

Introduction

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders in females, affecting approximately 8% of adolescent girls, yet many cases remain undiagnosed because early symptoms overlap with normal pubertal development. Insulin resistance (IR) is highly prevalent in adolescents and women with PCOS, affecting an estimated 35-80%, and contributes to hyperandrogenism, irregular ovulation, and reproductive dysfunction. Because IR is closely linked to PCOS pathophysiology, it has potential value to be a supportive marker during early clinical evaluations. However, IR is not currently a primary diagnostic criteria, and its role in guiding diagnosis and treatment remains unclear. This review, therefore, examines if IR influences the early diagnosis and clinical management of adolescents with PCOS.

Objectives

The study’s main goal is to evaluate if insulin resistance (IR) influences the early diagnosis and clinical management of adolescents with PCOS. The gap of knowledge is that current evidence on the diagnostic and management role of IR in adolescent PCOS has not been clearly synthesized. The hypothesis is that IR has a supportive role in early diagnosis and a strong influence on clinical management. The rationale for this review is that clarifying the clinical significance of IR may help improve evidence-based approaches to evaluating and managing adolescents with PCOS.

Methods

Databases: PubMed and Google Scholar
Keywords: “polycystic ovary syndrome,” “adolescent,” “insulin resistance,” “early diagnosis,” “screening,” “management,” “treatment,” and “intervention.”
Inclusion Criteria: Focused on adolescents with PCOS, relevance to PCOS diagnosis or clinical management, and articles published within the year 2000.
Exclusion Criteria: Focused only on adult women, studies primarily on unrelated complications, such as kidney injury or cardiovascular disease, and animal studies without clinical relevance.

Results

Table 1. Summary of major themes and findings across the included studies. Themes were organized according to the two specific aims: IR in early diagnostic evaluation and IR in clinical management.

Specific Aim	Theme	Summary Findings
SA 1	Supportive role of IR in early Diagnostic Evaluation	- IR may precede endocrine/reproductive abnormalities and contribute to the early development of PCOS - Earlier proposed adolescent diagnostic criteria include “insulin resistance or hyperinsulinemia” as one of five possible criteria - Clinical evaluation for suspected PCOS reported looking for signs or supporting evidence of IR
SA 1	Limitations of IR as a Diagnostic Criterion	- Physiologic IR during puberty can overlap with PCOS and complicate diagnosis - IR alone is not considered diagnostic - Current insulin tests have limited sensitivity, specificity, or clinical utility
SA 2	Metabolic Screening and Risk Assessment	- Metabolic abnormalities can occur early in adolescent PCOS - Several studies recommended glycemic screening, including the 2-hour OGTT, after diagnosis
SA 2	IR-directed treatment Decisions	- Lifestyle modification was commonly reported as first-line management - Metformin was repeatedly used as an insulin-sensitizing treatment and was associated with improvements in IR and some reproductive outcomes

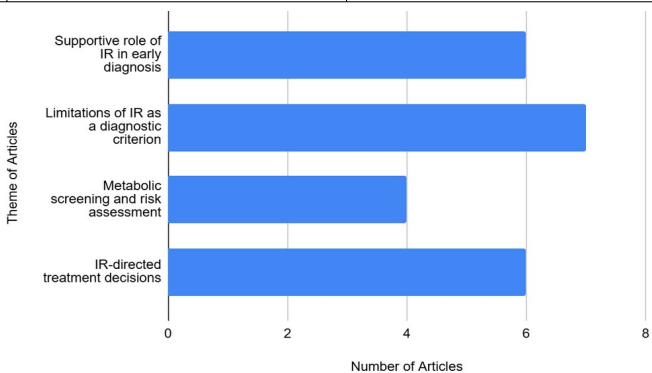


Figure 1. Number of included studies addressing each major theme. Each article could contribute to more than one theme, so categories were not mutually exclusive.

Discussion

Insulin resistance had a more consistent role in clinical management than in formal diagnosis of adolescent PCOS. Although IR and hyperinsulinemia may occur early and can be more severe in adolescents with PCOS, physiologic insulin resistance during puberty and limitations in the sensitivity, and clinical utility of current insulin tests reduce their diagnostic value. In contrast, IR-related metabolic abnormalities more consistently influenced screening and treatment. Studies emphasized glycemic assessment, lifestyle intervention, and insulin-sensitizing treatments such as metformin, indicating that IR currently has a stronger role in guiding management than in confirming a PCOS diagnosis.

Conclusion

These findings highlight the need for better standardized methods of assessing insulin resistance in adolescents with PCOS. Current evidence supports IR as an important metabolic feature and management target, but its diagnostic use is limited by normal pubertal changes and the lack of sufficiently reliable clinical insulin tests. This narrative review was limited by variation in PCOS diagnostic criteria, methods of measuring IR, and the amount of adolescent-specific evidence available. Future studies should evaluate standardized age and puberty-specific measures of IR and determine whether they can provide useful supportive information alongside current PCOS diagnostic criteria. In a clinical setting, better assessment of IR could help providers identify metabolic risk earlier and make more informed decisions about glucose screening and treatment.

References

