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# Review: The link among insulin intolerance and polycystic ovary syndrome (PCOS)

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**Abstract:**

During the past forty years, the global rate of being obese has increased, as have the frequency of other overweight-related concurrent illnesses such polycystic ovarian syndrome (PCOS). Based on hereditary sensitivity, PCOS generally appears clinically after weight gain, which typically happens throughout puberty. PCOS is a common endocrinopathy that affects around 6% to 10% of reproductive-age women. It is distinguished by a variety of homosexual and metabolic conditions. PCOS is linked to an elevated insulin level, which is unrelated to but worsened by obesity. Insulin resistance (IR) is a significant pathologic characteristic of polycystic ovarian syndrome, also called (PCOS), a prevalent endocrine condition affecting women of reproductive age. This study investigates the processes that emphasize the link between PCOS and insulin resistance, emphasizing the necessity of comprehensive care regimens, clinical consequences, and potential therapeutic options. A commonly misinterpreted hormonal illness that affects intermediates metabolic processes, the cardiovascular and genital systems, and has societal and psychological repercussions.

**Keywords**: polycystic ovarian syndrome , Insulin resistance.

# مراجعة: العلاقة بين عدم تحمل الأنسولين ومتلازمة تكيس المبايض(PCOS)

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**الملخص:**

خلال الأربعين عامًا الماضية، زاد المعدل العالمي للسمنة، كما زاد تواتر الأمراض المصاحبة الأخرى المرتبطة بالسمنة مثل متلازمة تكيس المبايض .(PCOS) بناءً على الحساسية الوراثية، تظهر متلازمة تكيس المبايض بشكل عام سريريًا بعد زيادة الوزن، والتي تحدث عادةً طوال فترة البلوغ. متلازمة تكيس المبايض هي اعتلال غدد صماء شائع يصيب حوالي 6٪ إلى 10٪ من النساء في سن الإنجاب. يتميز بمجموعة متنوعة من الحالات المثلية والأيضية. ترتبط متلازمة تكيس المبايض بارتفاع مستوى الأنسولين، وهو أمر غير مرتبط بالسمنة ولكنه يزداد سوءًا بسببها. تعد مقاومة الأنسولين سمة مرضية مهمة لمتلازمة تكيس المبايض، والتي تسمى أيضًا(PCOS) ، وهي حالة صماء شائعة تؤثر على النساء في سن الإنجاب. تبحث هذه الدراسة في العمليات التي تؤكد على الارتباط بين متلازمة تكيس المبايض ومقاومة الأنسولين، مع التأكيد على ضرورة

أنظمة الرعاية الشاملة والعواقب السريرية وخيارات العلاج المحتملة. مرض هرموني شائع سوء الفهم يؤثر على العمليات الأيضية والجهاز القلبي الوعائي والجهاز التناسلي، وله عواقب اجتماعية ونفسية.

**الكلمات المفتاحية**: متلازمة تكيس المبايض، مقاومة الأنسولين.

## Introduction:

Polycystic ovarian condition, or PCOS, affects 6-10% of women around the world and is distinguished by elevated testosterone levels, ovulatory failure, and irregular menstrual patterns. Rising insulin resistance (IR) affects 50-70% of women with PCOS(1), causing metabolic and sexual difficulties. For efficient therapy and maintenance, the link underlying IR and PCOS must be established. Metabolic syndrome, also referred to as MetS, is a set of medical diseases that include central obesity(2,3), high blood pressure, resistance to insulin, diabetes, and elevated cholesterol levels. Studies indicate the close connection among adiposity and PCOS38%–88% of women without PCOS are overweight or obese. According to a thorough assessment of relevant data, obese women had a 2.77 times higher risk of having PCOS than non-obese women. Furthermore, studies from the Northern Finnish Birth Registry (NFBC) 1966 demonstrate associations between Body Mass Index (BMI) and PCOS features at all ages, as well as an association with a rapid correction of overweight in childhood and the start of PCOS (and obesity) in adulthood. Polycystic ovary illness is thought to be caused by an abnormal hypothalamic-pituitary-ovarian or glucocorticoid axis(4). A disruption in the production rhythm of gonadotrophin-releasing hormone (GnRH) causes an approximate rise in LH to FSH release (5). Ovary estrogen is accountable for an aberrant feedback process that leads to an increase in LH secretion (6). In healthy women, the proportion of LH to FSH normally ranges between 1 and 2. In women with pcos ovarian disorder, this ratio reverses and can approach 2 or 3 (7)

## Mechanisms Linking IR to PCOS:

1. Hyperinsulinemia: ovarian androgen production is increased and sexual hormone-binding globulin (SHBG) is decreased when there is a resistance to insulin, which exacerbates elevated testosterone levels (8,9). Additional variables may potentially contribute to the development of insulin intolerance in women having PCOS(10). They involve higher levels of blood progesterone (both in adult and before conception, with proof of the latter coming coming from an ovine simulation of PCOS34) and a higher specificity of androgen receptors (measured by the steroid receptors CAG repeat frequency) (11,12).

2. Adiposity: PCOS patients frequently have obesity, which exacerbates IR. Failure

of the adipose tissue interferes with the production of adipokines, which increases inflammation and IR. Additional variables may potentially contribute to the development of insulin intolerance in women having PCOS(14,15,16). They involve higher levels of blood progesterone (both in adult. The visfatin, for example, is an adipokine that regulates digestion, inflammatory processes, and responsiveness to insulin.44, 53 Visfatin serum levels are greater in PCOS women than in healthy women.53-56 Elevated amounts of plasma the protein visfatin in PCOS may lead to insulin resistance and metabolic disorders. The literature on various adipokines in PCOS has yielded inconsistent findings (17,18).

3. Inflammation: PCOS has been associated with elevated levels of inflammatory substances indicators like CRP and IL-6, both of which contribute to IR, as well as chronic mild to regulate inflammatory conditions. Additional variables may potentially contribute to the development of insulin intolerance in women having PCOS (19). They involve higher levels of blood progesterone (both in adult. Furthermore, several research support the link between PCOS, vascular conditions, and endothelial cells failure, regardless of age, weight, or metabolic conditions (21,22).

**Clinical Implications:**

1. Women who have PCOS and IR are more likely to develop metabolic syndrome, which includes elevated cholesterol levels, dyslipidemia, and type 2 diabetes (23). Additional variables may potentially contribute to the development of insulin intolerance in women having PCOS. They involve higher levels of blood progesterone (both in adult. The ADA (American Diabetes Association) proposes using FPG or HbA1c rather than the OGTT for screening for T2D. However, FPG has been deemed inadequate as a means of detection in women with PCOS (24). In a similar vein HbA1c has been proposed as Because of its multiple benefits, it serves as a type 2 diabetes indication. These include its ability to detect typical blood sugar levels in the two to three months preceding the test, its relatively simple method of use (such as just one blood samples), and its durability and adaptability to changes caused by fasting for an extended period, digestion. states, or biological variability (25).

2. Cardiovascular Disease (CVD): IR and other metabolic irregularities in PCOS increase the risk of CVD, necessitating prompt treatment and monitoring. They involve higher levels of blood progesterone (both in adult. The syndrome believed to be a result of a mix of familial susceptibility and pregnancy and postpartum environmental variables such as obesity, nutrition, tension, and hormonal imbalances (26).

3. Reproduction. The dysfunction: IR causes an anovulation monthly irregularities, and infertility in PCOS, reducing quality of life and mental wellness. Sexual orientation regulates the production of cellular indicators that regulate adaptive as well as innate immunity (27). Women possess greater defenses versus diseases, an inclination to create antibodies, and a preference for the Th2-related type reaction (28).

**Therapeutic Strategies:**

1. Nutrition and strenuous exercise are the most effective therapy for lowering insulin resistance and enhancing physiological and sexual health in PCOS (29).
2. Pharmacological Therapies: Metformin, an insulin sensitizer, is commonly used to treat IR in PCOS. Thiazolidinediones (e.g., pioglitazone) are now under investigation, however caution is advised due to potential side effects(30).
3. Inflammation Management: Anti-inflammatory drugs and lifestyle changes that lower inflammation can benefit women with PCOS and IR (31).

4. Hormonal Methods: Birth control and anti-androgen drugs can treat increased amounts of testosterone and menstrual abnormalities, but they must be weighed against the risk of metabolic disease (32).

**Conclusion:**

PCOS is distinguished by elevated levels of insulin, which has a significant impact on biochemical and sexual wellness. Improved outcomes require comprehensive supervision, which includes lifestyle changes and targeted medication. Current research should focus on finding the molecular pathways that connect IR and PCOS, as well as developing new therapeutics.

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