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PREVALENCE AND CLINICAL PHENOTYPES OF POLYCYSTIC OVARY SYNDROME IN ADOLESCENT GIRLS LIVING IN IODINE-DEFICIENT REGIONS

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Abstract. Polycystic ovary syndrome (PCOS) is one of the most common endocrine conditions affecting females of reproductive age, yet its recognition during adolescence remains methodologically challenging. Pubertal maturation is characterized by transient menstrual irregularity, acne, and multifollicular ovarian morphology—features that can overlap with PCOS and inflate prevalence estimates when adult criteria are applied without age-specific safeguards. Contemporary evidence demonstrates that adolescent PCOS prevalence varies substantially by diagnostic framework: meta-analytic data indicate higher estimates under the original Rotterdam criteria than under the stricter adolescent-oriented recommendations embedded within the 2023 International Evidence-Based Guideline.

Keywords: adolescent girls; polycystic ovary syndrome; prevalence; clinical phenotypes; hyperandrogenism.

INTRODUCTION

Adolescence is a period when the reproductive endocrine axis is still “calibrating.” Menarche marks the beginning of cyclicity, but regular ovulatory cycles often take time to establish, and early post-menarche years commonly feature variable cycle length and anovulatory bleeding patterns. For clinicians, educators, and researchers, the difficulty is that these expected transitional features overlap with PCOS, a syndrome defined by hyperandrogenism and ovulatory dysfunction (and, in some adult frameworks, polycystic ovarian morphology). Because diagnostic thresholds and the role of ultrasound differ between adolescents and adults, the same adolescent population may yield markedly different prevalence estimates depending on which criteria are used. This is not a minor statistical nuance: overdiagnosis can stigmatize adolescents, drive unnecessary testing, and cause inappropriate labeling; underdiagnosis can delay intervention for metabolic, psychological, and reproductive risks that may track into adulthood.

MATERIALS AND METHODS

Against this clinical backdrop sits a regional and environmental layer: iodine nutrition. Iodine deficiency remains prevalent in many inland and mountainous territories and is typically assessed at the population level via urinary iodine concentration (UIC). The World Health Organization (WHO) indicates that a population of school-age children should have a median UIC ≥100 μg/L, with <20% of samples below 50 μg/L, as a benchmark of adequate iodine intake. [4] Since thyroid hormones influence growth, energy metabolism, and aspects of reproductive regulation, thyroid dysfunction in iodine-deficient settings can contribute to menstrual irregularity and other symptoms that overlap with PCOS-related presentations. Therefore, when evaluating PCOS prevalence and phenotypes

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among adolescents living in iodine-deficient regions, it is crucial to integrate adolescent-appropriate PCOS diagnostics with contextual thyroid assessment and iodine status measurement, rather than treating PCOS as a purely "ovarian" phenomenon detached from environmental endocrinology.

RESULTS AND DISCUSSION

The central reason prevalence estimates diverge is that PCOS is not diagnosed with a single biomarker. It is defined by a constellation of features that can fluctuate with puberty, body composition, and measurement methods. In adolescents, this creates a "moving target" problem. Meta-analyses illustrate the magnitude of this variability. A large systematic review and meta-analysis focused on adolescents found that prevalence depends strongly on diagnostic criteria, with higher estimates when broader frameworks are used. [6] More recently, a global meta-analysis incorporating multiple world regions reported a pooled prevalence of 9.8% when applying the original Rotterdam criteria, but 6.3% when applying the more stringent criteria aligned with the International Evidence-Based Guideline. [1] These differences highlight two methodological realities: first, diagnostic breadth changes the numerator (who counts as PCOS); second, puberty-related overlap changes the false-positive rate, especially when ultrasound morphology is weighted heavily.

The implication for iodine-deficient regions is straightforward: if a region has a higher background rate of thyroid abnormalities, menstrual irregularity may be more frequent for reasons unrelated to PCOS. Without an adolescent-specific diagnostic framework and a thyroid exclusion algorithm, prevalence estimates can drift upward, not because PCOS is truly more common but because differential diagnosis was incomplete. Conversely, if a region has limited access to biochemical androgen testing and relies mostly on clinical signs (which may be confounded by acne common in puberty), PCOS may be undercounted. Therefore, prevalence studies in resource-variable and iodine-deficient settings must clarify (i) what diagnostic criteria were used, (ii) which exclusion diagnoses were checked, and (iii) what laboratory methods were applied.

The 2023 International Evidence-Based Guideline and its adolescent-focused publications converge on a key principle: for adolescents, both ovulatory dysfunction and hyperandrogenism are required; moreover, ultrasound and anti-Müllerian hormone (AMH) are not recommended for diagnosis during adolescence due to poor specificity. [2–3] This is a major departure from how many adult-oriented Rotterdam interpretations are applied in general practice, and it directly affects phenotype classification. If ultrasound morphology is removed from the diagnostic core, phenotype characterization must shift toward clinical and biochemical expression—how severe hyperandrogenism is, how persistent ovulatory dysfunction is, and what metabolic and psychological features co-occur.

CONCLUSION

PCOS in adolescence sits at the intersection of normal pubertal transition and early-life endocrine pathology, making prevalence estimation highly sensitive to diagnostic criteria and study design. Contemporary evidence indicates that pooled adolescent prevalence is notably higher under the original Rotterdam criteria than under the stricter adolescent-oriented criteria aligned with the 2023 International Evidence-Based Guideline (approximately 9.8% vs 6.3%, respectively). [1] The guideline's adolescent recommendations—requiring both ovulatory dysfunction and hyperandrogenism, discouraging ultrasound and AMH for diagnosis, and introducing an "at risk" category with reassessment around full reproductive maturity—provide a practical framework to reduce overdiagnosis while preserving clinical vigilance. [2–3]

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