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BEHAVIORAL DETERMINANTS AND PREVENTION OF CHILDHOOD OBESITY

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Abstract:

Childhood obesity is a chronic, multifactorial disease associated with early cardio metabolic and psychosocial complications. Although genetic, prenatal, and socioeconomic factors contribute to risk, modifiable behaviors—dietary patterns, recreational screen exposure, and insufficient physical activity—play a central role in its development and persistence. An integrated, multi-level approach involving families, schools, and healthcare systems is essential for sustainable outcomes.

Keywords: childhood obesity; overweight; dietary patterns; sugar-sweetened beverages; screen time; sedentary behavior; physical activity; prevention

INTRODUCTION

Childhood obesity is a chronic, multifactorial condition that develops through the interaction of genetic susceptibility, prenatal and early-life factors, socioeconomic conditions, and the surrounding environment, including the school setting, neighborhood infrastructure, and food marketing. However, it is most strongly expressed through modifiable lifestyle behaviors, particularly unhealthy dietary patterns, prolonged sedentary time (often related to screen use), and insufficient physical activity. The clinical importance of childhood obesity extends beyond excess body weight. It is associated with early development of cardio metabolic and psychosocial complications, including type 2 diabetes mellitus, arterial hypertension, dyslipidemia, metabolic dysfunction–associated fatty liver disease (MAFLD), and musculoskeletal complaints. In addition, children with obesity may experience stigma, psychological distress, and reduced social functioning. Therefore, pediatric care should address obesity as a chronic disease requiring early identification, risk assessment, and comprehensive prevention and management rather than as a cosmetic concern.

ASSESSMENT AND DIAGNOSTIC CHALLENGES

The most common clinical approach to identifying obesity in children is body mass index (BMI) interpreted using age- and sex-specific percentiles, since body composition changes with growth and pubertal development. In routine practice, several barriers reduce the quality of assessment and counseling:

- BMI monitoring is not always performed regularly.
- Brief screening questions on diet and screen time are not consistently standardized.
- Communication may become stigmatizing or blaming, which decreases trust and reduces adherence to recommendations.

Nutrition-Related Problems. A major driver of childhood obesity is habitual intake of energy-dense foods and beverages, including fast foods, sweetened snacks, and sugar-sweetened beverages (SSBs). Such products are typically high in added sugars and unhealthy fats and contribute to a persistent positive energy balance. From a prevention perspective, reducing saturated and trans fats, added sugars, and excess salt supports healthier weight trajectories.

Regarding free sugars, it is recommended limiting intake to *less than 10% of total daily energy,* and preferably *below 5%* where feasible, because lower sugar intake is associated with better health outcomes. Evidence from meta-analyses indicates that consumption of SSBs is positively associated with BMI and weight gain in both children and adults. This association is clinically relevant because "liquid calories" often produce weak satiety and may increase total energy intake without reducing intake from other sources.

In addition, observational studies suggest that irregular meal timing (e.g., late dinners), frequent snacking, poor portion control, and eating while using screens may increase obesity risk through combined mechanisms such as distracted eating, higher caloric intake, and stronger influence of advertising, which together reinforce unhealthy food preferences.

Screen Time and Sedentary Behavior. Screen time represents an important component of sedentary behavior and may contribute to excess weight gain. Recommendations emphasize limiting sedentary time, particularly recreational screen exposure. In early childhood, screen time is generally *not recommended*

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for infants, and for children aged *2–4 years* it should be limited to *no more than one hour per day,* with less exposure considered better.

Screen time may contribute to obesity through several pathways:

- reduced energy expenditure due to prolonged sitting;
- increased consumption of snacks and sweet beverages during screen use;
- disrupted sleep patterns, especially with evening screen use, which can influence appetite regulation and behavior.

Thus, screen exposure affects both energy balance and behavioral regulation.

Insufficient Physical Activity. International recommendations state that children and adolescents aged 5–17 years should perform an average of at least 60 minutes per day of moderate-to-vigorous physical activity, mainly aerobic, and include muscle- and bone-strengthening activities on at least three days per week. In children aged 0–5 years, physical activity is primarily defined as active play, and children aged 1–4 years should accumulate at least 180 minutes per day of activity at varying intensities. Despite these targets, physical activity often remains below recommended levels. Common barriers include limited access to safe outdoor spaces, reduced physical education time, increased use of passive transport, and displacement of active play by screen-based activities.

The Reinforcing "Triad": Diet–Screen Time–Physical Activity. Childhood obesity typically results from a combination of factors rather than a single cause. When recreational screen time increases, physical activity often decreases, snacking tends to rise, and sleep is delayed. These interacting behaviors create a reinforcing cycle that increases weight gain risk and makes lifestyle correction more difficult.

Primary Pediatric Care. Early screening and risk stratification should be integrated into routine pediatric care. Height, weight, and BMI percentile should be assessed at each visit or at least annually. Brief, standardized screening questions can identify modifiable exposures, such as:

- "How many hours of screen time per day?"
- "How often are sugar-sweetened beverages consumed per week?"
- "How many minutes of active movement per day?"

When metabolic risk is suspected, further evaluation may include blood pressure measurement and laboratory tests such as lipid profile, glucose indices/markers of insulin resistance, and liver enzymes, depending on local protocols.

Family-centered counseling is essential because long-term behavioral change depends on the home environment. Counseling should avoid stigma and consider the family's resources and constraints. In practice, *substitution* is often more effective than strict prohibition—for example, replacing sweetened drinks with water or unsweetened fermented dairy beverages, replacing energy-dense snacks with fruit or portion-controlled nuts (with allergy precautions), and replacing passive screen time with enjoyable active play.

Nutrition-Focused Solutions. A practical goal is to limit free sugars to below 10% of daily energy intake (preferably below 5%). Clinical and school-based strategies include:

- reducing or eliminating SSBs from daily consumption;
- monitoring "hidden sugars" by reading product labels (e.g., packaged yogurts, cereal bars, confectionery);
- restricting sugary drinks and high-sugar snacks in school cafeterias.

Screen-Time Management

Age-appropriate limits should be applied, especially in early childhood. In older children, management should focus not only on reducing total screen time but also on changing high-risk routines:

- avoid eating meals while using screens ("screen-free meals");
- limit screens before bedtime to support sleep hygiene;
- avoid televisions in children's bedrooms.

These measures reduce distracted eating and help normalize sleep patterns.

Physical-Activity Promotion

For ages 5–17, achieving 60 minutes/day of moderate-to-vigorous activity can be supported through a simple "three-block" routine:

- 15–20 minutes in the morning (walking or stairs),
- 20–30 minutes after school (active play or sports),
- 15–20 minutes in the evening (family walk).

Active transport to school (walking or cycling) can be encouraged when safe and feasible, and schools can implement short "active breaks" during the day. In early childhood (0–4 years), the main objective is to increase active play and reduce prolonged restraint in strollers or seats.

CONCLUSION

Childhood obesity is a chronic, multifactorial disease that increases metabolic and psychosocial risks early in life. The most important modifiable determinants

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include diet quality (especially excess free sugars and SSBs), sedentary behavior and screen time, and insufficient physical activity. Abdominal obesity may represent a higher-risk phenotype, and hyperuricemia can be considered a potential marker associated with metabolic complications. Effective prevention and management require early screening, family-based multicomponent lifestyle intervention, and multidisciplinary collaboration (pediatrician, endocrinologist, dietitian, psychologist) when indicated.

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