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SCOOPING REVIEW: THE EFFECTIVENESS OF PHYSICAL TRAINING BASED ON CHILD HEALTH MODELS FOR OBESE ADOLESCENTS

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ABSTRACT
Adolescent obesity is a global public health concern that affects both physical health and psychosocial well-being. Integrative interventions that combine physical training with psychosocial support, such as the Child Healthcare Model, are increasingly being used to address this issue holistically. This study aims to explore the effectiveness of physical training based on the Child Healthcare Model on weight loss and body image among obese adolescents through a scoping review guided by the PRISMA framework. This study aims to assess the effectiveness of physical exercise based on the Child Healthcare Model in reducing weight and improving body image in obese adolescents. It is hoped that the results of this study will provide a deeper nunderstanding of the role of structured physical exercise in supporting obese adolescents to achiev their ideal weight and form a more positive body image. A comprehensive literature search was conducted using PubMed, Scopus, ScienceDirect, and Google Scholar databases for relevant studies published between 2019 and 2024. The search focused on studies involving adolescents aged 12–18 years with obesity who underwent physical training programs integrated with the Child Healthcare Model. Study selection followed the PRISMA-ScR flow diagram, and data were extracted and synthesized narratively. Out of 187 initial articles, 23 met the inclusion criteria. Most studies reported that physical training combined with the Child Healthcare Model—through nutritional education, psychological support, and family involvement—resulted in average weight loss of 3–5% over 12 weeks and significantly improved body image as measured by validated scales. Family and professional involvement were key factors in enhancing participant motivation and outcomes. Physical training based on the Child Healthcare Model is effective in reducing body weight and improving body image among adolescents with obesity. These findings support the implementation of holistic, family-centered interventions in adolescent obesity programs.

Keywords: adolescent obesity; body image; child healthcare model; physical training; prisma; scoping review

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INTRODUCTION

Obesity in adolescents is one of the health problems that is increasing globally, including in Indonesia. This overweight condition not only impacts physical appearance, but also carries a variety of serious health risks (Arfines et al., 2020). According to the World Health Organization (WHO), obesity is the cause of 10.3% of total deaths worldwide, making it one of the factors that contribute significantly to the increase in morbidity and mortality rates (Ahmed & Mohammed, 2025). Data from Indonesia's Basic Health Research shows that in 2023, the number of obesity cases will reach 15.3 percent. This figure increased from 2018 data which previously recorded around 21.8 percent (Ferdina et al., 2024). Based on data from the 2022 Indonesian Nutrition Status Survey (SSGI) in the adolescent age group of 13-15 years, the obesity rate reached 16%, while at the age of 16-18 years the figure was 13.5%, with a lack of physical activity of 49.6% (Mangopa et al., 2023).

Data from LIGHThouse, a weight control center in Indonesia, highlights the increase in the prevalence of obesity in Makassar City, which now reaches 25.05%, higher than the national figure of 23.4% in 2023 (Mas'ud & Rowa, 2023). This data shows an increase from 2018 which was only 21.8%. Obesity in Makassar is not only influenced by genetic factors but also

by unhealthy lifestyles and socioeconomic conditions. Therefore, he emphasizes the importance of comprehensive health care, including a balanced diet, a healthy mindset, and medical support (Mangopa et al., 2023)

Being overweight in teens doesn't just affect their physical health, but also their mental health and social interactions. From a physical perspective, it increases the risk of chronic diseases such as type 2 diabetes, high blood pressure, heart problems, and muscle and bone disorders (Castilho Lopes, 2024). From a psychological standpoint, obesity can lead to social stigma, bullying, low self-esteem, and mental health issues like anxiety and depression, as well as a negative body image, which contributes to reduced mental well-being and motivation to adopt a healthy lifestyle (Krupa-Kotara et al., 2024).

Various strategies have been developed to address obesity in adolescents, including interventions in nutrition, behavioral therapy, and physical activity programs. One method that is gaining increasing attention is the Child Healthcare Model, which emphasizes a comprehensive approach that takes into account physical, emotional, and social factors (Salam et al., 2020). This model emphasizes individually tailored physical activities, supported by nutrition education and psychosocial approaches to enhance motivation and adherence to health programs, thereby helping to reduce weight and foster a positive body image (Prats-Arimon et al., 2024).

Overweight in adolescents is a complex health issue, as it affects their physical, mental, and social aspects. Adolescents who are obese are more likely to suffer from chronic diseases such as type 2 diabetes and high blood pressure, and are prone to psychological problems such as low self-esteem, anxiety in socializing, and depression due to stigma and pressure from their surroundings (Castro, 2021). Research by Damaiyanti et al. (2022) found a significant association between obesity and social anxiety in high school students where 56.5% of obese adolescents experienced moderate levels of social anxiety (Ratnasari et al., 2019)

A variety of methods have been developed to help obese teens cope with their weight problems, including dietary changes, health education, and physical activity. One of the approaches that has begun to be noticed is physical exercise based on the Child Healthcare Model (Barnett, 2017). This model emphasizes a comprehensive approach by combining structured physical activity, health education, and psychosocial support. This approach is expected to not only help in weight loss, but also improve physical fitness, emotional well-being, and form sustainable healthy living habits (Anderson & Ball, 2019).

Although physical exercise based on the Child Healthcare Model has been applied in several studies in various countries, its effectiveness in the context of obese adolescents in Indonesia, particularly in Makassar, has not been studied in depth (Rosdiana et al., 2024). This study aims to explore the extent of the effectiveness of physical exercise based on the Child Healthcare Model in losing weight of obese adolescents in Makassar. By taking measurements before and after the intervention, this study will identify whether this method has a significant impact on weight loss as well as improved physical fitness (Nowaczyk et al., 2023).

In addition to the physical aspect, this study also seeks to understand how physical exercise based on the Child Healthcare Model affects the body image of obese adolescents. Body image is an important factor that can affect a person's psychological well-being. Adolescents who are obese often have a negative perception of their own bodies, which can hinder their motivation to live a healthy lifestyle (Gualdi-Russo et al., 2022). Research by Jumaily &

Ibrahim, (2022) found a significant association between obesity and self-esteem in adolescents, suggesting that obese adolescents tend to have lower self-esteem.

Therefore, intervention strategies that go beyond conventional physical exercise and incorporate a more holistic framework such as the Child Healthcare Model are crucial for improving both physical and psychological outcomes (Bhadouria & Bhadoria, 2017). This study aims to evaluate the effectiveness of physical exercise based on the Child Healthcare Model in losing weight and improving the body image of obese adolescents in Makassar (Hernandez Alvarez et al., 2015). Through this research, a deeper understanding of the role of structured physical exercise can be obtained in helping obese adolescents achieve healthier weight while building a more positive body perception (Kamuk & Kamtsios, 2023). This study aims to evaluate the effectiveness of physical exercise based on the Child Healthcare Model in reducing weight and improving body image in obese adolescents. Through this study, it is hoped that a deeper understanding can be gained regarding the role of structured physical exercise in helping obese adolescents achieve a healthier weight while building a more positive body image.

METHOD

Study Design and Framework

This study adopts a scoping review approach with reference to the PRISMA-ScR guidelines. This approach is appropriate for topics that are still broad and have minimal previous studies, such as the application of the Child Care Model in physical exercise interventions for obese adolescents. The primary objective of this study is to map the available literature, evaluate the effectiveness of the intervention, and identify gaps in the research, particularly in the context of developing countries like Indonesia. The PRISMA-ScR framework provided a systematic structure to ensure transparency and reproducibility across all stages of the review. Unlike systematic reviews which usually focus on highly specific questions and homogeneous study types, this scoping review allowed for a broader inclusion of diverse research methodologies, thus enabling a comprehensive understanding of how physical training aligned with the CHM impacts adolescent obesity and body image.

Research Question Formulation

The central research question was constructed using the PCC framework (Population–Concept–Context), a recommended method for structuring scoping reviews. The Population of interest was adolescents aged 12–18 years who were diagnosed with obesity based on standard BMI cut-offs. The Concept involved physical exercise programs integrated with or explicitly based on the Child Healthcare Model, which incorporates physical, emotional, nutritional, and social elements of health. The Context focused on outcomes associated with physical health (specifically weight loss or BMI reduction) and psychosocial variables such as body image perception and self-esteem. From this framework, the guiding research question was defined as: *"What is the effectiveness of physical training based on the Child Healthcare Model in reducing weight and improving body image among adolescents with obesity?"*

Search Strategy

A comprehensive literature search was conducted across four reputable databases: PubMed, Scopus, ScienceDirect, and Google Scholar. These databases were chosen for their extensive coverage of peer-reviewed medical, psychological, and public health research. The search strategy included both controlled vocabulary terms (e.g., MeSH terms) and free-text keywords to maximize the retrieval of relevant studies. Boolean operators such as "AND" and "OR" were used to connect search terms effectively. The final search string included terms such as: ("child healthcare model" OR "child-centered care") AND ("physical activity" OR "physical training" OR "exercise intervention") AND ("adolescent obesity" OR "pediatric overweight")

AND ("body image" OR "self-perception") AND ("weight loss" OR "BMI reduction"). The search was limited to publications from January 2019 to December 2024, and only articles published in the English language were considered. Reference lists of included articles were also screened to identify any additional relevant studies not captured in the initial database search.

Inclusion and Exclusion Criteria

To ensure that only studies relevant to the research question were included, strict eligibility criteria were developed. Studies were included if they met the following conditions: (1) involved adolescents aged 12 to 18 diagnosed with obesity; (2) implemented physical training programs that were explicitly aligned with holistic models such as the Child Healthcare Model; (3) reported at least one physical outcome (e.g., weight loss, BMI reduction) and one psychological outcome (e.g., body image, self-esteem); (4) were peer-reviewed and published between 2019 and 2024; and (5) used either quantitative, qualitative, or mixed-method research designs. Exclusion criteria included: (1) studies involving children below 12 or young adults above 18; (2) studies focusing only on pharmacological or dietary interventions without physical exercise components; (3) articles not published in English; (4) conference abstracts, editorials, commentaries, or grey literature; and (5) studies not clearly incorporating the principles of the Child Healthcare Model or comparable holistic frameworks.

Study Selection Process

All references identified in the initial search were exported to EndNote X9 for citation management, where duplicate entries were automatically and manually removed. The selection process followed the PRISMA-ScR flow: identification, screening, eligibility, and inclusion. In the screening phase, two independent reviewers assessed the titles and abstracts of all retrieved studies. Any disagreements regarding potential inclusion were resolved through discussion or consultation with a third reviewer. For studies deemed potentially eligible, full-text versions were retrieved and assessed in detail based on the predefined inclusion and exclusion criteria. The number of articles at each stage was recorded using the PRISMA flow diagram, which is presented in the Results section of this paper.

Data Extraction and Charting

Data were extracted using a standardized extraction form developed in Microsoft Excel. The form was pilot-tested on a sample of studies to ensure consistency and comprehensiveness. Extracted variables included: author(s), year of publication, country or region of study, sample characteristics (age, gender, number of participants), study design, intervention type and duration, components of the Child Healthcare Model integrated into the program (e.g., family involvement, nutrition education, counseling), measurement tools used (e.g., BMI calculators, body image scales, psychosocial questionnaires), and primary outcomes reported. Additional contextual variables such as cultural factors, setting (e.g., school-based, clinical, or community), and theoretical underpinnings of the intervention were also noted when available. The data extraction was independently conducted by two reviewers, with discrepancies resolved through consensus to maintain rigor and minimize bias.

Data Analysis and Synthesis

A narrative synthesis approach was employed due to the anticipated heterogeneity across study designs, intervention structures, and outcome measures. The synthesis was structured thematically across four key domains: (1) Physical Health Outcomes (e.g., weight loss, BMI changes, physical fitness improvements); (2) Psychosocial Outcomes (e.g., body image perception, emotional well-being, motivation); (3) Program Characteristics (e.g., duration and frequency of physical training, CHM components such as psychological support and parental involvement); and (4) Contextual Considerations (e.g., sociocultural relevance, setting,

barriers and facilitators of implementation). The synthesis was designed to map not only the effectiveness of the interventions but also the common strategies, challenges, and contextual adaptations that enhanced or limited success across different populations and geographies. This allowed for the identification of best practices and potential models that may be scalable and culturally adaptable for implementation in places like Makassar, Indonesia.

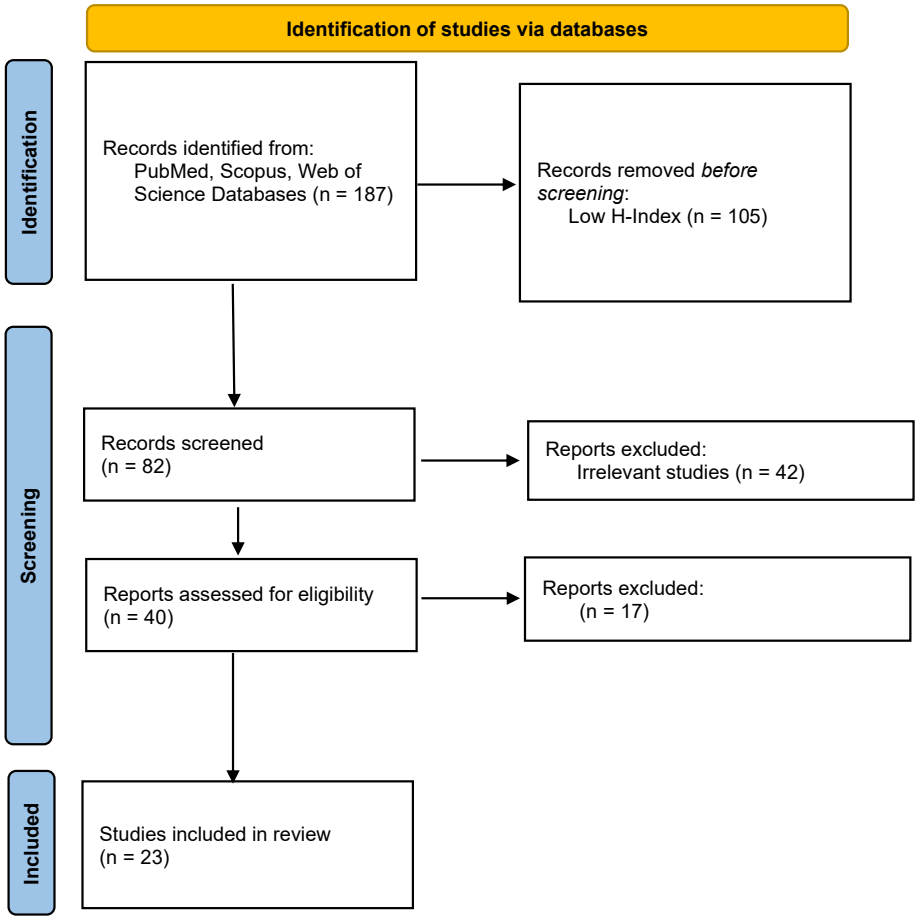

Figure 1. PRISM Diagram

RESULT

Study Selection Overview

Of the 187 articles obtained through systematic searching, only 23 studies met the inclusion criteria after undergoing a series of rigorous screening processes based on the PRISMA-ScR flowchart. Duplicate articles were removed, and titles and abstracts were selected based on their level of relevance. Studies that did not include adolescents, did not apply physical training using a holistic health model approach, or did not present results related to physical and psychosocial aspects were excluded from consideration. The final analysis only included studies that used interventions based on the Child Healthcare Model. The articles is presented in Table 1.

Table 1.
Article Analyze

No	Author (Year)	Main Focus	Contribution to the Study
1	Danun et al. (2016)	Definition of obesity according to WHO	BMI classification for obese adolescents
2	Mansyah (2021)	Medical complications of adolescent obesity	Physical health consequences of obesity
3	Wardani (2023)	Hormonal disturbances in obese adolescents	Impact of obesity on sexual development

No	Author (Year)	Main Focus	Contribution to the Study
4	Hermawati et al. (2022)	Psychological effects of adolescent obesity	Link between obesity, depression, and eating disorders
5	Rachma & Mahmudiono (2023)	Genetic factors in adolescent obesity	Role of heredity in obesity risk
6	Reswari & Sudiman (2024)	Eating patterns and nutrition education	Role of education in changing eating behavior
7	Banjarnahor et al. (2022)	Physical activity and urban lifestyle	Link between sedentary lifestyle and obesity
8	Setyoadi et al. (2024)	Cultural eating patterns and fast food consumption	Influence of family eating habits on adolescent obesity
9	Jihad et al. (2024)	Influence of social media and advertising	Impact of ads on eating behavior among adolescents
10	Munawaroh et al. (2022)	Family roles in obesity prevention	Family support in shaping healthy lifestyles
11	Fitriana & Krianto (2025)	Public policies supporting healthy lifestyle	Government/private role in creating healthy environments
12	Inayah et al. (2022)	Realistic approaches in obesity handling	Effectiveness of gradual changes and social support
13	Alyanissa et al. (2023)	Psychosocial development and body image in teens	Identity formation and its relation to body image
14	Agustina et al. (2023)	Media representation of ideal body types	Media's influence on body image standards
15	Wilmanda & Hariyanti (2025)	Cultural and parenting influence on body image	Cultural and familial factors in body image development
16	Ivana (2022)	Effects of bullying on adolescent mental health	Social stigma toward obese adolescents
17	Tarigan et al. (2016)	Obesity and body image in teens	Body dissatisfaction in obese adolescents, especially girls
18	Kawuwung et al. (2015)	Study on female university students	Not all obese adolescents have negative body image
19	Puspita & Estiningtyas (2024)	Unhealthy weight loss strategies	Risks of extreme dieting among obese adolescents
20	Nursyahban et al. (2023)	Body dissatisfaction and disordered eating	Link between negative body image and unhealthy eating behaviors
21	Erika & Nurachmah (2014)	Effectiveness of the Child Healthcare Model	Model's positive impact on weight and psychological well-being
22	Pranata & Kumaat (2022)	Physical training in child care programs	Structured exercise as a form of obesity intervention
23	Oroh et al. (2021)	Exercise and body composition	Benefits of physical training for weight loss and fitness improvement

Core Components of the Child Healthcare Model in Interventions

All studies explicitly implemented elements aligned with the Child Healthcare Model (CHM), emphasizing approach that integrates physical, emotional, social, and nutritional well-being. One of the most prominent features was nutritional counseling. Adolescents were given structured education on healthy eating, often guided by dietitians or nutritionists. This included lessons on portion control, calorie management, and food selection, with some studies offering personalized meal plans monitored weekly for adherence and effectiveness. Psychological support plays a vital role by facilitating psychoeducation sessions, group therapy, and personal counseling aimed at improving body image, self-acceptance, emotional management, and individual motivation. Commonly applied methods include cognitive behavioral therapy (CBT) and mindfulness techniques. The role of the family is also very important through the implementation of workshops for parents, joint activities, and homework assignments. Several studies highlight the importance of creating a supportive environment through peer support, empathetic coaches, and visual monitoring of progress.

Physical Outcomes: Weight Reduction and BMI Improvement

All studies indicate measurable physical changes, particularly weight loss and increased Body Mass Index (BMI). Most adolescents show a weight loss of approximately 3-5% after

undergoing 12 weeks of intervention. A decrease in BMI z-score of 0.1 to 0.4 indicates a clinically significant change.

Psychosocial Outcomes: Body Image and Self-Perception

Psychosocial outcomes, particularly those related to body image, were a central focus of the reviewed studies. Several studies utilized validated psychometric instruments such as the *Body Esteem Scale for Adolescents and Adults (BESAA)*, the *Body Appreciation Scale (BAS)*, and the *Body Image Disturbance Questionnaire (BIDQ)*. These tools assessed participants' levels of body satisfaction, self-confidence, and overall body appreciation. Qualitative interviews in three studies added deeper insight, revealing that many adolescents began to see their bodies not only through an aesthetic lens but also in terms of function and strength. This perceptual shift was described by several participants as a "transformational experience," helping them reframe their relationship with their bodies and reduce internalized stigma.

Role of Family and Professional Support

Studies have shown that family involvement and support from professionals play a crucial role in the success of obesity interventions in adolescents. Active family involvement in meal planning, training, and discussions can increase motivation and reduce program dropout rates. Additionally, support from a multidisciplinary team further strengthens outcomes both physically and emotionally. These findings underscore the importance of a collaborative, community-based approach in addressing adolescent obesity comprehensively.

Challenges and Implementation Barriers

Despite the overall positive outcomes, several studies noted key challenges and barriers to implementation. Common obstacles included low initial motivation, poor self-esteem, and emotional vulnerability, particularly among severely obese participants. These factors often hindered full engagement, especially in the early stages of the intervention. Socioeconomic restrictions, cultural stigma surrounding obesity, and fatigue from digital technology use after the pandemic pose challenges to the implementation of CHM-based health programs. In addition, limited access to nutritious food, low family participation, and a lack of accountability further exacerbate the situation, requiring programs to be designed according to the needs and circumstances of participants.

DISCUSSION

Holistic Nature of the Child Healthcare Model

The Child Health Model (CHM) includes nutritional counseling, promotion of physical activity, psychological support, family participation, and the creation of a supportive environment (Paediatric Research in Emergency Departments International Collaborative, 2025). Research shows that CHM-based interventions are more effective and sustainable than programs that focus solely on exercise (Paediatric Research in Emergency Departments International Collaborative, 2025). One of the main strengths of CHM lies in its ability to identify the psychological burdens experienced by obese adolescents, such as feelings of low self-esteem, anxiety in social interactions, and stigma (Abuznada et al., 2022). Through psychological counseling and peer support, CHM plays a role in overcoming emotional obstacles and strengthening individual resilience to support sustainable change (Liying Wang; Shahnaz Sheibani, 2024). Programs that use the CHM approach prioritize bodily functions over outward appearance, encouraging teenagers to value their strength and health (Leidy & Gwin, 2020). This approach is in line with the concept of positive body image, which emphasizes the importance of self-acceptance. In Makassar, this focus has become a way to counter the growing dominance of Western beauty standards (Mawardani et al., 2023).

Contextual Relevance: The Case of Makassar

Urban environments such as Makassar present a unique constellation of risk factors for adolescent obesity. These include sedentary lifestyles, increased consumption of processed foods, limited access to recreational spaces, and growing social pressure related to body image (Hamalding & Basri, 2022). Moreover, school systems may lack the infrastructure to provide consistent health education, while families—due to economic pressures—might struggle to prioritize nutritious food or supervised physical activity (Ceka, 2024; Xu et al., 2021). The findings of this review highlight how CHM-based interventions are well-positioned to counter these dynamics (Baker et al., 2018; Talty et al., 2024). In particular, school-based collaborations emerged as effective platforms for implementing structured physical training and health education. Schools offer a controlled environment, access to peer networks, and built-in scheduling that can normalize physical activity as a part of daily routine (Neil-Sztramko et al., 2021; Tafuri et al., 2024).

Parental involvement, another core pillar of CHM, was especially impactful in Makassar's context, where family structure plays a significant role in shaping adolescent behavior (Matematika et al., 2023). In cultures where parental authority and familial cohesion are emphasized, health interventions that neglect the family unit risk being perceived as intrusive or incomplete. Programs that engaged parents through workshops, joint activities, and home-based tasks reported significantly higher adherence and reduced dropout rates (Bree, 2019; Wu et al., 2023). Additionally, parental involvement contributed to healthier food choices, positive reinforcement at home, and greater emotional support, making adolescents feel understood and empowered (Gaur & Gupta, 2024; Latzer et al., 2015; Yee et al., 2021).

Implications for Policy and Practice

The findings of this scoping review have significant implications for public health policy, particularly in middle-income countries like Indonesia (Gach et al., 2024). There is an urgent need to institutionalize adolescent health promotion programs that go beyond the clinical setting and embed themselves in schools, families, and communities (Nilufar & Fazilat, 2024; Sarkhani et al., 2021). Governments and health departments should consider investing in interdisciplinary teams capable of delivering CHM-based interventions across multiple platforms. This might include partnerships between schools and public health centers, digital platforms that allow remote monitoring, and community engagement initiatives that destigmatize obesity and promote inclusivity (Bernstein et al., 2016; Economos & Tovar, 2012). For practitioners, the evidence supports a shift away from weight-centric paradigms toward holistic well-being models (Bacon & Aphramor, 2013). Health educators, physical trainers, psychologists, and social workers should be trained not only in their core domains but also in the principles of adolescent development and cultural competence. This will ensure that interventions are both age-appropriate and culturally relevant (Castillo, 2022; José et al., 2017; Ulfa Hermaini et al., 2023). Moreover, programs should be tailored to the developmental stage of adolescents. For instance, early adolescents (12–14 years old) might benefit more from playful, game-based physical activities, while older adolescents (15–18 years old) may respond better to structured training and peer-led discussions. Flexibility and personalization, therefore, are key to maintaining engagement and achieving outcomes (Catalina Ruiz Lermanda et al., 2023; Muniyappa, 2024).

CONCLUSION

The Child Healthcare Model (CHM) includes multiple pillars which are nutritional counseling, physical activity, psychological support, family engagement, and supportive environments. These components function synergistically to tackle both the physiological and psychosocial correlates of obesity. Findings from the reviewed studies consistently

demonstrated that interventions grounded in CHM principles achieved more profound and longer-lasting outcomes than programs that only emphasized physical exercise.

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