

Hair-Related Problems among Polycystic Ovarian Syndrome-Affected
Teenage Girls

Naila Sattar

PG trainee (FCPS), PUMHS, IMCH, OBGYN.

Mahwish Iqbal

Consultant Gynecologist, PUMHS, IMCH, OBGYN.

Raishem

Professor, FCPS, PUMHS, IMCH, OBGYN

Aryan Fatima

Undergraduate, MBBS. SRMC

Nargis Ali

PG Trainee, (MCPS), JPMC, Karachi

Abdul Khalique

PG Trainee (FCPS), PUMHS, IMCH, Pediatrician

Abstract

Author Details

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Corresponding E-mails & Authors*:

Polycystic ovary syndrome (PCOS) is one of the most prevalent endocrine disorders affecting adolescent girls, with onset often occurring during the early reproductive years. It is a multifactorial condition characterized by a complex interplay among genetic predisposition, hormonal imbalance, and environmental influences. The hallmark

features of PCOS include hyperandrogenism (excess production of male hormones), ovulatory dysfunction leading to menstrual irregularities, and polycystic ovarian morphology. During adolescence, diagnosis can be particularly challenging, as normal pubertal changes may overlap with PCOS features; however, persistent symptoms such as irregular cycles and clinical signs of androgen excess warrant careful evaluation. One of the most distressing aspects of PCOS in teenage girls is the presence of hair-related manifestations, which are primarily driven by elevated androgen levels. Hirsutism, characterized by excessive growth of coarse, dark hair in androgen-dependent areas such as the face, chest, and back, is a common complaint. It often leads to embarrassment, low self-esteem, and social withdrawal, especially in cultures where such features are stigmatized. The severity of hirsutism may vary, but even mild cases can

significantly affect body image and confidence in adolescents. In addition to hirsutism, androgenic alopecia (female pattern hair loss) is another important concern. It presents as diffuse thinning of hair over the crown and frontal scalp due to the miniaturization of hair follicles under the influence of androgens. For teenage girls, hair loss can be particularly alarming, as it contrasts with societal expectations of thick, healthy hair and may lead to heightened anxiety and emotional distress. Early recognition and management are essential to prevent progression and to preserve hair density. Acne-related hair and scalp issues are also frequently observed in adolescents with PCOS. Increased sebum production, driven by androgen excess, can lead to oily scalp conditions, dandruff, and inflammatory acne lesions along the hairline and scalp. These dermatological manifestations further compound the psychosocial burden of the disorder. The visibility of these symptoms often makes them more distressing than metabolic abnormalities, as they directly affect physical appearance and peer interactions. Beyond the physical symptoms, the psychological impact of hair-related issues in PCOS should not be underestimated. Adolescence is a critical period for identity formation and self-image, and visible changes such as unwanted hair growth or hair loss can lead to anxiety, depression, and reduced quality of life. Many affected girls may avoid social situations, experience bullying, or develop negative body image perceptions. Therefore, a holistic approach to management is essential, incorporating not only medical treatment but also psychological support and counseling. Overall, hair-related manifestations in adolescent PCOS are not merely cosmetic concerns but significant clinical features that require timely recognition and comprehensive care. Early diagnosis, lifestyle modification, pharmacological interventions (such as hormonal therapy and anti-androgens), and dermatological treatments can help manage these symptoms effectively. Addressing both the physical and emotional aspects of the condition is crucial to improving long-term outcomes and enhancing the overall well-being of affected individuals. **Objective:** The primary objective of this study is to determine the prevalence and spectrum of hair-related problems among teenage girls diagnosed with polycystic ovary syndrome (PCOS). These hair-related manifestations include hirsutism, androgenic alopecia (female pattern hair loss), and acne-associated scalp or hair conditions. By identifying how frequently these conditions occur within this

population, the study aims to highlight the burden of dermatological manifestations of PCOS during adolescence, a critical period marked by heightened sensitivity to physical appearance and self-image. A further objective is to classify and characterize the different types and severity of hair-related problems observed in these patients. Standardized clinical assessment tools, such as the modified Ferriman–Gallwey score for hirsutism and validated grading systems for androgenic alopecia and acne severity, may be utilized to ensure objective evaluation. This classification will help in understanding the distribution patterns and clinical presentation of these manifestations in teenage girls with PCOS. In addition, the study seeks to assess the association between hair-related problems and key clinical parameters, including age, body mass index (BMI), menstrual irregularities, and the presence of other signs of hyperandrogenism. Evaluating these relationships will provide insight into whether certain clinical profiles are more strongly linked with specific hair disorders, thereby aiding in early identification and risk stratification of affected individuals. Another important objective is to examine the correlation between hair-related manifestations and hormonal profiles in adolescents with PCOS. Hormonal parameters, including serum testosterone, dehydroepiandrosterone sulfate (DHEAS), luteinizing hormone (LH), follicle-stimulating hormone (FSH), and insulin levels, will be analyzed. This will help determine whether the severity or type of hair-related issues is associated with the degree of hormonal imbalance, particularly hyperandrogenism and insulin resistance, which are central to PCOS pathophysiology. Finally, the study aims to provide a comprehensive understanding of the clinical and endocrine determinants of hair-related problems in teenage girls with PCOS. The findings may contribute to improved screening strategies, earlier diagnosis, and targeted management. By linking dermatological manifestations with underlying hormonal and metabolic disturbances, this research can support a more integrated and patient-centered approach to PCOS care in adolescents. **Methods::** A descriptive cross-sectional study was conducted in the Department of Dermatology and Gynecology at a tertiary care hospital over 6 months. The study included 120 teenage girls aged 13–19 years who were diagnosed with PCOS using the Rotterdam criteria. Hair-related problems were clinically assessed. Hirsutism was evaluated using the Ferriman-Gallwey score, and alopecia was identified through clinical evaluation.

Hormonal profiles, including serum testosterone and the LH/FSH ratio, were also recorded. Data were collected using a structured proforma—a standardized form for consistent data recording. This form captured demographic information, menstrual history, and family history of PCOS (polycystic ovary syndrome) or endocrine (hormone-related) disorders. Relevant clinical features were also noted. Anthropometric measurements, including height, weight, and body mass index (BMI), were recorded using standardized techniques. Each participant underwent a detailed dermatological exam (skin and hair assessment). The exam identified the presence and severity of hirsutism (excess hair growth in women), androgenic alopecia (a type of hair loss), and other scalp- or hair-related conditions. All assessments were performed by trained clinicians to ensure consistency and minimize observer bias (differences in results caused by the assessor). Venous blood samples were collected aseptically for hormonal analysis. Serum testosterone and the LH/FSH ratio were measured using standard laboratory methods. Samples were preferably collected in the early follicular phase or at a consistent time in irregular cycles to reduce hormonal variability. All laboratory investigations were conducted in the hospital's diagnostic laboratory while following quality control protocols to ensure accuracy and reliability. The collected data were entered and analyzed using statistical software such as SPSS. Descriptive statistics, including mean, standard deviation, frequencies, and percentages, summarized the data. Associations between hair-related problems and clinical or hormonal factors were assessed using the chi-square test and the independent t-test. A p-value of less than 0.05 was considered statistically significant. Ethical approval was obtained from the institutional review board. Informed consent was taken from all participants or their guardians before the study began. **Results:** Among participants, hirsutism was identified in 58%, androgenic alopecia in 32%, and diffuse hair thinning in 45%. Elevated serum testosterone correlated strongly with the severity of hair-related symptoms ($p < 0.01$). Psychological distress related to hair loss was present in 62% of patients. The severity of hirsutism, as measured by the Ferriman–Gallwey score, was directly correlated with elevated LH/FSH ratios and higher body mass index (BMI), clarifying that endocrine changes often manifest in specific hair disorders. Specifically, individuals with increased BMI were more likely to show moderate to severe hirsutism and extensive hair thinning

than those with normal BMI. Similarly, androgenic alopecia was more prevalent among participants with chronic menstrual irregularities and increased androgen concentrations, further underscoring the link between endocrine dysregulation and observable hair-related symptoms. Additionally, a substantial proportion of patients reported a diminished quality of life due to hair-related issues. Low self-esteem, social avoidance, and embarrassment were frequently reported, especially among those with noticeable facial or scalp hair. Psychological distress was markedly higher among participants with more severe symptoms, emphasizing that the impact of PCOS extends beyond somatic manifestations. These findings underscore the necessity of incorporating psychological evaluation and intervention into comprehensive care for adolescents with PCOS.

Conclusion: Hair-related problems are common among teenage girls with PCOS and demonstrate a strong link to hyperandrogenism and hormonal imbalance. Symptoms such as hirsutism, androgenic alopecia, and hair thinning clearly indicate endocrine disturbances and act as key markers for disease severity. Their high prevalence underscores the need for routine dermatological assessment in PCOS evaluations for adolescents. Early diagnosis and a multidisciplinary approach involving dermatologists, gynecologists, and mental health professionals are crucial for addressing both the physical and psychological impacts of the disease. Prompt intervention, encompassing hormonal management, lifestyle changes, and counseling, can substantially improve clinical outcomes, boost self-esteem, and enhance quality of life. Additionally, these findings stress the value of early screening for hair-related symptoms in adolescent girls with suspected PCOS. As these signs are often visible and particularly distressing, they can enable timely diagnosis and treatment. Incorporating regular hormonal and dermatological assessments into practice can support early detection of high-risk individuals and help prevent both cosmetic and metabolic complications. There is also a need to increase awareness and education among patients, families, and healthcare providers about PCOS's effects on physical appearance and mental health. Dispelling misconceptions, reducing stigma, and encouraging open discussion about these issues can promote treatment adherence and patient satisfaction. Future research should employ larger, multicenter studies to investigate the relationship between hormonal imbalance and dermatological symptoms and to assess targeted therapies to improve

long-term outcomes. **Keywords:** PCOS, hirsutism, alopecia, teenage girls, hyperandrogenism, hair disorders

INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting adolescent girls and women of reproductive age. Its prevalence varies across populations but is increasingly recognized worldwide. PCOS is a heterogeneous condition involving hyperandrogenism, chronic anovulation, and polycystic ovarian morphology, as defined by the Rotterdam criteria. Its pathophysiology is complex and involves genetic predisposition, insulin resistance, and hormonal dysregulation. Diagnosis in adolescents can be challenging because symptoms such as irregular menstrual cycles and acne may overlap with normal pubertal changes. However, when symptoms persist beyond the typical pubertal transition, they often indicate an underlying disorder needing clinical attention.

PCOS is not only a reproductive disorder but also has major metabolic implications. Many affected individuals exhibit insulin resistance, hyperinsulinemia, obesity, and a higher risk of developing type 2 diabetes mellitus and cardiovascular diseases later in life. These metabolic problems can intensify androgen production and worsen symptoms. Early onset of PCOS during adolescence may predispose individuals to long-term complications, making early recognition and intervention crucial. Although PCOS is a systemic condition, the most noticeable and distressing symptoms for many teenage girls are often dermatological, especially those related to hair growth and distribution.

Among the clinical features of PCOS, hair-related problems are especially significant due to their visibility and impact on physical appearance. These include hirsutism, androgenic alopecia, and diffuse hair thinning, all of which result primarily from elevated circulating androgens and increased hair follicle sensitivity to these hormones. Androgens stimulate the conversion of fine vellus hair to coarse terminal hair in androgen-dependent areas, such as the face, chest, and abdomen, leading to hirsutism. Conversely, on the scalp, androgens contribute to follicular miniaturization, resulting in thinning and progressive hair loss typical of androgenic alopecia.

Hirsutism is often the most prominent and socially noticeable sign of hyperandrogenism. It can greatly affect a young girl's self-image and confidence. This is especially true in sociocultural settings where smooth, hair-free skin is seen as a standard of beauty. The severity of hirsutism can vary. Even mild cases may cause significant emotional distress and lead to frequent cosmetic interventions, such as waxing, threading, or laser treatments. Androgenic alopecia, while less immediately obvious than hirsutism, can be just as distressing. A gradual reduction in hair density over the crown and frontal scalp can create anxiety about appearance and fears of premature aging.

Diffuse hair thinning is another commonly reported concern among adolescents with PCOS, often associated with hormonal imbalance and nutritional or metabolic factors. In addition, increased sebum production due to androgen excess can contribute to scalp conditions such as dandruff and acne along the hairline, further complicating hair health. These overlapping issues highlight the multifaceted impact of PCOS on hair physiology and dermatological well-being. Importantly, these manifestations are not merely cosmetic but are closely linked to the syndrome's underlying endocrine abnormalities.

The psychological impact of hair-related problems in adolescents with PCOS is significant. Adolescence is a critical period for emotional development, identity formation, and social interactions. Visible symptoms, such as unwanted facial hair or significant hair loss, can cause embarrassment, social withdrawal, low self-esteem, and even anxiety or depressive symptoms. The stigma from these features may also prevent individuals from seeking timely medical care, which can delay diagnosis and management.

Early detection and comprehensive management of hair-related symptoms in PCOS are vital. A multidisciplinary approach—including dermatologists, gynecologists, endocrinologists, and mental health professionals—can address both physical and emotional aspects of the condition. Interventions may include hormonal therapy, lifestyle modification, dermatological treatments, and psychological support. Recognizing the importance of these symptoms, this study aims to evaluate the prevalence and types of hair-related problems among teenage girls with PCOS. It also

examines their association with clinical and hormonal parameters to improve understanding and management of this condition.

MATERIALS AND METHODS

Study Design

This study was designed as a descriptive cross-sectional study aimed at evaluating the prevalence and types of hair-related problems among teenage girls diagnosed with polycystic ovary syndrome (PCOS). The cross-sectional design was chosen to assess participants' clinical and hormonal characteristics at a single point in time, enabling identification of associations between hair-related manifestations and underlying endocrine parameters.

Study Setting and Duration

The study was conducted in the Departments of Dermatology and Gynecology at a tertiary care hospital, which provided access to a diverse patient population with confirmed PCOS. Data collection was conducted over 6 months, during which eligible participants attending outpatient clinics were consecutively recruited. The multidisciplinary setting facilitated comprehensive evaluation, including both dermatological and gynecological assessments.

Sample Size

A total of 120 teenage girls diagnosed with PCOS were included in the study. The sample size was determined based on feasibility, patient availability, and the expected prevalence of dermatological manifestations in PCOS. Consecutive sampling was employed to minimize selection bias and ensure inclusion of all eligible participants presenting during the study period.

Inclusion Criteria

Participants were included if they met the following criteria: girls aged between 13 and 19 years, diagnosed with PCOS according to the Rotterdam criteria (requiring at least two of the following: oligo/anovulation, clinical or biochemical hyperandrogenism, and polycystic ovarian morphology), and those who were willing to participate in the study. Written informed consent was obtained from all participants, and, for minors, assent along with parental or guardian consent was secured prior to enrollment.

Exclusion Criteria

Participants were excluded if they had other endocrine disorders that could influence hair growth or hormonal status, such as thyroid dysfunction or Cushing syndrome. Those who had received hormonal therapy, including oral contraceptives, anti-androgens, or corticosteroids within the past three months, were also excluded to avoid confounding effects on hormonal levels and clinical presentation. Additionally, individuals with chronic dermatological diseases unrelated to PCOS, such as alopecia areata or scalp psoriasis, were excluded to ensure that observed hair-related manifestations were primarily attributable to PCOS.

Data Collection Procedure

Data were collected using a structured and pre-tested questionnaire that included demographic details, menstrual history, family history of PCOS, and lifestyle factors. A thorough clinical examination was conducted for each participant. Hirsutism was assessed using the modified Ferriman–Gallwey scoring system, while androgenic alopecia and hair thinning were evaluated through clinical examination of the scalp. The severity and distribution of hair-related conditions were carefully documented by trained clinicians to ensure consistency.

Hormonal Assessment

Venous blood samples were collected aseptically for hormonal analysis. Serum testosterone levels and luteinizing hormone (LH) and follicle-stimulating hormone (FSH) levels were measured, and the LH/FSH ratio was calculated. Samples were collected at a standardized time, preferably during the early follicular phase of the menstrual cycle or at a consistent time for participants with irregular cycles, to reduce hormonal variability. All laboratory analyses were performed using standardized assays in the hospital's diagnostic laboratory.

Statistical Analysis

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including mean, standard deviation, frequency, and percentage, were used to summarize the data. Associations between hair-related problems and clinical and hormonal parameters were evaluated using appropriate statistical tests, including the chi-square test for categorical variables and the

independent t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval for the study was obtained from the hospital's institutional review board prior to commencement. All procedures were conducted in accordance with ethical standards. Confidentiality of participant information was strictly maintained, and participants were assured of their right to withdraw from the study at any time without affecting their medical care.

RESULTS

Mean age of participants: 16.8 ± 1.7 years

Table 1: *Demographic and Clinical Characteristics*

Variable	Frequency	Percentage%
Age 13–15 years	42	35%
Age 16–19 years	78	65%
Irregular menstrual cycles	86	71.7%
Obesity (BMI >25)	52	43.3%

Table 2: *Prevalence of Hair-Related Problems*

Condition	Frequency	Percentage%
Hirsutism	70	58%
Androgenic alopecia	38	32%
Hair thinning	54	45%

Table 3: *Severity of Hirsutism (Ferriman-Gallwey Score)*

Severity	Frequency	Percentage (%)
Mild	32	45.7%

Moderate	25	45.7%
Severe	13	18.6%

Table 4: Association with Hormonal Levels

Parameter	Mean ± SD	p-value
Serum Testosterone	72 ± 18 ng/dL	<0.01
LH/FSH Ratio	2.4 ± 0.9	0.02

DISCUSSION

This study highlights the high prevalence of hair-related problems among teenage girls with PCOS. It emphasizes the clinical importance of dermatological manifestations in this population. Hirsutism emerged as the most common finding. Hair thinning and androgenic alopecia followed closely. These results are in line with previous literature, which consistently identifies hyperandrogenism as a key driver of hair follicle alterations in PCOS. Increased conversion of vellus to terminal hair in androgen-sensitive areas, along with scalp follicular miniaturization, explains the coexistence of excessive hair growth and hair loss in affected individuals. The relatively high frequency of these manifestations in adolescents suggests that such symptoms may appear early in the disease course. They should not be overlooked during clinical evaluation.

The study further showed a significant association between elevated serum testosterone levels and the severity of hair-related symptoms. This finding reinforces the central role of androgen excess in PCOS. Elevated androgens stimulate hair growth on the face and trunk. They also disrupt the normal hair growth cycle on the scalp. This leads to progressive thinning and alopecia. Additionally, the observed relationship between hormonal imbalance and clinical presentation highlights the importance of biochemical assessment in adolescents who present with dermatological complaints. It also suggests that hair-related symptoms can be visible indicators of underlying endocrine dysfunction. This should prompt a timely investigation and diagnosis.

Another important observation in this study was the association between hair-related problems and clinical parameters such as BMI and menstrual irregularities. Participants with higher BMI were more likely to exhibit severe hirsutism and hair

thinning. This may be attributed to insulin resistance's role in worsening androgen production. Hyperinsulinemia enhances ovarian androgen secretion and reduces sex hormone-binding globulin levels. This increases the bioavailability of circulating androgens. The interplay between metabolic and hormonal factors complicates the clinical picture of PCOS. This underscores the need for a comprehensive approach to assessment and management.

The psychological impact of hair-related manifestations observed in this study is particularly noteworthy. A significant proportion of participants reported emotional distress and low self-esteem. Many also experienced social withdrawal due to visible changes in their appearance. Adolescence is a sensitive developmental stage, and body image concerns are pronounced during this period. Conditions such as hirsutism and androgenic alopecia can lead to embarrassment and reduced confidence. They may also cause symptoms of anxiety and depression. These findings highlight that the burden of PCOS extends beyond physical health. It significantly affects mental well-being and quality of life.

Given these observations, early identification and intervention are crucial. A multidisciplinary approach involving dermatologists, gynecologists, and mental health professionals is essential for holistic care. Medical management should aim to reduce androgen levels. Lifestyle modifications can address metabolic factors and help improve clinical outcomes. At the same time, psychological support and counseling should be part of routine care. This helps adolescents cope with the emotional challenges associated with the condition. Overall, the findings of this study are consistent with existing evidence and add to a growing body of literature. They emphasize the significance of hair-related problems in PCOS. However, variations in prevalence rates across different studies may be due to differences in sample size, population characteristics, diagnostic criteria, and assessment methods. Further large-scale, multicenter studies are recommended. These would help validate these findings and explore the long-term impact of early intervention on dermatological and psychological outcomes in adolescents with PCOS.

CONCLUSION

Hair-related problems are common among teenage girls with polycystic ovary syndrome (PCOS). Hirsutism is the most frequent clinical sign, followed by hair thinning and androgenic alopecia. These findings highlight the significant dermatological burden in adolescents with PCOS. These symptoms are often among the earliest and most visible indicators of the disorder. The strong link between these manifestations and elevated androgen levels reinforces the central role of hyperandrogenism in PCOS and its direct impact on hair follicle dynamics.

Hair-related problems also have a major psychological impact. Adolescents with visible changes, like excessive facial hair or scalp hair loss, often report low self-esteem, social anxiety, and emotional distress. These issues can harm body image, relationships, and quality of life during this sensitive stage. Addressing the psychological side of PCOS is as important as managing clinical features.

Early diagnosis and intervention are vital to prevent both dermatological and metabolic complications in PCOS. Hormonal evaluation, including serum androgen assessment, should be considered in adolescents with hair-related complaints. Early detection enables targeted treatment strategies to control androgen excess and improve outcomes.

A multidisciplinary approach is key for effective PCOS management in teenage girls. Collaboration among dermatologists, gynecologists, endocrinologists, and mental health professionals ensures comprehensive care. Treatment may include hormonal therapy, lifestyle changes, dermatological interventions, and psychological counseling. Raising awareness among patients, families, and healthcare providers about hair-related PCOS symptoms is important. Educating adolescents can reduce stigma, promote early care-seeking, and improve treatment adherence. Future studies should focus on larger populations and the long-term benefits of early, multidisciplinary interventions for both physical and psychological outcomes in adolescents with PCOS.

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