Obesity, Endocrine Dysfunction, and PCOS in Adolescence: Clinical Challenges and Management– the role of Artificial Intelligence

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Abstract

Adolescent obesity has become a critical global health concern with significant endocrine and reproductive consequences. Excess adiposity during puberty alters metabolic and hormonal regulation, leading to menstrual dysfunction, insulin resistance, and increased prevalence of polycystic ovary syndrome (PCOS). Diagnosis of PCOS in adolescence remains challenging due to overlap between physiological pubertal changes and pathological features, increasing the risk of both over diagnosis and delayed treatment. Evidence-based management emphasizes lifestyle intervention as first-line therapy, with pharmacologic and emerging adjunctive therapies applied when necessary. This paper reviews mechanisms linking obesity to endocrine dysfunction in adolescence, clinical challenges in PCOS diagnosis, current management strategies, and long-term health implications. A multidisciplinary and patient-centered approach is essential to optimize outcomes and prevent future metabolic and reproductive complications. AI represents a significant advancement for identifying, monitoring, and treating complex, interconnected metabolic and endocrine conditions in adolescents.

This article was conducted as a narrative literature review.

Keywords: adolescent obesity, endocrine dysfunction, menstrual disorders, PCOS, insulin resistance, lifestyle intervention, artificial intelligence.

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