AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

OBESITY IN CHILDREN: CLINICAL, METABOLIC AND INFLAMMATORY ASPECTS

Bobojonov Khurshid Jumaniyozovich
https://orcid.org/0009-0006-5776-8944
Lecturer at the Department of Pre-Clinical Sciences Asia International University

Resume. Childhood obesity has become one of the most serious global public health challenges of the 21st century. The prevalence of overweight and obesity among children and adolescents has increased dramatically over the past decades, leading to early onset metabolic disorders, cardiovascular complications, and psychosocial consequences. Obesity in children is not only a result of excessive caloric intake but represents a complex multifactorial disease involving genetic predisposition, environmental influences, endocrine mechanisms, behavioral factors, and chronic low-grade inflammation.
Recent evidence highlights the role of adipose tissue as an active endocrine organ producing adipokines and pro-inflammatory cytokines that contribute to insulin resistance, dyslipidemia, hypertension, and non-alcoholic fatty liver disease (NAFLD). Early identification of risk factors and implementation of preventive strategies are crucial to reducing long-term morbidity and mortality.

This article analyzes the epidemiology, pathophysiology, clinical manifestations, complications, diagnostic approaches, and modern management strategies of pediatric obesity..

Key words: childhood obesity, pediatric metabolic syndrome, insulin resistance, adipokines, inflammation, BMI, cardiovascular risk, children

Relevance

According to the World Health Organization (WHO), childhood obesity has increased more than fourfold over the last four decades. Globally, millions of children under 18 years are classified as overweight or obese. The condition is no longer limited to high-income countries; it is rapidly increasing in low- and middle-income regions.

Childhood obesity is associated with:

- Early development of type 2 diabetes mellitus
- Arterial hypertension
- Dyslipidemia
- Non-alcoholic fatty liver disease
- Obstructive sleep apnea
- Orthopedic complications
- Psychosocial disorders

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

Importantly, obese children are highly likely to become obese adults, which significantly increases the risk of cardiovascular diseases and premature mortality.

Given the rising prevalence and severe long-term consequences, childhood obesity represents a priority issue in pediatric healthcare.

Purpose of the study

To analyze the clinical, metabolic, inflammatory, and psychosocial aspects of obesity in children and to evaluate modern diagnostic and therapeutic approaches aimed at early prevention and effective management.

Materials and Methods

This article is based on a comprehensive review of contemporary scientific literature, international guidelines, and clinical observations in pediatric practice from 2018 to 2025.

Data sources included:

- WHO global reports
- International pediatric endocrinology guidelines
- Peer-reviewed clinical trials
- Observational studies on metabolic and inflammatory markers

Anthropometric assessment included:

- Body Mass Index (BMI) calculation
- BMI-for-age percentiles
- Waist circumference
- Waist-to-height ratio

Laboratory assessment parameters included:

- Fasting glucose
- Insulin levels
- HOMA-IR index
- Lipid profile
- Liver function tests
- Inflammatory markers (CRP, IL-6, TNF-alpha)

Statistical analyses from cited studies were considered significant at $p < 0.05$.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

Results

1. Epidemiology

The prevalence of childhood obesity varies by region but shows a consistent upward trend. Urbanization, sedentary lifestyle, increased screen time, and consumption of ultra-processed foods contribute significantly.

Adolescents demonstrate higher prevalence compared to younger children. Boys are slightly more affected in some populations, though gender differences vary geographically.

2. Pathophysiology

Obesity results from chronic positive energy balance; however, its biological mechanisms are complex.

Adipose Tissue as an Endocrine Organ

Adipose tissue secretes biologically active substances:

- Leptin
- Adiponectin
- Resistin
- TNF-alpha
- IL-6

In obesity:

- Leptin resistance develops
- Adiponectin levels decrease
- Pro-inflammatory cytokines increase

This leads to chronic low-grade systemic inflammation.

Insulin Resistance

Excess adiposity increases free fatty acid release, impairing insulin signaling pathways. Hyperinsulinemia develops as compensation, eventually progressing to glucose intolerance and type 2 diabetes.

3. Clinical Manifestations

Childhood obesity presents with:

- Increased BMI (>95th percentile)
- Central adiposity

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

- Acanthosis nigricans (marker of insulin resistance)
- Early puberty in some cases

Psychological features include:

- Low self-esteem
- Social isolation
- Depression
- Eating disorders

4. Metabolic Complications

4.1 Type 2 Diabetes Mellitus

Incidence of pediatric type 2 diabetes has risen in parallel with obesity. Insulin resistance precedes hyperglycemia.

4.2 Dyslipidemia

Typical lipid abnormalities:

- Elevated triglycerides
- Low HDL cholesterol
- Elevated LDL cholesterol

These changes accelerate atherosclerosis.

4.3 Hypertension

Obesity increases sympathetic nervous system activity and activates the renin-angiotensin-aldosterone system, contributing to elevated blood pressure.

5. Inflammatory Mechanisms

Chronic low-grade inflammation is a hallmark of obesity. Elevated CRP, IL-6, and TNF-alpha correlate with BMI and waist circumference.

Inflammatory cytokines:

- Impair endothelial function
- Promote atherosclerotic plaque formation
- Contribute to insulin resistance

The inflammatory profile in obese children resembles early stages of adult cardiovascular disease.

6. Non-Alcoholic Fatty Liver Disease (NAFLD)

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

NAFLD is one of the most common obesity-related complications in children. It ranges from simple steatosis to non-alcoholic steatohepatitis (NASH), fibrosis, and cirrhosis.

Elevated ALT and ultrasound findings are typical diagnostic indicators.

7. Diagnosis

Diagnosis is based on BMI-for-age percentiles:

- Overweight: 85th–94th percentile
- Obesity: ≥95th percentile

Waist circumference is important for assessing central obesity.

Laboratory screening is recommended for children with BMI ≥95th percentile.

Discussion

Childhood obesity is a chronic multifactorial disease requiring a multidisciplinary approach.

Contributing Factors

1. Genetic predisposition
2. High-calorie diet
3. Low physical activity
4. Screen time
5. Sleep deprivation
6. Socioeconomic factors

Prevention Strategies

- Promotion of breastfeeding
- Healthy school nutrition programs
- Reduction of sugary beverages
- Daily physical activity (≥60 minutes)
- Parental education

Conclusion

- Childhood obesity is a rapidly growing global health problem.
- It is associated with metabolic, cardiovascular, hepatic, and psychosocial complications.
- Chronic low-grade inflammation plays a central role in disease progression.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 02. February ,2026

- Early identification and prevention strategies are essential.
- Multidisciplinary management improves long-term outcomes.

Further large-scale longitudinal studies are required to optimize screening protocols and individualized treatment strategies.

References.

1. World Health Organization. Report of the Commission on Ending Childhood Obesity. Geneva; 2022.
2. American Academy of Pediatrics. Clinical Practice Guideline for the Evaluation and Treatment of Children and Adolescents With Obesity. 2023.
3. Centers for Disease Control and Prevention. Childhood Obesity Facts. 2024.
4. Styne DM et al. Pediatric Obesity—Assessment, Treatment, and Prevention. Endocrine Society Guidelines. 2018.
5. Braunwald E. Heart Disease: A Textbook of Cardiovascular Medicine. 12th ed. 2021.
6. Daniels SR. The consequences of childhood overweight and obesity. Future Child. 2020.