow

Study Selection Process (Study Selection & PRISMA Flowchart). Identification of articles collected from the database using relevant keywords. Furthermore, Screening is carried out, to remove duplicate articles. and title and abstract checks are checked for suitability with the topic. To assess Eligibility, Articles that meet the criteria are evaluated in full, articles that are not written in English and are not available in full text (open access) are not included in the analysis. After carrying out these selection stages, the selected articles are analyzed and summarized in table form.

3. Data Extraction and Analysis (Analytical Method)

Data from the selected studies were extracted and analyzed using a narrative synthesis approach guided by thematic coding. Each article was carefully reviewed to identify the main polivy focus, imlementation strategy, and reported outcomes related to childhood obesity prevention.

Key finding such as policy objectives, intervention types, effectiveness, and contextual factors were coded and categorized into major themes :

Regulatory measures (e.g., taxation and marketing restrictions)

a) Educational or school-based programs,
b) Health system interventions (e.g., obesity screening and counseling), and

c) Community or environmental initiatives (e.g., promotion of physical activity).

This thematic coding process enabled comparison across different countries and policy models. The findings were then synthesized narratively to highlight which strategies demonstrated the strongest evidence of effectiveness and feasibility for adaptation in the Indonesian context.

RESULTS

Based on the PRISMA table, a search was conducted from journal databases with relevant keywords, limited to publications in the last 10 years for English-language articles and research on policies to prevent childhood obesity. There were 14 articles that met the inclusion criteria. The following are the articles presented in the Literature Review table.

Table 1. Thematic Summary of Global Childhood Obesity Prevention Policies

Theme	Researchers (Year)	Country / Study	Policy Focus / Strategy	Key Findings
Regulation	Li et al. (2024); Dong et al. (2024); Bellew et al. (2019); Hawkes et al. (2015); World Heart Federation (2020)	China, Australia, Global	Sugar-sweetened beverage tax, restrictions on unhealthy food marketing, and front-of-pack labeling (FOPL).	Regulatory measures were proven effective in reducing the consumption of sugary and fatty foods, showing rapid short-term impacts.
Education	Bellew et al. (2019); Messing et al. (2023); Dodson et al. (2024)	USA, Europe, Germany	School-based nutrition education, literacy programs, and curriculum integration.	Education-based programs improved children's awareness and healthy eating behaviors, with sustained long-term outcomes when supported by parental involvement.
Community Intervention	Hernandez et al. (2022); Small & Aplasca (2016); Lister et al. (2023)	USA, Europe	Physical activity promotion, family-based programs, and community mental health support.	Community programs enhanced physical activity and diet quality, reducing psychosocial impacts of obesity in children.
Health Professionals	Daniels & Hassink (2015); Tseng (2017); Li et al. (2024)	USA, China	Childhood obesity screening, nutrition counseling, and collaboration between schools and health centers.	Pediatricians play a key role in early detection and family education. Regular screening in primary care ensures timely intervention.

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In summary, regulatory policies demonstrated the strongest immediate effects, while educatational and community-based interventions fostered sustainable behavioral changes. The involvement of healthcare professionals ensured early detection and reinforced the link between policy and practice, which is crucial for long-term obesity prevention efforts.

DISCUSSION

Based on the Literature Review table, the following thematic analysis was carried out :

Comparison of Childhood Obesity Prevalence and Prevention Policy Effectiveness

Childhood obesity has become a pressing global health problem with a marked increase in prevalence over recent decades. Studies consistently show high prevalence rates in developed and emerging economies such as the United States (19.7%), China (20.0%), Mexico (17.5%), and the United Kingdom (14.1%), while the European region averages 12.5%(3). In Indonesia, Riskesdas 2018 reported that obesity prevalence among children aged 5–12 years reached 9.2%, an increase from previous years, and more recent SSGI data confirm that the upward trend continues,(8). However, comparability across countries remains limited due to differences in surveillance methods, population characteristics, and reporting standards. These variations must be considered when interpreting prevalence data and developing region-specific prevention strategies.

Comparison of Childhood Obesity Prevention Policies in Various Countries

Different countries have adopted diverse strategies to curb the epidemic, with varying levels of effectiveness. In Beijing, modeling studies revealed that restrictions on unhealthy food marketing combined with nutrition counseling in primary health care offered the highest return on investment, reducing long-term disease burden and economic costs,(11). Nevertheless, this evidence is based on model simulations that assume ideal compliance and enforcement, which may differ from real-world implementation, especially in lower-resource settings

In the United States, emphasis has been placed on both regulatory and behavioral approaches. Policies include taxation on sweetened beverages, restrictions on the marketing of unhealthy foods, and school-based nutrition education. A nationwide evaluation indicated that sweetened beverage taxes reduced consumption by approximately 12% within the first two years,(2). Similarly, Mexico's introduction of an SSB tax and food advertising restrictions resulted in a 9.7% decline in consumption in the first year,(13).Despite these successes, their long-term sustainability depends on political stability and industry cooperation, both of which can vary significantly across countries. In the United Kingdom, the "Daily Mile" initiative was launched to encourage children to walk or run one mile each school day, leading to a 30% increase in physical activity among participating students,(3). China has also integrated school-based obesity examinations and health worker screenings, alongside public awareness campaigns, to strengthen prevention,(14).

Critical Evaluation and Contextual Reflection :

Although the reviewed studies report promising outcomes, several limitations should be noted. Most were conducted in high- and middle-income countries with robust infrastructure and enforcement systems, which limits direct generalization to Indonesia. Potential publication bias may also exist, as studies with favorable outcomes are more likely to be published. Moreover, few studies evaluate the long-term sustainability of interventions beyond two to five years.

In Indonesia, implementing similar policies faces political and socio-economic barriers. The proposed sugar-sweetened beverage tax has yet to be enacted due to strong lobbying by the beverage industry,

while food advertising to children remains largely unregulated. Economically, high-calorie foods are more affordable for low-income families, and culturally, many parents still perceive overweight children as healthy. These contextual challenges must be addressed to ensure policy feasibility and long-term success.

Globally, front-of-pack nutrition labeling (FOPL) has been promoted as an effective tool to guide consumer behavior. Warning-based labels, in particular, have been shown to help reduce unhealthy food consumption,(15)However, the effectiveness of FOPL systems is influenced by consumer literacy and socio-economic status, which may limit its impact in low- and middle-income countries like Indonesia where public understanding of nutrition labels remains low. Evidence from Australia further confirms that comprehensive interventions—such as SSB taxation, marketing restrictions, and mandatory school nutrition education—are among the most effective national strategies,(16).

Promoting Physical Activity and School-Based Program

The role of physical activity is repeatedly emphasized. In Germany, only 15% of adolescents were found to meet WHO physical activity recommendations, underscoring the need for policies that integrate schools, families, and communities(17).However, the generalizability of these findings may be limited since most data come from countries with established school infrastructure and trained physical education teachers, conditions that are not yet fully met in Indonesia. In the US, randomized controlled trials showed that dissemination of policy briefs with locally relevant data increased policymakers' support for obesity prevention measures,(18). Meanwhile, studies targeting low-income households demonstrated that family-, school-, and workplace-based policies could effectively improve both diet quality and physical activity among children (19).

Psychosocial and Mental Health Dimensions

Beyond physical health outcomes, childhood obesity also has profound psychosocial consequences. Research indicates that obese children are more vulnerable to bullying, stigma, and low self-esteem, leading to long-term mental health risks. Accordingly, prevention strategies should include mental health promotion within schools and communities, (20).

Nevertheless, few studies have quantitatively assessed the psychological impact of obesity prevention programs, indicating a research gap in evaluating emotional well-being as part of policy outcomes. Global reviews and meta-analyses reinforce the necessity of systemic approaches, combining dietary improvement, physical activity promotion, and reduction of exposure to unhealthy food marketing (21).

Role of Pediatricians and Screening

Healthcare providers, particularly pediatricians, play a central role in primary prevention. They not only deliver nutrition counseling to families but also support school health initiatives and promote healthy lifestyle practices from early childhood,(9). Screening for obesity in primary care has been recommended as a systematic and effective intervention, ensuring timely detection and action,(22). In China, institutionalized school-based screenings have shown promising outcomes in early identification and intervention,(23). Indonesia is currently still focusing on nutrition education campaigns and promoting healthy eating patterns, but does not yet have strict regulations regarding taxes on sweetened beverages and marketing of unhealthy foods. With the increasing trend of childhood obesity, a more comprehensive policy is needed (8). Studies from various countries show that regulation-based policies are more effective in the short term, while education-based policies have a greater impact in the long term.

The Most Relevant Policies for Indonesia

Based on the results of the literature review, Indonesia can adapt several policies that have proven successful in other countries, by considering local conditions Indonesia's current policies remain limited, focusing largely on nutrition education campaigns and promoting healthy eating habits without strong regulatory frameworks for sweetened beverage taxation or advertising restrictions,(8). Based on international evidence, Indonesia could benefit from adopting several proven strategies :

1. Sweetened Beverage Taxation – Effective in Mexico and the US,(13).
2. Unhealthy Food Marketing Regulation – Demonstrated effectiveness in the EU and Mexico,(3).
3. Nutrition Education in Schools – Successfully implemented in the US and Europe,(9).
4. Mandatory Obesity Screening – Successfully institutionalized in China,(23).
5. Develop a National Physical Activity Program in Schools. Programs such as the "Daily Mile" in the UK have been successful in increasing children's physical activity,(17). Indonesia could develop a similar program, such as 30 minutes of mandatory exercise per day in primary schools.

Global strategies for childhood obesity prevention include taxation on sweetened beverages, advertising restrictions, nutrition education, health screenings, and school-based physical activity programs.

Policy effectiveness varies, with regulation-based approaches being more effective in the short term, while education-based and health interventions provide long-term sustainability.

For Indonesia, the most relevant policies are taxation on sweetened beverages, regulation of unhealthy food marketing, integration of nutrition education into school curricula, mandatory obesity screening by health workers, and national promotion of physical activity in schools.

Based on the findings of *the literature review* , the effectiveness of policies varies across countries depending on the level of compliance, oversight, and other policy support. Here is a summary of their effectiveness (Tabel 2)

Table 2. Summary of their effectiveness

Policy	Country	Effectiveness	Implementation Constraints
Sweetened Beverage Tax,(24)	Mexico, USA, UK,(25).	Consumption drops by 12–15% within 2 years of implementation,(26).	Resistance from beverage industry, lack of compliance in some areas
Unhealthy Food Marketing Regulation,(27).	Mexico, European Union	Reducing children's exposure to unhealthy food advertising	Companies use alternative marketing methods such as social media
Nutrition Education in Schools,(28).	US, Europe	Increasing children's awareness of healthy eating patterns,(29).	Effectiveness depends on the quality of the curriculum and parental participation.
Obesity Examination and Screening,(30)	USA, Australia	Early detection increases, intervention is faster	Not all families follow the doctor's recommendations
Physical Activity Program (Daily Mile),(31).	English	Children become more physically active, obesity rates decrease	Not all schools have adequate facilities

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Regulation-based policies (taxes and marketing) are more effective on a national scale, while education-based policies and health interventions require the active involvement of families and schools to be more successful.

Every policy has challenges and requires an adaptation process. Obesity prevention efforts can start from examination and Obesity Screening by Health Workers. Currently, childhood obesity screening in Indonesia has not been carried out systematically. Regulations are needed so that pediatricians in health centers and hospitals are required to conduct routine examinations and provide recommendations for children at risk of obesity.

The National Campaign to Increase Physical Activity such as the UK's "Daily Mile" program can be adapted in Indonesia in the form of a daily sports program in elementary schools. Although such programs face significant challenges, particularly due to inadequate sports facilities and limited trained personnel in many Indonesian schools, they represent a promising foundation for promoting healthy lifestyles when combined with family and community-based interventions.

CONCLUSIONS

1. Global strategies for childhood obesity prevention include taxation on sweetened beverages, advertising restrictions, nutrition education, health screenings, and school-based physical activity programs.
2. Policy effectiveness varies, with regulation-based approaches being more effective in the short term, while education-based and health interventions provide long-term sustainability.
3. For Indonesia, the most relevant policies are taxation on sweetened beverages, regulation of unhealthy food marketing, integration of nutrition education into school curricula, mandatory obesity screening by health workers, and national promotion of physical activity in schools.

RECOMMENDATIONS

1. Implement taxation on sweetened beverages immediately to reduce excess sugar consumption.
2. Establish strict regulations to limit advertising of unhealthy foods targeted at children.
3. Integrate nutrition education as a mandatory subject within the school curriculum to foster healthy eating habits from an early age.
4. Institutionalize mandatory childhood obesity screening in health centers and schools for early detection and intervention.
5. Develop a national physical activity program for children, such as daily mandatory exercise in primary schools.

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