



Tricks to reduce the incidence of obesity in children in Indonesia

Trik atasi kejadian obesitas pada anak di Indonesia

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Abstract

The annual incidence of childhood obesity in Indonesia is increasing. This increase was due to the low promotion of children's physical activity and nutritional education campaigns. This research aimed to collect evidence on how to design appropriate strategies to overcome the problem of obese children in Indonesia. The research used A literature review was conducted by searching the PubMed Central, BMC, BMJ, Science Direct, and PLOS One databases published between 2019 and June 2023 by analyzing data regarding program tricks to reduce obesity incidents in children using searches based on population (P), exposure (E), and results (O) as inclusion criteria. Only ten articles met the inclusion criteria. All articles discussed the importance of a healthy diet; 80% of articles discussed physical activity, which can quickly reduce obesity in children, and programs to overcome obesity in children face internal obstacles (60%) and external obstacles (80%). In conclusion, combining a healthy eating pattern program with physical activity is the main strategy for overcoming obesity in children. Strategies are also needed to minimize obstacles by establishing good cooperative relationships between parents and the community

Keywords: barriers, childhood obesity, healthy diet, physical activity

Abstrak

Angka kejadian obesitas pada anak di Indonesia semakin meningkat setiap tahunnya. Peningkatan disebabkan rendahnya promosi aktivitas fisik anak dan kampanye pendidikan gizi. Penelitian bertujuan untuk mengumpulkan bukti mengenai bagaimana merancang strategi yang tepat untuk mengatasi masalah anak obesitas di Indonesi. Penelitian menggunakan tinjauan literatur dengan menelusuri database PubMed Central, BMC, BMJ, Science Direct, dan Plos One yang diterbitkan antara tahun 2019 hingga Juni 2023 dengan menganalisis data mengenai trik menekan kejadian masalah obesitas pada anak menggunakan penelusuran berdasarkan populasi (P), paparan (E), hasil (O) sebagai kriteria inklusi. Hasilnya hanya sepuluh artikel yang sesuai. Seluruh artikel membahas tentang pentingnya pola makan sehat, 80% artikel membahas aktivitas fisik mampu menurunkan obesitas pada anak dengan cepat; dan program atasi obesitas pada anak menghadapi rintangan internal (60%) dan rintangan eksternal (80%). Kesimpulan, memadukan program pola makan sehat dan aktivitas fisik menjadi trik utama dalam mengatasi obesitas pada anak. Selain itu, diperlukan strategi untuk meminimalisir hambatan dengan menjalin hubungan kerjasama yang baik dengan orang tua dan masyarakat.

Kata Kunci: Aktivitas fisik, diet sehat, hambatan, obesitas pada anak

Introduction

Obesity has had a negative impact on nutritional lifestyles in the modern era and has become one of the most critical public health problems in the world over the last four decades (Mado et al., 2021; UNICEF, 2022). The World Health Organization (WHO) reports that in 2020, at least 38,9 million children under the age of 5 years were overweight or obese (World Health Organization, 2022). Indonesia is experiencing a problem of obesity, which has increased significantly in most groups of children aged 1-5 years by 20% (7,6 million), aged 13-18 years by 14,8% (3,3 million), and continues to increase every year (UNICEF, 2022).

An increase in the incidence of childhood obesity affects both physical and emotional health. Physical health problems in Children with obesity are at a higher risk of developing non-communicable diseases than adults (World Health Organization, 2022). Emotional health problems in children with obesity include feelings of insecurity, low self-esteem, depression, and even the risk of bullying; therefore, it is reasonable for them to feel anxious and pull back from society (Williams et al., 2023).

In Indonesia, children that are categorized as obese based on anthropometry include: (1) Children age 0-60 months old have a body weight based on body weight per body length or body weight per body height (WHZ) with maximum score (Z-Score) $> + 3$ SD; (2) children age 0-60 months old have a Body Mass Index (BMI) based on age (BAZ) with maximum score (Z-Score) $> + 3$ SD; and children age 5-18 years old have a Body Mass Index based on age (BAZ) with maximum score (Z-Score) $> + 2$ SD (Menteri Kesehatan Republik Indonesia, 2020).

Previous studies have investigated various pharmacological treatments and prevention strategies to suppress childhood obesity (Vohra et al., 2022). However, the prior research still cannot prevent the incidence of childhood obesity in society (Williams et al., 2023). However, researchers have not found the most effective intervention program to treat obesity in children, especially in Indonesia (UNICEF, 2022). This is because research has not been identified that directly planned and implemented structured strategies to overcome obesity in children (UNICEF 2022). In addition,

more information is needed regarding the daily calorie requirements and energy spent when performing physical activity based on the child's age (Wangge, 2019).

Therefore, this study aimed to discover tricks to solve the problem of childhood obesity in society. For a specific purpose, this research aimed to understand the effectiveness of a healthy diet in children with obesity and to understand the concepts of the effectiveness of physical activity in solving childhood obesity problems and challenges when implementing the program.

Methods

Study Design

This study used a literature review method through stages, including research questions, literature search, literature analysis, and presentation of results.

Research Question

This research question followed the guidelines presented in Table 1 (Munn et al., 2018; Teesside University, 2018): population (P): Obesity in Children; Exposure (E): Trick; Outcome (O): reduced incidence (Considine et al., 2017; Munn et al., 2018). Simplified use of critical judgment in published articles and increased transparency.

Conducting Search

Researchers have used databases such as PubMed, BMJ, BMC, Science Direct, and PLOS One to identify tricks to reduce the increasing incidence of childhood obesity in society. Before conducting a literature search, the research team determined the inclusion criteria, including reputable journals from 2019 until June 2023 with quantitative research, mixed methods, full text, and English manuscripts discussing interventions to reduce obesity in children that can be implemented in the community. The exclusion criteria were conference papers, symposiums, discussion papers, qualitative papers, obese children undergoing hospital treatment, pharmacological therapy for obesity literature reviews, and systematic reviews. The filter is explained by the researcher in Figure 1. Ten articles were included in this study.

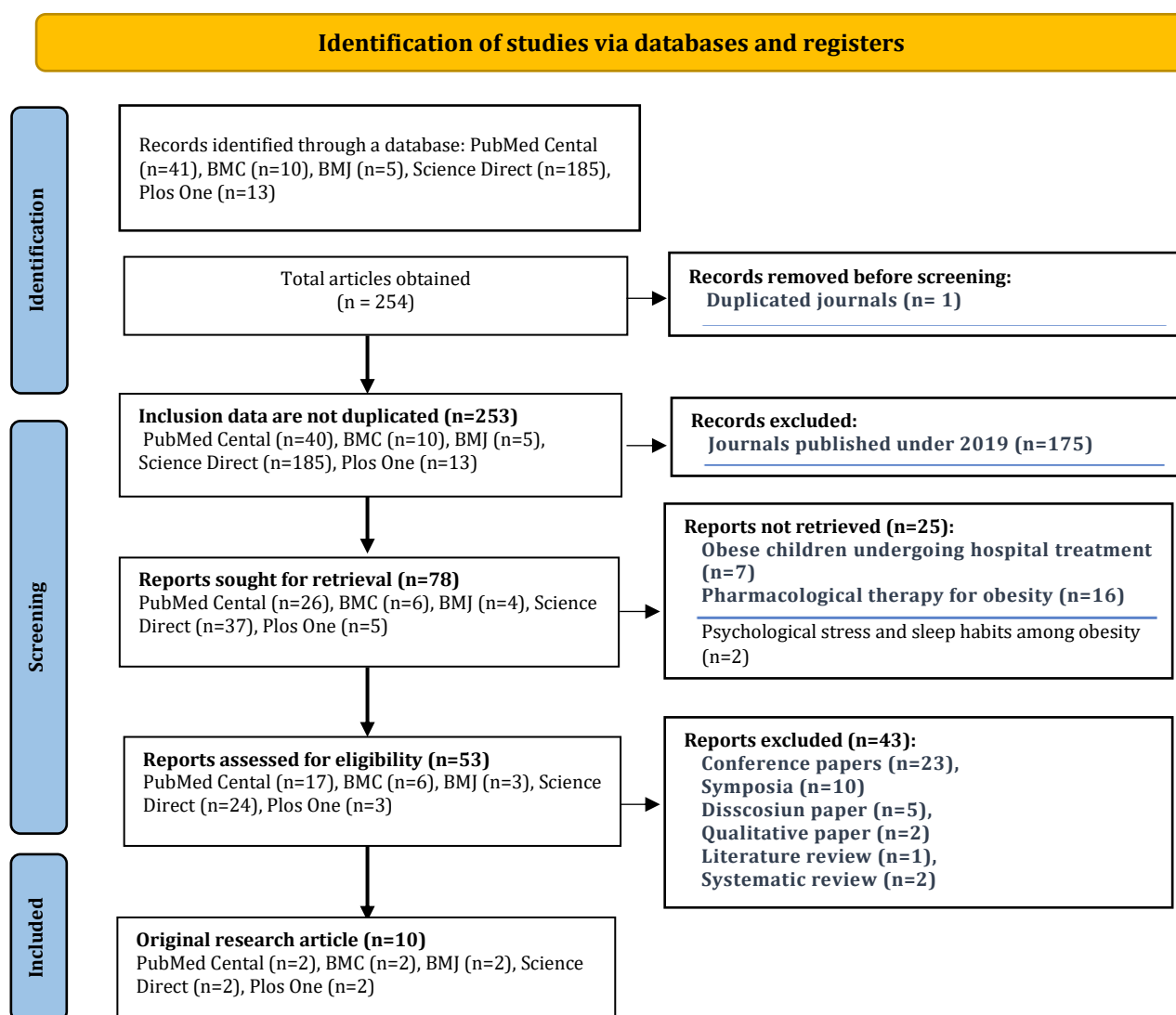


Figure 1. PRISMA flowchart steps in selecting the articles used for review (Page et al., 2021)

Articles retrieved from the database were cataloged using bibliographic management software (Mendeley 2.80.1) and then reviewed and classified.

Literature Analysis

After the description, researchers adjusted the flowcharts according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA). The general characteristics of the selected articles were analyzed based on the year of publication, intervention to reduce obesity in children, and research design to determine the content, results, and effects. We independently reviewed the literature and integrated the analysis results. Discussions and interrogative studies resolved differences in opinions until agreement was reached.

Presenting Results

This research includes ten research; the results are presented in the following section. The literature review results are presented in the order of general characteristics of the literature, content, format, interventions to reduce the incidence of obesity in children, barriers experienced, and the effect of implementation to reduce the incidence of obesity in children in the community.

Result and Discussion

Ten papers are described in this review, and we highlight ideas from each article in Table 1. These research findings came from the European continent (50%, n=5), the American continent (30%, n=3), and the Asian continent

(20%, n=2). The rate of programs aimed at overcoming obesity is 90% in developed countries and 10% in developing countries. This research was 100% conducted in urban areas. The ages of the children who participated were 60% school-age, 10% preschool-age, 10% school-age to teenagers, and 20% preschool-age to school-age. According to the respondent's parents' financial condition, 30% of children with obesity come from a low socioeconomic class (Anselma et al., 2019; Homs et al., 2021), 50% from the upper middle socioeconomic class (Karmali et al., 2019; Kummer et al., 2021; Lambrinou et al., 2019; Reilly et al., 2019; Xu et al., 2020), and 10% from the middle socioeconomic class (Li et al., 2019) (Table 2). In the innovation program, 90% of the articles used a healthy diet and physical activity for children. Fifty percent of the research was conducted in schools involving parents and teachers, and the remaining 50% was conducted in families involving only parents.

The incidence of childhood obesity is increasing and has negative physiological (Homs et al., 2021) and psychological effects (Mandelbaum & Harrison, 2022). It makes sense for developed countries to curb the rise in childhood obesity aggressively. Pathophysiologically, obesity occurs due to the inability of the hypothalamus to overcome the complexity of the body's architecture in controlling the regulation of neurons and hormones. Ghrelin, a gut-brain axis that plays a role in feelings of hunger and fullness, becomes uncontrolled with food intake (de Bont et al., 2021). Genetics, intrauterine environment, parental factors, ethnicity, physique, sleep time, and eating patterns influence individual elements in the occurrence of obesity in children (Jebeile et al., 2022). Housing and schools influence social factors (Homs et al., 2021). Individual factors are the causes of obesity, but socioeconomic factors and urban communities are the other main triggers (de Bont et al., 2021). Community factors in urban childhood obesity are caused by air pollution, which disrupts molecular mechanisms (Zafra-Tanaka et al., 2023); noise is associated with stress hormones and sleep deprivation (de Bont et al., 2021); lack of green space and large amounts of road traffic affect physical activity, healthy behavior (de Bont et al., 2021), and instant food consumption (Jebeile et al., 2022).

The researcher analyzed three main points from all articles that were reviewed: (1) food intake to overcome obesity, (2) physical activity in children to overcome obesity, and (3) challenges in program implementation to overcome obesity in children.

Food Intake Overcomes Childhood Obesity

All articles described the importance of food intake strategies given to children to prevent obesity by providing education and illustrations about their nutritional needs. It is known that 40% of parents from all articles give various snacks, such as instant food, as well as snacks and desserts with sugar or salt (Karmali et al., 2019; Lambrinou et al., 2019; Xu et al., 2020; Zacarías et al., 2019) because children would nag if they did not give it.

It is known that all diet innovation programs recommend greater consumption of fruits and vegetables. All articles used anthropometry or body mass index (BMI) together with additional assessment such as 30% child Food Frequency Questionnaire (FFQ) (Kummer et al., 2021; Lambrinou et al., 2019; Zacarías et al., 2019); 20% Dietary Diversity Score (DDS) (Li et al., 2019; Xu et al., 2020); 10% Dietary Behavior Score (Reilly et al., 2019); 10% Eating self-efficacy scale (ESES) (Karmali et al., 2019); 10% apps titled 'Eat Wisely, Move Happily' (Liu et al., 2019); 10% Dutch Obesity Intervention in Teenagers (DOiT) questionnaire (Anselma et al., 2019); and 10% e short Diet Quality Screener (sDQS). It was found that 90% of programs had succeeded in overcoming childhood obesity, while only 10% were unsuccessful, but were able to change their habits to a healthy breakfast (Xu et al., 2020), and 20% of programs had succeeded in suppressing healthy food expenses for every child (Li et al., 2019).

Nutritional Intake Strategies to Overcome Childhood Obesity

The success of this program has provided guidelines for children's eating patterns, daily energy needs, and limits of sugar consumption. Dietary guidelines for children with obesity are required to recommend fruits and vegetables (Homs et al., 2021; Reilly et al., 2019). Fruit and vegetable intakes differed between boys and girls. A cup can be used to measure fruit and

vegetable intake (236,58 ml or a measurement cup (250 ml. Girls aged 12 to 23 months old needed ½ to 1 cup fruit and 2/3 to 1 cup vegetables; girls aged 2 to 3 years old needed 1 to 1 ½ cup fruits and vegetables; girls aged 4 to 8 years old needed 1 ½ cup fruits and 1 ½ to 2 cups vegetables; girls aged 9 to 13 years old needed 1 ½ to 2 cups fruits and 2 to 2 ½ cups vegetables; and girls aged 14 to 18 years old needed two cup fruits and 2 ½ cups vegetables. Boys aged 12 to 23 months old needed ½ to 1 cup of fruits and 2/3 to 1 cup vegetables; 2 to 3 years old needed 1 – 1 ½ cups of fruits and vegetables; 4 to 8 years old needed 1 ½ cup fruits and 1 ½ to 2 cups vegetables; 9 to 13 years old needed 1 ½ - 2 cup fruits and 2 ½ - 3 cups vegetables; and 14 to 18 years old needed 3 cups fruits and 3 – 3 ½ cups vegetables (Hamner et al., 2023).

Children’s daily energy fulfillment is essential for more energy when they perform more physical activity (Homs et al., 2021; Kummer et al., 2021; Li et al., 2019; Liu et al., 2019). It was discovered that the daily energy requirement for infants is 100 kcal/kg/day, aged 1–3 years old, 80 kcal/kg/day; aged 4–5 years old, 70 kcal/kg/day; aged 6–8 years old, 60–65 kcal/kg/day; and >9 years old, 35–45 kcal/kg/day (Unaiza & Rouster, 2022).

Children's daily energy needs correlate with their sugar intake (Reilly et al., 2019; Zacarías et al., 2019). Parents must understand natural sugars and be sugar-free. Natural sugars are found in fruits, vegetables, and nuts, and lactose is found in milk and dairy products. Free sugar undergoes several artificial processes such as ice cream, cakes, biscuits, chocolate, soda, packaged juice, and cupcakes (Zacarías et al., 2019). Foods that contain free sugars can trigger obesity. The maximum daily sugar measurement

intake for children aged 2 to 4 years old was 15-16 grams or equal to 4 tablespoons; age 4 to 7 years old, 18–20 grams or equivalent to 4-5 tablespoons; age 7 to 10 years old was 20-23 gram atau equal to 5 ½ tablespoons; age 10 to 13 years old was 24–27 grams or equal to 5 ½-6 ½ tablespoons; age 13 to 15 years old was 27-32 gram or equal to 8 tablespoons; and age 15 to 19 years old needed 28-37 gram or equal to 9 tablespoons (Unaiza & Rouster, 2022).

Physical Activity in Children to Overcome Obesity

Eighty percent of the articles described the importance of physical activity in children to overcome obesity (Anselma et al., 2019; Homs et al., 2021; Karmali et al., 2019; Kummer et al., 2021; Li et al., 2019; Liu et al., 2019; Reilly et al., 2019; Xu et al., 2020). The results of this study are as follows: children, 39.57 minutes in the next 12 weeks, 53.04 minutes for 26 weeks (Kummer et al., 2021), 60 min every 32 meetings with physical activity and exercise (Homs et al., 2021), and 75 minutes every 13 sessions (Reilly et al., 2019). Moderate-to-Vigorous Physical Activity (MVPA) time for 10 hours that was reset every seven days with accelerometers (Anselma et al., 2019; Li et al., 2019) and for 24 hours every seven days by activating smartphone app ‘Eat Wisely, Move Happily’ (Liu et al., 2019); Children’s motor fitness (MOPER) for 45 minutes at the weekend and National holiday (Anselma et al., 2019); Physical activity counting steps every seven days using pedometer during the program implementation (Karmali et al., 2019)(Karmali et al., 2019); physical activity, “Happy 10,” every 10 minutes, two times during school hour with dance play, jump, squat, and resemble animals (Xu et al., 2020).

Table 1. Population, Exposure, and Outcome

Research Title	Trick to Reduce the Incidence of Obesity in Children					
PICO questions	1. What are the tricks used to reduce of childhood obesity? 2. How to reduce the increasing incidence of childhood obesity?					
Research topics	P (POPULATION)		E(EXPOSURE)		O (OUTCOME)	
Components						
Key Term	Obesity in Children	AND	Trick	AND	Reduce Incidence	
Alternative Term	OR Childhood Obesity	OR	Strategics	OR	Resolve problem	
Alternative Term	OR Fatness in pediatric	OR	Plan of Action	OR	Ease problems	
Alternative Term	OR Child's overweight	OR	Program	OR	Arrange problems in the community	

Table 2. Explanation of steps to reduce the incidence of obesity among children

Author (s)/ Country	Sample	Program	Long of Implement ation	Implementation activities	Results
Kummer et al., 2021 / USA	44 families with one or more children aged 5–11 years	Telehealth video conferencing group 'eatNplay'	Phase 1 (12 weeks); Washout (2 weeks); and Phase 2 (12 weeks).	Stage 1: Assessment Stress and quality of telehealth 'eatNplay'; Stage 2: Implementation 'eatNplay'; Stage 3: Evaluation—Telehealth 'eatNplay' program, effective weight behavior change interventions for children in rural communities.	The 'eatNplay' program regarding physical activity between the two groups (n = 20 each) was identified as "large" (Cohen's d = 0,9 effect size). The control group averaged 39,57 minutes of physical activity (SD = 1,97) for overweight or obese children and 47,21 minutes (SD = 18,56) for healthy children, while the experimental group increased to 53,04 minutes.
Homs et al., 2021 /Spain	810 children aged 8–12 years with obesity and 600 parents	Fitness, VALues and Healthy Lifestyle (FIVALIN) project	Three editions (1st - 2019/2020 ; 2nd - 2020/2021 ; 3rd - 2021/2022) of 10 months each	Experimental group stages:1 qualitative session (2 hours); 3 training (4 hours/training) face-to-face training method; 8 sports education sessions on health topics; 32 sports education sessions (1 hour/session); 8 workshops were held for 2 hours each session with the schedule.	Differences between the intervention and control groups were considered significant at p < 0,05
Xu et al., 2020 / China	Elementary school (n=38) Children with age 3 until 7 years old (n= 4846)	Comprehensive intervention (nutrition education intervention (NE) and physical activity intervention (PA)	12 months	The intervention group is given a nutrition guidebook, hangs a poster "Pagoda Diet for Chinese" in class, and implements "Happy 10" as a physical activity program.	Comprehensive Intervention did not increase whole daily food intake variation (0 (95% CI 0 to 0,1; p = 0,382) in DDS9, 0,1 (95% CI -0,1 to 0,2; p = 0,374), DDS28 0,1 (95% CI: -0,1, 0,3; p = 0,186) however, there was changed to a healthy breakfast (FVS 0,1 (95% CI: 0 to 0,1; p <0,001).

Li et al., 2019 / China	Primary school (n=40) School Children age 6 until 7 years old (n=1,641)	Children's Physical Activity and Dietary Behaviour Changes Intervention (CHIRPY DRAGON)	12 months	Step 1: Train 5 project teacher staff (CHIRPY DRAGON) and equip them with the program handbook. Step 2: Do measurement: anthropometry, Eating behaviours, Physical activity, Sedentary behaviours, Psychosocial outcomes (potential benefits and harms), and Blood pressure; Step 3: children's food consumption (95% CI 0,000 to 0,007; p = 0,034).	There was a decrease in children's BMI (-0,18, 95% CI -0,32 to -0,05, p = 0,007); proven to reduce obesity (OR 0,20, 95% CI 0,06 to 0,62, p = 0,005); actively exercising, dancing, or playing (OR 1,72, 95% CI 1,22 to 2,43, p = 0,002). This program was cost-effective in pressure; Step 3: children's food consumption (95% CI 0,000 to 0,007; p = 0,034).
Liu et al., 2019/ China	Twenty-four schools (n=1200 students) children aged 8 to 10 years	Diet, ExerCise and Cardiovascular Health-Children (DECIDE)	September 2018 to June 2019	Activities that focus on students and parents (health education and supervision and encouragement to increase children's physical activity outside of school) with the smartphone application 'Eat Wisely, Move Happy.'	There is a comparison of initial and follow-up visits based on body mass index (BMI), and changes in waist circumference, waist-to-hip ratio, systolic and diastolic blood pressure, body fat percentage, and physical fitness measures.
Lambrinou et al., 2019 / Belgium, Bulgaria, Germany, Greece, Poland and Spain	Kindergartens (n=309) in six European countries with children aged 3 to 6 years	ToyBox - intervention	Conducted during the 2012-2013 school year	Implemented projects: Levels 1 and 2 relate to healthy snacks and daily consumption of healthy snacks in classrooms/kindergarten; Levels 3 and 4 include implementing interactive classroom activities.	The ToyBox significantly increasing parental awareness of unhealthy snacks, while increasing parents' knowledge of recommendations for healthy fruit and vegetable snacks α 0,16 (95% CI 0,09 to 0,23); β -0,11 (95% CI -0,16 to -0,07).
Karmali et al., 2019/ Canada	50 parent-child dyads with children aged 2.5 to 10 years	Co-Active coaching	six months	The experimental group was given active coaching and health education by recording activity data for seven days and completing questionnaires.	Evaluation Multi-dimensional scale of perceived social support (MSPSS) with Cronbach's alpha 0,84 to 0,92; Weight efficacy lifestyle (WEL) questionnaire with Cronbach's alpha 0,70 to 0,90; Self-efficacy for

					overcoming barriers Cronbach's alpha 0,73 to 0,95; Eating self- efficacy scale (ESES) Cronbach's alpha 0,70, p<0,001; Generalized self-efficacy (GSE) scale Cronbach's alpha 0,75 to 0,91; and Short-form 36 (SF)-36 Cronbach's alpha 0,85.
Reilly et al., 2019/ United Kingdom	40 families who have children aged 6 and 14 years	Children's Health and Activity Modification Program ("C.H.A.M.P. Families)	Two years in the summer	Experimental group: C.H.A.M.P. Families (Dietary Behavior; Physical Activity; Empowerment and Autonomy; Food for Families; Improved Family Dynamics; Parental Self-Confidence and Health Behavior in Children)	Interventions to overcome obesity in children must start from the family, with parental involvement, Healthy group dynamics, and positive family communication essential for solving this problem.
Anselma et al., 2019 / Netherlands	Four elementary schools in low socioeconomic neighborhoods with children aged 9-12 years	'Kids in Action' project	in April 2016 to November 2019	Phase 1: Creating partnerships with schools and community centres; Phase 2: Formation of an Action Team consisting of an academic researcher and a research assistant; Phase 3: Intervention development Action Team; Phase 4: Implementation and evaluation	ENERGY-child questionnaire about the consumption of sugary drinks play (0,71/0,59); exercising (0,80/0,65); watch (0,64/0,09); Weekdays (0,67/0,63) and Weekend days (0,68/0,56)); playing games (Weekdays (0,67/0,35) and Weekend days (0,67/0,65))
Zacarias et al., 2019 / Mexico	50 mothers and 57 school- aged children (6 to 11 years old)	Niño Sano Adulto Sano program	October 2016 and May 2018	Stage 1: Assessment of needs frequently purchased by mothers with Food Frequency Questionnaire (FFQ); Stage 2: Goal setting; Stage 3: Obesity prevention intervention with the Niño Sano-Adulto Sano program; Stage 4: Implementation; Stage 5: Evaluation.	Self-efficacy to vary diet 9,12 (95% CI 2,02 to 16,22; p = 0,013); Self-efficacy to consume recommended fruits and vegetables 11,47 (95% CI 2,96 to 19,98; p = 0.010); and Average self-efficacy 6,40 (95% CI 0,86 to 11,92; p = 0,025).

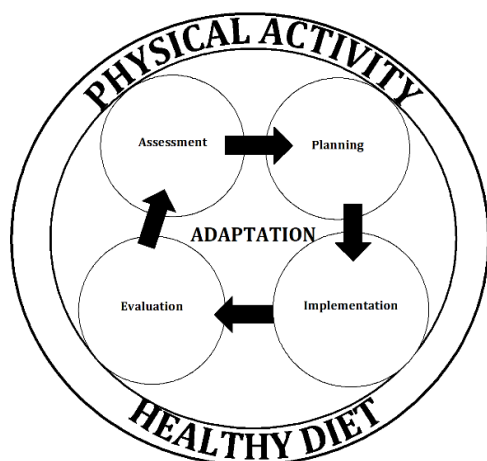


Figure 2. Planning a thorough healthy diet and physical activity program.

Physical Activity Strategies to Overcome Childhood Obesity

The massive energy release significantly helps reduce obesity in children. However, we need to know the daily total energy expenditure (TEE). TEE is a combined calculation of resting energy expenditure (REE), the thermal effect of food, and energy release in physical activity (PA) (Acar-Tek et al., 2023). The total energy expenditure (TEE) in children aged 1–18 years over 24 hours for boys and girls was absolutely different. TEE in boys was $310,2 + 63,3 \times \text{body weight (kg)} - 0,263 \times \text{body weight (kg)}^2$ and TEE in girls was $263,4 + 65,3 \times \text{body weight (kg)} - 0,454 \times \text{body weight (kg)}^2$ (Fuentes-Servín et al., 2021). REE is the largest component of the total daily energy release because all body organs use 60-70% of energy to function automatically (Acar-Tek et al., 2023; National Academies of Sciences, 2023).

It is known that the REE calculation for boys and girls is $= (0,02606 \times \text{Weight (kg)}) + (0,04129 \times \text{Height (cm)}) + (0,311 \times \text{Gender (sex)}) - (0,08369 \times \text{Age (years)}) - 0,808$. In genders, boys get “1” points, and girls get “0” points (Fuentes-Servín et al., 2021).

Reaching results in accordance with TEE; therefore, we need to measure energy release when performing physical activity. The higher the children’s physical activity, the closer they are to achieving the TEE’s target. It has been shown that children’s physical activities, such as dancing, playing, and squatting, resemble animals; it could reduce energy consumption by an average of 25,0-35,1 kcal per 10 minutes (Xu et al., 2020).

Challenges in Program Implementation to overcome childhood obesity

All the articles described the challenges that were experienced. Internal and external challenges were identified in the descriptions of all articles. There were 60% internal challenges in all reports, such as 20% of the parents who did not understand the explanation of application-based technology.

The success of the program certainly requires adaptation by starting an assessment; careful planning must have several plans, followed by the implementation and evaluation of the program, assessment of the program that has been implemented, and so on (Figure 2).

Challenges in Overcoming Childhood Obesity

To achieve long-term success in childhood obesity, interventions must be planned in advance; however, this is difficult to maintain (Clemente et al., 2022). Internal challenges must be carefully considered because thorough preparation is required before implementation. The challenge of being unable to assess children’s healthy food intake through seminars and workshops must be given to the community regarding this matter. Parents’ limited income in purchasing healthy food must be considered, especially parents with fixed income living in urban areas (Tsani et al., 2022). This is directly proportional to the respondents’ place of origin, especially in urban areas (Ma et al., 2023). The use of technology makes implementation easier, but parents’ lack of understanding of the application causes a bias. Internal obstacles must be carefully considered in collaboration with the government (Unaiza & Rouster, 2022).

External challenges arose from the respondents. During the implementation of the obesity intervention program, it is known that urban areas contribute to the incidence of childhood obesity because of low income; however, this was not an excuse, as every country has primary health services to help society prevent childhood obesity (Mandelbaum & Harrison, 2022). Parents play a crucial role in creating and developing healthy lifestyles and performing active exercise at home for their children. Parents form behavior and discipline when children are eating and exercising in various ways at various stages of their growth and development without being affected by

other family members' assumptions (Xu et al., 2020). In addition, it is essential for schools to cooperate with medical services to form a curriculum policy that requires physical activity in children (Liu et al., 2019), food services in the canteen that include total calorie intake, and screening services on children's nutritional status, which have become part of school health facilities (Liu et al., 2019; Xu et al., 2020).

The limitations of this study include the use of a literature review method, and it is essential to design experiment-based activities to determine the effectiveness of natural diet and physical activity programs in treating obesity in children.

Conclusion

It is difficult to achieve success in the implementation of obesity intervention programs. Proper and thorough preparation is essential for implementing programs that minimize challenges. Children's obesity intervention is not only by providing a healthy diet but also by calculating the total energy released every 24 hours by giving games as children's physical activity.

Parents play a crucial role in overcoming childhood obesity, and society has become the primary support for suppressing the incidence of obesity by strengthening the understanding of nutritional status, calculating the number of calories needed, and expending energy during physical activity at each child's age.

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