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POLYCYSTIC OVARY SYNDROME IN ADOLESCENCE IN ALBANIA: DIAGNOSTIC UNCERTAINTY AND THE RISK OF OVERDIAGNOSIS

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Abstract

Background: Diagnosing polycystic ovary syndrome (PCOS) during adolescence is inherently challenging due to the overlap between normal pubertal physiology and pathological features of the syndrome. In Albania, the absence of adolescent-specific national guidelines and limited access to specialized multidisciplinary services may further increase diagnostic uncertainty and the risk of overdiagnosis.

Objective: To critically examine diagnostic practices for adolescent PCOS in Albania and to propose pragmatic, evidence-based management strategies aimed at minimizing overdiagnosis while ensuring timely intervention for adolescents at genuine risk.

Methods: This narrative, clinically based analysis integrates data from adolescents aged 11–19 years evaluated for suspected PCOS in Albanian healthcare settings, combined with contemporary international evidence. Diagnostic criteria, treatment decisions, and follow-up outcomes were analyzed through a multidisciplinary clinical lens.

Results: Menstrual irregularities and hyperandrogenic symptoms were common in early adolescence but often transient. Application of adult diagnostic criteria led to premature PCOS labeling in a subset of patients. Lifestyle-focused management and longitudinal reassessment resulted in symptom resolution for many adolescents without the need for pharmacological therapy.

Conclusion: A cautious, developmentally informed approach to adolescent PCOS is essential in Albania. Emphasizing diagnostic restraint, timely follow-up, and lifestyle-centered care can reduce overdiagnosis and the associated psychosocial burden.

Keywords: *Adolescent PCOS, Albania, diagnostic uncertainty, overdiagnosis, lifestyle intervention*

Background

International societies, including American Society for Reproductive Medicine (ASRM) and European Society of Human Reproduction and Embryology (ESHRE) and the Pediatric Endocrine Society (11), have been increasingly vocal about the need for caution when diagnosing PCOS in adolescents. And that caution is well-justified. Many of the features we associate with PCOS, irregular cycles, acne, fluctuating hormone levels, are also completely normal during puberty. When adult diagnostic criteria are applied to

adolescents, a large proportion end up being incorrectly labeled.This overdiagnosis has real consequences. For a teenager, receiving a PCOS diagnosis can be alarming. It may generate anxiety about fertility, weight, body image, and long-term health. It can also lead to unnecessary exposure to medications like metformin or anti-androgens, and introduce a sense of being "chronically ill" during a developmental stage that is already emotionally complex. In short, mislabeling medicalizes normal physiology.

At the same time, true PCOS in adolescence does exist, and it carries important long-term risks, especially insulin resistance, metabolic syndrome, and potential reproductive challenges in adulthood. So the goal is not to ignore symptoms, but to interpret them through a developmentally informed lens.This is where a nuanced diagnostic approach becomes essential. Rather than relying on ultrasound morphology or isolated laboratory abnormalities, clinicians are encouraged to focus on persistent, well-defined features: menstrual irregularity that continues more than two years after menarche, and clear clinical or biochemical hyperandrogenism. These criteria help distinguish normal pubertal transition from true endocrine dysfunction.

The current literature emphasizes that the diagnosis of PCOS in adolescence is associated with considerable uncertainty. Many authors emphasize that menstrual disorders, acne, and mild hyperandrogenism are common in the first years after menarche (3,4).

Teede et al. (1) report that the quality of evidence informing the assessment and management of PCOS has generally improved over the past five years; however, it remains predominantly of low to moderate quality. Through international evidence-based guidelines, they caution that applying the Rotterdam criteria in adolescents substantially increases the risk of overdiagnosis. Consequently, they recommend age-specific diagnostic criteria for adolescents and advise against the routine use of ovarian ultrasound in this population.

Peña AS, and al. (2,6) proposed the concept of adolescents "at risk for PCOS", emphasizing longitudinal follow-up rather than early diagnosis. Extensive international engagement and rigorous processes generated International Guideline diagnostic criteria for adolescents that differ from adult criteria and clarified appropriate screening and management strategies for PCOS during adolescence. In terms of therapy, systematic studies support lifestyle interventions as the first line of treatment.

According to Ibáñez et al. (3)**,** PCOS in adolescence is characterized by a complex pathophysiology involving interactions between genetic and epigenetic factors. Their work examines the pathophysiology as well as the guidelines for the diagnosis and management of PCOS during adolescence, emphasizing that an appropriate diagnosis requires an adequate and careful evaluation of clinical and biochemical symptoms.

Ultimately, our responsibility is to protect adolescents both from overdiagnosis and from missed diagnosis. By grounding our clinical decisions in adolescent-specific guidelines, we avoid unnecessary labeling while still providing early, appropriate care for those who genuinely need it.

Objectives

This study examines diagnostic patterns and treatment outcomes in a large cohort of adolescents evaluated within a multidisciplinary women's health clinic in Albania. What makes this setting particularly valuable is the integration of endocrinology, gynecology, nutrition, and psychological care, allowing us to assess adolescent PCOS from multiple clinical perspectives.

Our goal was twofold: first, to clarify which diagnostic practices are truly supported by current evidence, and second, to identify why overdiagnosis remains so common in community settings. Many adolescents arrive with a pre-existing diagnosis of PCOS, often based on criteria that are inappropriate for their de-

velopmental stage, such as ovarian ultrasound findings or isolated hormonal values. When these same patients are reassessed using adolescent-specific guidelines, a large proportion no longer meet the criteria.

By analyzing this large cohort, our study provides a clearer picture of what accurate diagnosis looks like in adolescence. When we apply the correct criteria, persistent menstrual irregularity more than two years after menarche, combined with clear clinical or biochemical hyperandrogenism, we dramatically reduce mislabeling and avoid unnecessary treatments.

These findings are especially important for clinicians working in primary and community care. They emphasize that PCOS in adolescence should be diagnosed cautiously and thoughtfully, with a solid understanding of normal pubertal physiology. Only features that are persistent and clinically meaningful should be used to guide the diagnosis.

Ultimately, this study aims to bring greater clarity to adolescent PCOS, reduce diagnostic errors, and promote safer, more effective management for young patients.

Methods

In this study, we conducted a retrospective cohort review of adolescents aged 11 to 19 years who were evaluated between 2020 and 2024 at a private multidisciplinary women's health clinic in Albania. What makes this setting particularly valuable is its integration of endocrinology, gynecology, psychology, and nutrition services. This allowed us to assess each adolescent comprehensively, using consistent standards across specialties.

All patients were referred with suspected PCOS and underwent a standardized evaluation based on international adolescent-specific guidelines. To ensure diagnostic accuracy, we required two key features: persistent menstrual irregularity more than two years after menarche, and clear evidence of clinical or biochemical hyperandrogenism. Importantly, ovarian ultrasound morphology and AMH levels were intentionally excluded, given their poor reliability in early adolescence.

Clinical, endocrine, metabolic, and psychological data were collected at baseline and during follow-up visits over a 24-month period. This design allowed us to observe not only diagnostic patterns but also the impact of evidence-based treatment strategies on symptoms and metabolic markers over time.

Overall, this approach provided a robust framework for understanding how PCOS is diagnosed and managed in real-world adolescent care.

Data collection

For data collection, we extracted all clinical, metabolic, endocrine, and gynecologic information from the clinic's electronic medical records. Each adolescent was followed prospectively, with repeat evaluations every three to six months. This provided us with up to two years of longitudinal data to track symptom progression, treatment response, and overall clinical outcomes.

Diagnostic & Exclusion Criteria

In this study, we applied the modified international diagnostic guidelines specifically developed for adolescents with suspected PCOS. These criteria are intentionally more restrictive than adult criteria, because normal puberty often includes cycle irregularity and acne, which can easily be mistaken for signs of

PCOS. Using adolescent-specific definitions helps us avoid overdiagnosis and ensures that only patients with true, persistent features are identified.

The first requirement was **persistent menstrual irregularity beyond two years after menarche**. This reflects the point at which the hypothalamic-pituitary-ovarian axis is expected to mature. We considered menstrual cycles abnormal if they consistently exceeded 45 days, if the interval between cycles was shorter than 21 days, or if the adolescent met criteria for primary amenorrhea, defined as no menses by age 15 or more than three years after the onset of breast development, also known as thelarche. These definitions distinguish physiologic pubertal variation from true ovulatory dysfunction.

The second requirement was **evidence of hyperandrogenism**, which could be demonstrated clinically or biochemically. Clinical hyperandrogenism refers to signs such as moderate-to-severe acne or hirsutism, features that are visibly apparent and often distressing for adolescents. Biochemical hyperandrogenism was defined by elevated levels of total or free testosterone, measured through standardized laboratory testing. Importantly, we did not rely on ultrasound morphology or AMH levels, as both have been shown to be unreliable and potentially misleading in early adolescence.

By applying these two mandatory components, persistent menstrual irregularity and confirmed hyperandrogenism, we aligned our diagnostic approach with current recommendations from leading international societies. This allowed us to differentiate true PCOS from the wide spectrum of normal pubertal variability and ensured that adolescents received accurate diagnoses and appropriate management.

In evaluating adolescents for suspected PCOS, it is just as important to recognize which tests **should not** be used for diagnosis. In line with current international recommendations, our study excluded two commonly misapplied measures that lack specificity in this age group.

First, **polycystic ovarian morphology on ultrasound**, or PCOM, was not considered a diagnostic criterion. During early adolescence, multifollicular ovaries are extremely common and represent normal physiology rather than pathology. Relying on ultrasound in this population significantly increases the risk of overdiagnosis.

Second, we excluded **Anti-Müllerian hormone, or AMH, levels**. Although AMH is sometimes used in adult populations, it is highly variable in adolescents and does not reliably correlate with ovulatory function or true PCOS. Interpreting AMH during puberty often leads to inaccurate conclusions.

By excluding these two parameters, we ensured that diagnosis focused solely on clinical and biochemical features that are valid and meaningful in adolescents. This approach reduces diagnostic error and supports a more accurate, developmentally appropriate evaluation of PCOS

Statistical Findings and Results

In terms of statistical analysis, our approach centered on describing the diagnostic patterns and treatment outcomes observed across the entire adolescent cohort and then comparing these findings between two key groups: adolescents who arrived with a previous diagnosis of PCOS and those who were newly diagnosed within our clinic using adolescent-specific criteria.

We began with descriptive statistics, which allowed us to summarize the prevalence of clinical features, hormonal abnormalities, and metabolic findings in the population. These descriptive measures were crucial for establishing a baseline understanding of how adolescents present when referred for suspected PCOS. We also summarized treatment outcomes at follow-up intervals, including menstrual regularity, changes in acne or hirsutism, and improvements in metabolic markers.

Next, we performed comparative analyses to examine meaningful differences between patients who entered the clinic with an existing diagnosis versus those who were diagnosed after undergoing our standardized evaluation. This comparison highlighted the degree of overdiagnosis occurring in community settings and clarified how diagnostic accuracy influences clinical management. For example, adolescents previously labeled with PCOS were more likely to have been diagnosed based on ultrasound morphology or isolated hormonal results, criteria that lack specificity in adolescence. In contrast, those diagnosed within the clinic met well-defined guideline-based criteria, leading to a much smaller and more accurately identified group.

These statistical comparisons helped us quantify how misapplied diagnostic criteria contribute to inflated PCOS prevalence in youth, and they demonstrated that applying adolescent-specific guidelines results in a more targeted and clinically meaningful diagnosis. Ultimately, the statistical findings reinforce the importance of developmentally appropriate diagnostic standards and highlight the benefits of a structured, multidisciplinary assessment in reducing diagnostic error and improving treatment outcomes.

Diagnostic findings

In reviewing the diagnostic patterns within our cohort, one of the most striking findings was the discrepancy between community-based diagnoses and those confirmed using adolescent-specific criteria. Of the 524 adolescents who arrived with a prior diagnosis of PCOS, only 162 actually met the strict guideline-based criteria after reevaluation in our clinic.

This means that **69% of the adolescents previously labeled with PCOS were in fact overdiagnosed**. Most of these earlier diagnoses were based on criteria that are not reliable in adolescence, such as ultrasound morphology or isolated hormonal abnormalities.

When we apply the correct developmental criteria across the entire referred population, the **true prevalence of PCOS was only 6.9%**. This much lower and more accurate rate highlights how easily typical features of puberty can be mistaken for pathology when adult standards are used.

These findings underscore the critical importance of using adolescent-specific diagnostic guidelines. Doing so not only prevents unnecessary labeling and treatment but also ensures that the smaller group of adolescents who truly have PCOS receive appropriate, targeted care.

Në vend të vendosjes së menjëhershme të një diagnoze përfundimtare, adoleshentet me shenja të ngjashme me SOPK-në duhet të kategorizohen në grupe rreziku (i ulët, i ndërmjetëm, i lartë), bazuar në qëndrueshmërinë e simptomave, ashpërsinë e hiperandrogjenizmit dhe profilin metabolik.

Reasons of misdiagnosis

When we examined why so many adolescents had been misdiagnosed with PCOS prior to referral, three major patterns emerged.

The most common factor, accounting for 42% of misdiagnoses, was the reliance on ovarian ultrasound. Many adolescents had findings of PCOM, which are actually very typical in early puberty and do not indicate PCOS at this age. Using ultrasound as a diagnostic tool in adolescents almost inevitably inflates the diagnosis.

The second major contributor, seen in 37% of cases, was transient menstrual irregularity within the first two years after menarche. During this period, the reproductive axis is still maturing, and irregular cycles

are expected. Unfortunately, these normal patterns were frequently interpreted as pathological.

Finally, 21% of misdiagnosed cases were based on isolated mild hyperandrogenemia. Without persistent symptoms or cycle dysfunction, slightly elevated androgen levels in adolescents lack diagnostic meaning. Yet in community settings, these single lab abnormalities were often treated as confirmation of PCOS.

Together, these findings illustrate how easily normal adolescent development can be misclassified as disease when inappropriate criteria are used. They highlight the necessity of applying adolescent-specific guidelines to ensure accurate and responsible diagnosis.

The 12-month follow-up

At the 12-month follow-up, we observed meaningful improvements among the adolescents who were correctly diagnosed with PCOS using adolescent-specific criteria. These outcomes highlight the effectiveness of a targeted, guideline-based treatment approach.

First, 78% of patients showed improved menstrual regularity. This reflects stabilization of ovulatory function with appropriate use of lifestyle counseling, hormonal therapy when indicated, and careful longitudinal monitoring.

Second, 64% reported a reduction in acne or hirsutism, two of the most visible and emotionally distressing features of PCOS in adolescence. These improvements demonstrate the benefit of individualized dermatologic and endocrine management, particularly when hyperandrogenism is correctly identified.

Finally, 54% demonstrated improvement in metabolic markers, including HOMA-IR, fasting insulin, and lipid profiles. While metabolic changes tend to occur more gradually, this level of improvement reinforces the value of early lifestyle intervention and coordinated multidisciplinary care.

Together, these findings show that when PCOS is accurately diagnosed and managed appropriately, adolescents experience substantial gains across reproductive, dermatologic, and metabolic domains within the first year of treatment."

Discussion

This study highlights the substantial risk of over diagnosing PCOS during adolescence. Many of the features we associate with PCOS, such as irregular menstrual cycles and acne, are also completely normal parts of pubertal development. When these physiologic changes are misinterpreted as pathology, adolescents are frequently labeled with PCOS prematurely.

Our findings suggest that clinicians in community settings often rely on adult diagnostic criteria or place too much emphasis on ovarian ultrasound results. Both practices contribute significantly to misdiagnosis. Ultrasound findings like PCOM are extremely common in early adolescence and should not be used as a diagnostic tool, yet many adolescents received their diagnosis based solely on imaging.

This pattern of overdiagnosis can lead to unnecessary treatments, emotional distress, and confusion for patients and families. By applying adolescent-specific guidelines and focusing on persistent symptoms, rather than transient pubertal changes, we can ensure more accurate diagnosis and provide care that truly aligns with each patient's developmental stage.

Guideline

International guidelines consistently emphasize two essential principles when diagnosing PCOS in adolescents. The first is that ultrasound should not be used as a diagnostic tool in early adolescence. Polycystic ovarian morphology, or PCOM, is extremely common during normal pubertal development and has very little diagnostic value at this age. Relying on ultrasound leads to unnecessary labeling and is one of the major drivers of overdiagnosis.

The second key guideline is that menstrual irregularity must be persistent and clearly outside the boundaries of normal pubertal variation. Irregular cycles are expected in the first one to two years after menarche as the reproductive axis matures. Only when these irregularities continue beyond this developmental window do they carry diagnostic significance.

Together, these guidelines remind clinicians to differentiate normal pubertal physiology from true pathology. Applying them correctly reduces misdiagnosis, prevents unnecessary treatments, and ensures that adolescents with genuine PCOS receive appropriate and timely care.

Implication

The implications of our findings strongly reinforce current international recommendations. When we re-evaluated, adolescents using age-appropriate diagnostic criteria, nearly seven in ten prior PCOS diagnoses proved inaccurate. This highlights how easily normal pubertal changes can be misinterpreted when adult criteria or unreliable markers are used.

The psychological impact of misdiagnosis was substantial. Many adolescents expressed fears about infertility, long-term medication dependence, or future metabolic disease, concerns that were out of proportion to their actual health status. Such anxiety can shape self-image and health behaviors at a critical developmental stage.

A multidisciplinary approach helps mitigate these harms by ensuring that treatment is aligned with the patient's developmental needs. Evidence-based therapy should focus on managing specific symptoms, not on reinforcing a diagnostic label. Lifestyle guidance, appropriately selected hormonal therapy, and careful metabolic monitoring remain the foundation of effective adolescent PCOS care.

Overall, these implications emphasize that accurate diagnosis protects adolescents not only medically, but also psychologically, while supporting more targeted and meaningful treatment."

Conclusion

To conclude, our study shows clearly that PCOS continues to be one of the most frequently misapplied diagnoses in adolescent gynecology. Many of the features that are considered hallmark signs of PCOS in adults—such as irregular cycles, acne, and variable hormone levels—are extremely common during normal pubertal maturation. When clinicians rely on adult diagnostic standards, the result is a high rate of false positives and unnecessary medicalization of healthy adolescents.

By applying adolescent-specific diagnostic criteria, we were able to reduce misdiagnosis dramatically. These criteria emphasize persistent menstrual irregularity beyond the early pubertal years and clear clinical or biochemical hyperandrogenism. When these principles are used consistently, the diagnosis becomes far more accurate, and treatment becomes more meaningful.

Our findings also highlight the essential value of multidisciplinary evaluation. When endocrine, gynecologic, metabolic, and psychological perspectives are integrated, clinicians gain a more complete understanding of each patient's developmental stage, clinical needs, and emotional context. This leads to care that is truly patient-centered instead of label-centered.

The implications for practice are straightforward: clinicians should avoid the premature use of ultrasound, which lacks specificity in early adolescence; they should not rely on isolated biochemical results without clinical correlation; and they must resist the temptation to apply adult criteria to adolescents. Following these principles protects young patients from unnecessary anxiety and treatment while ensuring that those with true PCOS receive timely, targeted, and effective management.

Ultimately, accurate diagnosis is not just a technical exercise, it is a safeguard for adolescent well-being, shaping healthier physical and psychological outcomes for years to come.

- Development of national guidelines specific to adolescents
- Training professionals on pubertal physiology
- Delaying diagnostic labeling with follow-up protocols
- Integrating lifestyle medicine into routine care
- Expanding psychological support
- Establishing clear referral pathways

Clinical implications and study limitations

Based on our findings, several important clinical implications emerge. First, the study reinforces the need for clinicians to adopt adolescent-specific diagnostic criteria when evaluating suspected PCOS. Misdiagnosis was common in this cohort, largely due to the misapplication of adult standards, reliance on ultrasound, or interpretation of transient pubertal features as pathology. By focusing instead on persistent menstrual irregularity and clear hyperandrogenism, clinicians can significantly reduce unnecessary labeling, avoid inappropriate treatments, and minimize psychological distress for adolescents and their families.

Second, the findings highlight the value of a multidisciplinary approach. When endocrinology, gynecology, psychology, and nutrition are aligned, patient care becomes more individualized and developmentally appropriate. This model improves symptom management, enhances metabolic outcomes, and provides emotional support during a vulnerable developmental period.

However, several limitations must be acknowledged. The study was conducted in a single private multidisciplinary clinic, which may limit generalizability to broader or resource-limited settings. Because the analysis was retrospective, we relied on previously documented clinical information, which may be incomplete or variable in detail. Additionally, while follow-up extended to 24 months, longer-term outcomes into adulthood were not assessed. Another limitation is that some prior diagnoses were based on outside laboratory and imaging studies with differing quality standards.

Despite these constraints, the study offers valuable insights into diagnostic challenges and highlights practical strategies to improve accuracy and care. The implications emphasize that thoughtful, developmentally informed evaluation leads to better clinical decision-making and healthier long-term trajectories for adolescents.

Summery

PCOS in adolescence should be conceptualized as a dynamic spectrum rather than a static diagnosis. Care based on biological maturity, conservative management, and multidisciplinary follow-up can reduce overdiagnosis and protect long-term reproductive and metabolic health.

References

1. Teede HJ, Tay CT, Laven J, Dokras A, Moran LJ, Piltonen TT, Costello MF, Boivin J, M Redman L, A Boyle J, Norman RJ, Mousa A, Joham AE; International PCOS Network. Recommendations from the 2023 International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome. Fertil Steril. 2023 Oct;120(4):767-793. doi: 10.1016/j.fertnstert.2023.07.025. Epub 2023 Aug 14. PMID: 37589624.

2. Peña AS, Witchel SF, Boivin J, Burgert TS, Ee C, Hoeger KM, Lujan ME, Mousa A, Oberfield S, Tay CT, Teede H. International evidence-based recommendations for polycystic ovary syndrome in adolescents. BMC Med. 2025 Mar 11;23(1):151. doi: 10.1186/s12916-025-03901-w. PMID: 40069730; PMCID: PMC11899933.

3. Ibanez L, Oberfield SE, Witchel S, Auchus RJ, Chang RJ, Codner E, et al. An international consortium update: pathophysiology, diagnosis, and treatment of polycystic ovarian syndrome in adolescence. *Horm Res Paediatr. 2017;88(6):371–95* https://doi.org/10.1159/000479371, PubliMed

4. Zhang Y, Yang K, Fan T, Zheng D, Liu H. Diagnosis and Treatment of Adolescent Polycystic Ovary syndrome:A Review. *Int J Womens Health*. 2025; 17:459-474, https://doi.org/10.2147/IJWH.S506498

5. Kamboj MK, Bonny AE. Polycystic ovary syndrome in adolescence: diagnostic and therapeutic strategies. *Transl Pediatr. 2017 Oct;6(4):248-255*. doi: 10.21037/tp.2017.09.1, PMID: 29184806; PMCID: PMC5682369.

6. Witchel SF, Oberfield SE, Peña AS. Polycystic ovary syndrome in adolescence. Journal of the Endocrine Society. 2019.

7. Mousa A, Tay CT, Teede HJ. Technical report for the 2023 international evidence-based guideline for the assessment and management of polycystic ovary syndrome. Australia: Monash University. 2023, https://bridges.monash.edu/articles/report/Technical_Report_for_the_2023....

8. Tehrani FR, Amiri M. PCOS in adolescents: diagnostic challenges. *International Journal of Endocrinology and Metabolism*. 2019.

9. Morin-Papunen L., Risk factors in adolescence for the development of polycystic ovary syndrome. *Gynecology*. 2016;49(11):838–845. doi:10.1007/s00129-016-3935

10. https://www.eshre.eu/Annual-Meeting/Best-of-ASRM-and-ESHRE-2025