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Racial and Ethnic Differences in Hirsutism Among Women with Polycystic Ovary Syndrome (PCOS): A narrative review

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Abstract

Polycystic ovary syndrome (PCOS) is a prevalent endocrine disorder in women, frequently accompanied by hirsutism—a clinical marker of hyperandrogenism. However, the expression and diagnostic thresholds for hirsutism vary significantly across racial and ethnic groups. This narrative review synthesizes current evidence on ethnic disparities in hirsutism prevalence among women with PCOS, with an emphasis on Asian populations. While 60–90% of Middle Eastern and Caucasian women with PCOS meet the classic modified Ferriman-Gallwey (mFG) threshold of ≥8, less than 30% of East Asian women do—despite similar biochemical profiles. These disparities arise from differences in hair follicle androgen sensitivity, baseline hair density, and cultural grooming practices. The review critiques the universal use of mFG ≥8 and advocates for ethnicity-adjusted cutoffs (e.g., ≥5–7 in East Asians, ≥10–12 in South Asians) combined with biochemical testing. Such tailored approaches enhance diagnostic accuracy, prevent over- or underdiagnosis, and support culturally sensitive clinical care. Future directions include genetic studies, simplified tools, and greater inclusion of diverse populations in PCOS research to improve diagnostic equity and therapeutic outcomes.

Keywords: Polycystic ovary syndrome (PCOS); hirsutism; ethnic differences; modified Ferriman-Gallwey score; hyperandrogenism.

1. Introduction

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders in women, with community-based prevalence estimates ranging from 6 % to 20 % of those of reproductive age, depending on whether the NIH, Rotterdam, or AE-PCOS criteria are applied (Teede et al., 2018). The syndrome affects metabolic, reproductive, dermatological, and psychological domains, making it both a life-course health concern and a considerable public-health burden (Teede et al., 2023).

Clinical feature of PCOS is hirsutism, defined as excessive terminal hair growth in a male-pattern distribution. Whereas hirsutism affects only 4 – 11 % of women in the general population, it rises to 65 – 75 % in women with PCOS, underscoring its strong association with hyperandrogenism (Spritzer et al., 2022). Beyond its diagnostic value, hirsutism frequently triggers psychosocial distress, prompting many women to seek clinical care.

The psychosocial impact should not be underestimated

Cross-sectional surveys consistently show that the PCOS symptoms women find most bothersome are hirsutism, menstrual irregularity, and weight issues that are closely linked with poorer quality-of-life scores, heightened

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body-image dissatisfaction, and depressive symptoms (Ligocka et al., 2024). This intersection of physical and psychological well-being underlines the need for accurate recognition and culturally sensitive counselling.

However, the expression and severity of hirsutism vary markedly across racial and ethnic groups. Large U.S. multicentre analyses report clinical hirsutism in 70 – 80 % of Caucasian and Hispanic women with PCOS but in < 30 % of their East-Asian counterparts, even when biochemical hyperandrogenism is comparable (VanHise et al., 2023). Such disparities are attributed to differences in hair-follicle androgen sensitivity, baseline body-hair patterns, and cultural reporting behaviours.

Diagnostic methodology compounds this problem. The modified Ferriman-Gallwey (mFG) score remains the standard visual tool, but its classic threshold of ≥ 8 was derived from Caucasian cohorts. Ethnic-specific studies demonstrate that a lower cut-off often ≥ 5 – 7 better discriminates hirsutism in East- and Southeast-Asian women. For example, a Filipino cross-sectional study established mFG ≥ 7 as the optimal threshold linked to biochemical hyperandrogenism (Ilagan et al., 2019). Without such adjustments, clinicians risk under-diagnosing PCOS in populations with intrinsically low body-hair density.

In light of these observations, this review synthesises current evidence on racial and ethnic differences in the prevalence and presentation of hirsutism among women with PCOS, with a special focus on the comparatively understudied Asian region. By interrogating genetic, hormonal, and sociocultural contributors and by critiquing the tools used to measure hirsutism we aim to highlight knowledge gaps and propose directions for more equitable diagnostic practice worldwide.

2. Hirsutism in PCOS: Definition and Diagnostic Criteria

The modified Ferriman-Gallwey (mFG) score remains the most widely used clinical tool for grading hirsutism. It evaluates coarse (terminal) hair in nine androgen-sensitive body areas such as upper lip, chin, chest, upper abdomen, lower abdomen, upper back, lower back, upper arms, and thighs. It assigns each site a score from 0 (no terminal hair) to 4 (frankly virile). The total score ranges from 0 to 36, and the original diagnostic cut-off of mFG ≥ 8 corresponded to the 95th percentile of a reference population of Caucasian women (Hatch et al., 1981). Subsequent validation studies have confirmed the tool's practicality and acceptable inter-observer reliability, securing its status as the bedside "gold standard" for clinical hirsutism (Spritzer et al., 2022).

One universal cut-off, however, does not fit all ethnicities. Large observational series from Thailand, Korea, and Singapore reveal that the 95th-percentile mFG score in non-PCOS East- and Southeast-Asian women clusters around 4–6 points; therefore, thresholds of mFG ≥ 5–7 better identify androgen excess in these populations (Cheewadhanaraks et al., 2004; Kim et al., 2011). In contrast, South-Asian and Middle-Eastern populations demonstrate intrinsically denser body-hair patterns. An Iraqi cohort recalibrated the diagnostic marker to mFG > 13 for Kurdish women, and older Indian data support thresholds of ≥ 10–12 (Al-Rasheed et al., 2019). A recent meta-analysis spanning ten countries confirmed that optimal ethnicity-specific cut-offs vary from 5 (East Asian) to 11 (Mediterranean/Middle-Eastern) (Zhang et al., 2024). Reflecting these findings, the 2023 international PCOS guideline now recommends mFG ≥ 4–6 to flag hirsutism in East-Asian women (Teede et al., 2023).

Despite its utility, the mFG system has well-recognised limitations. Subjectivity and observer bias persist even after training, with inter-rater coefficients ranging from 0.60 to 0.85; self-scoring. It is common in epidemiological surveys that shows high sensitivity but comparatively lower specificity (Carmina and Azziz, 2006). Hair-removal practices such as waxing or laser epilation can mask true severity, necessitating thorough history-taking. The full nine-site inspection is also time-consuming and intrusive; accordingly, a simplified two-site model (chin + lower abdomen) can predict global scores ≥ 8 with >90 % sensitivity and offers a rapid alternative for screening (Mortada et al., 2020). Finally, variability in hair pigmentation and curl pattern can lead to under-scoring in light-haired Caucasians or over-scoring in individuals with coarse, pigmented hair from African or Middle-Eastern backgrounds.

Because visual scoring alone can be confounded by these factors, biochemical assessment is essential. Measurement of total and free testosterone, sex-hormone-binding globulin (SHBG), free-androgen index, dehydroepiandrosterone sulfate (DHEAS), and androstenedione should complement mFG scoring, particularly where ethnic variability or hair-removal practices obscure clinical evaluation. The Endocrine Society's 2018 clinical practice guideline explicitly recommends a combined clinical-plus-biochemical approach, with repeat testing and assay standardisation to diagnose androgen-excess disorders (Endocrine Society, 2018).

In light of accumulating evidence, there is growing consensus that population-specific mFG thresholds, integrated with streamlined visual tools and hormonal biomarkers, are critical to reducing diagnostic inequity. Such an approach is especially important for East- and Southeast-Asian women, in whom hyperandrogenic PCOS is frequently under-recognised, and it guides the development of culturally and biologically tailored therapeutic strategies (Kim et al., 2021; Teede et al., 2023).

3. Racial and Ethnic Differences in Hirsutism Prevalence

Hirsutism is present in a majority of women with PCOS, yet its frequency and clinical visibility differ strikingly across racial and ethnic groups. In predominantly Caucasian and Hispanic cohorts, ~60 – 80 % of women with PCOS meet the classic modified Ferriman-Gallwey (mFG) cut-off of ≥ 8 (Azziz et al., 2004). By contrast, East-Asian populations report the lowest rates often below 30 % even when biochemical hyperandrogenism is documented (Cheewadhanaraks et al., 2004). South-Asian women occupy an intermediate position (≈ 50 – 70 %), while Middle-Eastern and Mediterranean groups consistently show the highest prevalence, reaching 70 – 90 %, likely reflecting a combination of genetic predisposition and denser baseline body hair (Spritzer et al., 2022). African-American data are mixed: some community studies report 40 – 50 % when scored at mFG ≥ 8, yet others approach 60 % differences that may relate to scoring difficulty with coarse, pigmented hair (VanHise et al., 2023). These disparities highlight the limitations of a single diagnostic threshold and underscore the need for ethnicity-specific mFG cut-offs to avoid both over- and under-diagnosis.

Table 1 Prevalence of Hirsutism Among Women with PCOS Across Different Ethnicities, Illustrating Variations in Diagnostic Thresholds and Hair Growth Patterns Based on Modified Ferriman-Gallwey (mFG) Scores

Ethnicity / Region	Hirsutism Prevalence in PCOS (%)	Illustrative Study	Key Notes
Caucasian (White)	60 – 80 %	Azziz et al., 2004	Classic mFG ≥ 8 threshold derived from Caucasian data.
South Asian	50 – 70 %	Yildiz et al., 2012	Often higher free-androgen index; some centres use mFG ≥ 10 – 12.
East Asian	10 – 30 %	Cheewadhanaraks et al., 2004	Lowest prevalence; optimal diagnostic cut-off mFG ≥ 5 – 7.
Middle Eastern / Mediterranean	70 – 90 %	Spritzer et al., 2022	Dense terminal hair; possibly higher 5-α-reductase activity.
Hispanic / Latina	50 – 80 %	Azziz et al., 2004	Prevalence parallels Caucasian women when mFG ≥ 8.
African-American	40 – 60 %	VanHise et al., 2023	Coarse, pigmented hair may complicate visual scoring and lower reported rates.

Collectively, these data demonstrate how baseline hair-growth patterns, genetic variability in androgen sensitivity, and cultural grooming practices shape the observed prevalence of hirsutism in PCOS. Applying a universal mFG threshold risk under-recognising hyperandrogenism in low-hair-density groups such as East-Asian women and over-labelling high-density populations such as Middle-Eastern women. Accordingly, consensus guidelines now recommend ethnicity-adjusted mFG cut-offs and routine biochemical assessment to achieve equitable and accurate PCOS diagnosis across diverse populations (Teede et al., 2023).

4. Possible Explanations for Racial Differences

The striking ethnic gradients in hirsutism prevalence among women with PCOS likely stem from a multifactorial interplay of biological and sociocultural determinants. First, genetic polymorphisms affecting androgen-receptor sensitivity and 5α-reductase activity can modulate how vigorously hair follicles respond to circulating androgens; allelic variants that heighten receptor affinity or enzymatic conversion of testosterone to the more potent dihydrotestosterone appear more common in Mediterranean and Middle-Eastern populations than in East Asians (Carmina and Azziz, 2006;

Spritzer et al., 2022). Second, baseline terminal-hair distribution differs by ancestry, reflecting evolutionary adaptation and divergent baseline androgen milieus South and Middle-Eastern Asian women, for example, demonstrate denser truncal and limb hair independent of PCOS, whereas East-Asian women show sparsest growth (Yildiz et al., 2012). Third, hormone profiles are not identical across races; although total testosterone can be similar, the free-androgen index and adrenal androgens such as dehydroepiandrosterone sulfate (DHEAS) often run higher in Hispanic, South-Asian, and African-American cohorts, potentially amplifying clinical hair growth (Azziz et al., 2004; VanHise et al., 2023). Fourth, cultural factors influence case detection: in many East- and Southeast-Asian settings excessive body hair is stigmatised, leading women to under-report symptoms or clinicians to under-investigate them (Cheewadhanaraks et al., 2004). Finally, methodological limitations of the modified Ferriman-Gallwey (mFG) score contribute to apparent disparities; hair colour, texture, and density vary by ethnicity, and the score—developed in fair-skinned Caucasian women can underestimate hair visibility on dark skin or overcount coarse, pigmented hair, thereby skewing prevalence estimates (Hatch et al., 1981; Teede et al., 2023). Collectively, these genetic, endocrine, cultural, and methodological factors converge to produce the distinctive racial patterning of clinical hirsutism seen in PCOS.

4.1. Clinical Implications

Appreciating ethnic variation in hirsutism is not merely academic; it directly influences diagnostic accuracy, patient counselling, and therapeutic decision-making. When clinicians apply a uniform modified Ferriman-Gallwey (mFG) cut-off of ≥ 8, East- and Southeast-Asian women whose baseline hair density is intrinsically low are at considerable risk of being falsely reassured, despite biochemical evidence of hyperandrogenism or anovulation (Cheewadhanaraks et al., 2004; Teede et al., 2023). Under-recognition delays lifestyle and pharmacologic interventions, thereby permitting escalation of cardiometabolic comorbidities that already vary by race (Yildiz et al., 2012). Conversely, using the same threshold can "over-label" hirsutism in Middle-Eastern or Mediterranean women, exposing them to potentially unnecessary anti-androgen therapy or cosmetic procedures and reinforcing stigma regarding body hair (Spritzer et al., 2022).

Adopting ethnicity-adjusted diagnostic thresholds for example, mFG ≥ 5–7 in East Asians and ≥ 10–12 in South Asians combined with systematic biochemical testing (free-androgen index, DHEAS) can improve case detection and curb overtreatment (Azziz et al., 2004; VanHise et al., 2023). Furthermore, recognising cultural grooming practices and psychosocial distress linked to hirsutism is essential for shared decision-making: studies show that the psychological burden of visible hair growth often outweighs its endocrinological severity, demanding sensitive dialogue, mental-health screening, and, where appropriate, referral for cognitive-behavioural or dermatologic support (Ligocka et al., 2024). Finally, population-specific thresholds should inform epidemiological surveillance and clinical-trial inclusion criteria to avoid under-representation of low-hair-density ethnicities in PCOS research, thereby ensuring that emerging therapeutics are generalisable across diverse populations (Teede et al., 2023).

5. Conclusion and Future Directions

Marked ethnic variation in the prevalence and visibility of hirsutism underscores the need for population specific approaches to diagnosing and managing PCOS. Evidence reviewed in this article shows that clinical hirsutism affects fewer than 30 % of East Asian women but up to 90 % of Middle Eastern women with PCOS, largely due to differences in baseline hair density, androgen sensitivity, and sociocultural factors. Applying a universal modified Ferriman Gallwey (mFG) cut off therefore risks both under and over diagnosis, with downstream consequences for timely therapy and psychosocial wellbeing.

Future research should prioritise four areas. First, robust normative studies across diverse populations are needed to establish validated, ethnicity adjusted mFG thresholds and explore simplified screening tools that account for hair colour, texture, and removal practices. Second, genomic and epigenetic investigations could clarify how androgen receptor variants and 5α reductase polymorphisms contribute to ethnic differences in hair follicle responsiveness (Carmina and Azziz, 2006). Third, longitudinal cohort studies should assess whether early detection using ethnicity tailored criteria improves long term metabolic and reproductive outcomes, particularly in low hair density groups where PCOS is often missed. Finally, clinical trials testing anti androgen therapies and cosmetic interventions must ensure adequate representation of ethnically diverse participants to generate generalisable efficacy and safety data.

By integrating genetic insights, culturally sensitive diagnostic tools, and inclusive research designs, clinicians and investigators can deliver more equitable, precise, and patient centred care for all women with PCOS, regardless of racial or ethnic background.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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