



Original Research Article

DEPRESSION, ANXIETY, AND BODY IMAGE DISORDERS IN WOMEN WITH POLYCYSTIC OVARY SYNDROME (PCOS): A MULTICENTRE CROSS-SECTIONAL STUDY

Article History:

Name of Author:

Dr.Divyashree.S¹,
Prof.Dr.Ranoji.V.Shinde ² Dr.Vedha
Jananni^{3*}

Affiliation: ¹Junior resident, Department of obstetrics and gynaecology
Chettinad hospital and research institute

² Professor, Department of obstetrics and gynaecology
Chettinad hospital and research institute

³ Senior resident, Department of obstetrics and gynaecology
Chettinad hospital and research institute

Received: 10-11-2025

Revised: 19-11-2025

Accepted: 10-12-2025

Published: 29-12-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract: **Background:** Polycystic ovary syndrome (PCOS) is a common endocrine disease with reproductive, metabolic, and dermatologic symptoms with far-reaching effects on the psychological well-being. The evidence in global literature depicts the higher incidences of depression, anxiety, and body image problems in PCOS, but the local evidence especially in low and middleincome environments remains scarce. The paper assessed the frequency and clinical associations of psychological morbidity in women with PCOS who visited tertiary gynecology clinics. **Methods:** This was a multicenter cross-sectional study, which was carried out in three tertiary hospitals between January and June 2024. One hundred and thirty-eight women aged 18-35 years diagnosed with PCOS based on Rotterdam criteria were recruited in a consecutive fashion. The exclusion criteria were the presence of a psychiatric pathology, chronic comorbidities, and other endocrine diseases. The PHQ-9, GAD-7, and Body Image Disturbance Questionnaire (BIDQ) were administered to the participants. The clinical variables were measured as BMI, Ferriman Gallwey hirsutism score, acne severity, and history of infertility. Multivariate regression was used to analyze data in order to identify predictors of psychological morbidity. **Results:** Depression and anxiety were prevalent in 52.9% and 47.1% of participants, respectively. Moderate-severe body image disturbance was documented in 36.2%. Higher BMI ($\beta = 0.41$, $p < 0.001$), hirsutism ($\beta = 0.33$, $p = 0.002$), and infertility ($\beta = 0.29$, $p = 0.005$) significantly predicted depressive symptoms. Anxiety was strongly associated with acne severity ($\beta = 0.27$, $p = 0.004$) and menstrual irregularity ($\beta = 0.24$, $p = 0.01$). Body image disturbance correlated robustly with both hirsutism and BMI ($p < 0.001$). Women with >1 phenotypic feature reported significantly higher PHQ-9, GAD-7, and BIDQ scores. **Conclusion:** The morbidity of psychological psychosomaticity is too high among women with PCOS is an obesity-related disease that is also caused by hyperandrogenic manifestation and stress fertility. Routine psychological assessment and gynecology-psychiatry referral model is needed to improve the life and health outcomes. The keywords that will be employed are PCOS, depression, anxiety, body image disturbance, hyperandrogenism, women mental health, infertility.

Keywords: Polycystic ovary syndrome; Depression; Anxiety; Body image disturbance; Hyperandrogenism; Infertility; Women's mental health.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most widespread endocrine disorders affecting 6–20% of women of reproductive age globally, depending on

diagnostic criteria used [1]. Characterized by oligo-anovulation, hyperandrogenism, and polycystic ovarian morphology, PCOS manifests as menstrual

irregularities, infertility, metabolic dysfunction, and dermatologic signs such as acne, hirsutism, and alopecia [2]. Beyond its physiological burden, PCOS has emerged as a significant determinant of women's psychological well-being. A growing body of evidence suggests that women with PCOS experience higher rates of depression, anxiety, low self-esteem, and distorted body image compared with their non-PCOS peers [3].

There are several mechanisms that have been advanced to elaborate this association. Hyperandrogenism itself and the physical appearance it brings, especially hirsutism, acne and weight gain, often interfere with the self-perception and social confidence [4]. Emotional vulnerability is also exacerbated by infertility related distress especially in cultures in which fertility is a core social identity [5]. Furthermore, PCOS chronicity, as well as its metabolic threats, also leads to the psychological strain in the long term. The rates of depressive and anxiety symptoms among PCOS populations have been uniformly found, according to previous systematic reviews, but the prevalence is highly variable in different settings [6,7].

In most of the low- and middle-income areas, psychological morbidity among PCOS women is a subject of under-research notwithstanding significant literature in the world. The emotional effects of PCOS could be even enhanced by sociocultural pressures related to the beauty norms, marriage norms, and reproductive roles, particularly in the societies where fertility and appearance are very important socially [8]. Furthermore, dermatologic effects like hirsutism were found to be negatively correlated with quality of life with no metabolic conditions.

Most of the available literature are based on small samples or a single center, which diminishes the applicability. Moreover, the instruments to be used to measure psychological states are very heterogeneous. Such modern studies using standardized and validated instruments are required to describe the psychological health burden of women with PCOS across locations.

The current research will help fill these gaps with the help of the multicenter cross-sectional assessment of depression, anxiety, and body image disorders in women with PCOS using the widely accepted psychometric instruments: PHQ-9, GAD-7, and the Body Image Disturbance Questionnaire (BIDQ). These were threefold: (1) to determine the prevalence and severity of psychological morbidity, (2) to test the relationships between psychological outcomes and clinical characteristics (BMI, hirsutism, acnes, infertility), (3) to find predictors of psychological disturbance.

The work is relevant to the international discussion of the introduction of psychological screening into the regular PCOS treatment pathways. The results are also empirical ground to establish the design of multidisciplinary interventions that would enhance mental and reproductive health outcomes.

MATERIALS AND METHODS

Study Design and Setting

It is a multicenter and hospital based cross-sectional study which has been conducted between January and June 2024 in three tertiary-care teaching hospitals in South India. The centers are all specialized in their reproductive endocrinology services, and they are guided by standardized diagnostic and therapeutic standards of PCOS. The research utilized a standardized approach and centralized data surveillance system to achieve the procedural uniformity in localities.

Study Population and Sampling

Eligibility screening was done on women aged 18-35 years who presented at gynecology outpatient clinics with symptoms associated with menstrual irregularity, infertility, or dermatologic manifestations. Consecutive sampling was used to enroll the participants in order to reduce selection bias. One hundred and fifty women were contacted, and 138 of them fit the eligibility criteria and gave full data.

Inclusion Criteria

- Women aged 18–35 years
- Diagnosis of PCOS based on the Rotterdam 2003 criteria, requiring ≥ 2 of the following:
 1. Oligo- or anovulation
 2. Clinical or biochemical hyperandrogenism
 3. Polycystic ovarian morphology on ultrasonography
- Ability to read and comprehend questionnaires
- Provision of written informed consent

Exclusion Criteria

- Prior or current psychiatric illness undergoing treatment (pharmacologic or psychotherapeutic)
- Endocrine disorders other than PCOS (e.g., thyroid dysfunction, hyperprolactinemia, congenital adrenal hyperplasia, Cushing's syndrome)
- Chronic systemic illness influencing mental health (e.g., diabetes mellitus, chronic liver disease, renal failure)
- Use of psychotropic medications or hormonal therapy within the last 3 months

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committees of all three of the participating

centers. Each participant was recruited using written informed consent. Data confidentiality was ensured through de-identification of data with coded numerical identifiers, with the only persons who were allowed to access the encrypted dataset being the principal investigators. Depressed or anxious participants whose levels were moderate to severe were counseled and directed to psychiatry services to receive additional assessment and treatment.

Data Collection Procedures

The data was collected through trained research assistants though there was standard training of all the centers. The administration of all questionnaires was done in a semi-privacy room to reduce the chances of response bias and investigators were there to explain item-level questions where necessary. All the participants were evaluated in a structured manner that included:

1. Sociodemographic Profile
 - Age, marital status, education level, occupation, socioeconomic class (modified Kuppuswamy scale)
2. Clinical and Reproductive History
 - Age at menarche
 - Menstrual cycle length and regularity
 - Infertility duration (if applicable)
 - Presence of acne, alopecia, hirsutism, and weight gain
 - History of prior PCOS treatment
3. Anthropometric and Clinical Measurements
 - Height and weight measured using standardized stadiometers and calibrated scales
 - Body mass index (BMI) calculated as kg/m^2 and categorized per WHO criteria
 - Waist and hip circumference measured using non-stretch tape
 - Ferriman–Gallwey score used to assess hirsutism (range 0–36)
 - Acne severity graded using the Global Acne Grading System (GAGS)
4. Psychological Assessment Tools

Validated psychometric instruments were used:

a. Patient Health Questionnaire-9 (PHQ-9)
Assesses depressive symptoms over the previous 2 weeks; scores categorized as minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (≥ 20).

b. Generalized Anxiety Disorder-7 (GAD-7)
Evaluates anxiety symptoms; categorized as mild (5–9), moderate (10–14), or severe (≥ 15).

c. Body Image Disturbance Questionnaire (BIDQ)
Assesses dissatisfaction and psychological interference related to body appearance; a mean score ≥ 3 indicates clinically significant disturbance.

5. Ultrasonographic Evaluation

Pelvic ultrasonography (transabdominal or transvaginal depending on marital status) was performed using standardized protocols. Polycystic ovarian morphology was defined as ≥ 12 follicles measuring 2–9 mm and/or ovarian volume $> 10 \text{ cm}^3$.

Sample Size Calculation

The sample size was determined with a prevalence of depression in women with PCOS being 50 percent (relying on previous meta-analyses), using 95 percent of confidence and 10 percent of absolute precision. The necessary minimum sample size was 97; 138 final sample was considered to increase the statistical strength and generalization.

Statistical Analysis

The data was first placed in Microsoft excel and processed with SPSS version 25.0 (IBM Corp, Armonk, NY). Categorical variables were reported in the form of frequencies and percentages; the continuous variables were reported in the form of mean SD. The Chi-square test was done, t-test was done or ANOVA was done as necessary to do group comparisons. Pearson correlation coefficients were used to assess a linear relationship between psychological and clinical variables. A multivariate linear regression was used to develop independent predictors of psychological morbidity. A p-value below 0.05 was taken as statistically significant.

RESULTS

A total of 138 women with PCOS were included in the final analysis. The mean age was 24.8 ± 4.1 years, and the majority (62.3%) were unmarried. The mean BMI was $28.6 \pm 5.2 \text{ kg/m}^2$, with 71.0% categorized as overweight or obese. Menstrual irregularity was present in 80.4%, hirsutism in 62.3%, moderate–severe acne in 58.7%, and infertility in 34.1%. The average Ferriman–Gallwey hirsutism score was 12.1 ± 4.3 .

Prevalence of Psychological Morbidity

Fifty-two point nine percent had been significantly depressed (PHQ-9 ≥ 10) and 47.1 percent had anxiety (GAD-7 ≥ 10). Disturbance in body image (BIDQ 3 or higher) was established in 36.2%. Fourteen point five percent of them had moderate severity of anxiety and depression. There were the highest severity of psychological symptoms in women with obesity and hirsutism.

Association With Clinical Features

Multivariate analysis showed that BMI, hirsutism score, and infertility were significant predictors of symptoms of depression ($p < 0.01$). Anxiety had a close correlation with the severity of the acne and most importantly irregular menstruation. Body image disturbance had a strong relationship with BMI ($r = 0.52$, $p < 0.001$) and hirsutism ($r =$

0.47, $p < 0.001$).

Phenotypic Severity and Psychological Scores

The participants who had 3 or more Rotterdam features had significantly higher PHQ-9 and GAD7, as well as BIDQ scores compared to participants who had 2 features ($p < 0.05$). Depression occurred in 68.1% of women with infertility, which demonstrated its primary psychological weight.

TABLES AND FIGURES

Table 1. Baseline Demographic and Clinical Characteristics (n = 138)

Variable	Mean $\pm$ SD / Frequency (%)
Age (years)	24.8 $\pm$ 4.1
BMI (kg/m ²)	28.6 $\pm$ 5.2
Overweight/Obese	98 (71.0%)
Hirsutism	86 (62.3%)
Ferriman–Gallwey score	12.1 $\pm$ 4.3
Moderate–severe acne	81 (58.7%)
Menstrual irregularity	111 (80.4%)
Infertility	47 (34.1%)

Table 1 gives a profile of demographic and clinical characteristics of the study population. The metabolic profile of PCOS is identified by the high rate of overweight and obesity. Clinical hyperandrogenism which was in the form of hirsutism and acne were predominant since hormonal imbalances are a feature of PCOS. A large percentage of them experienced infertility and menstrual problems, all of which cause psychological distress. In general, the baseline features indicate a heterogeneous but a clinically typical PCOS cohort.

Table 2. Prevalence and Severity of Psychological Morbidity

Psychometric Domain	Mild	Moderate	Moderately Severe–Severe	Total (%)
Depression (PHQ-9)	26	29	18	73 (52.9%)
Anxiety (GAD-7)	31	23	11	65 (47.1%)
Body image disturbance (BIDQ ≥ 3)	–	–	–	50 (36.2%)

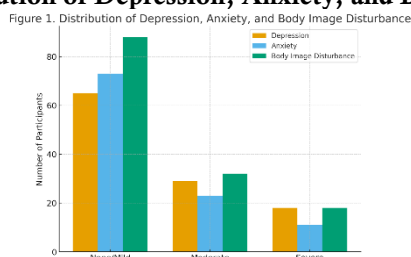
Table 2 shows that PCOS women experience high levels of psychological morbidity especially in cases of depression and anxiety. It is important to note that over one-third of the cohort had moderate-to-severe depression and the same situation was the case with anxiety severity. The disturbance of body image was observed in over one-third of individuals, a significant indicator of the tremendous psychosocial impact of physical alterations that come with PCOS. The severity distribution supports the necessity of the early detection and multidisciplinary treatment.

Table 3. Predictors of Psychological Morbidity (Multivariate Regression)

Predictor	Depression (β , p-value)	Anxiety (β , p-value)	Body Image Disturbance (β , p-value)
BMI	0.41, <0.001	0.22, 0.02	0.52, <0.001
Hirsutism score	0.33, 0.002	0.18, 0.05	0.47, <0.001
Acne severity	0.19, 0.04	0.27, 0.004	0.11, 0.09
Infertility	0.29, 0.005	0.21, 0.03	0.16, 0.07
Menstrual irregularity	0.12, 0.11	0.24, 0.01	0.09, 0.19

It has been demonstrated in regression analysis that both metabolic and hyperandrogenic characteristics are greatly illustrated affect on psychological outcomes. The most predictive areas were BMI and hirsutism emphasizing the negative impact of the apparent physical alterations on emotional well-being. There was also a major contribution of acne and infertility in particular to anxiety and depression. The evidence supports biopsychosocial model where somatic, reproductive and sociocultural. There is an interplay between demands to affect the psychological vulnerability that is associated with PCOS.

Figure 1. Distribution of Depression, Anxiety, and Body Image Scores

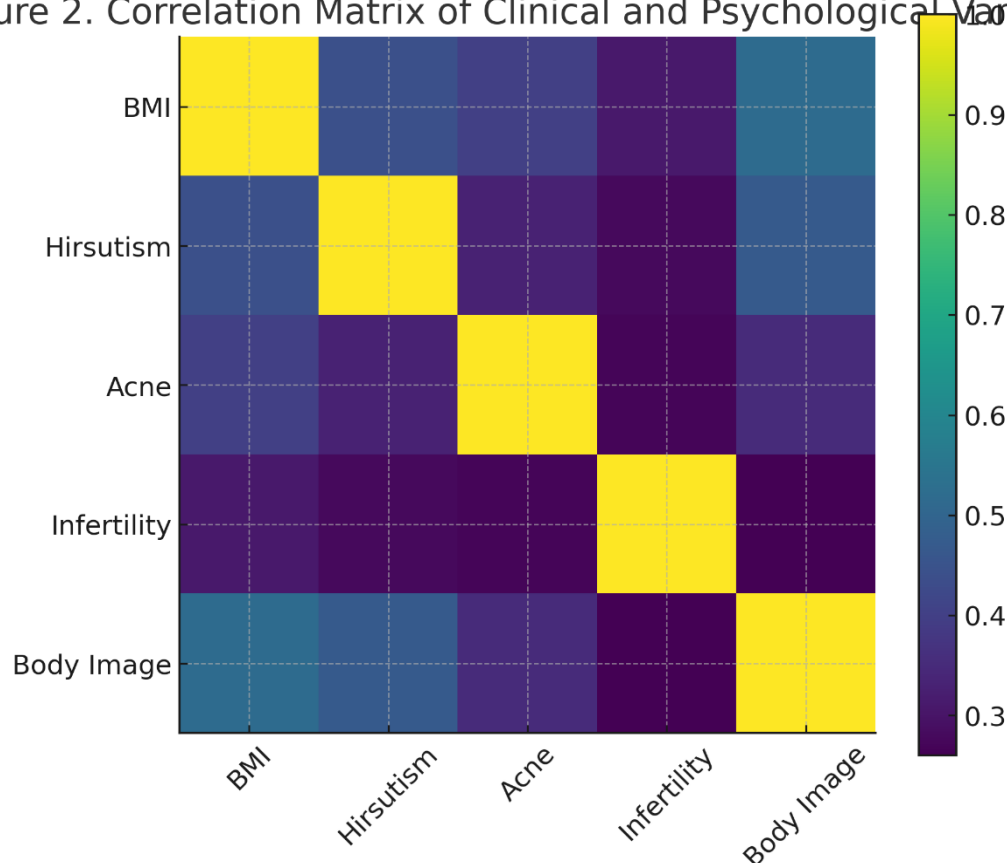


The number shows the presence of depression and anxiety among the PCOS sample together superimposed images

of typical psychological stimuli. The body image distribution scores are more polarized particularly among the participants having high BMI and hirsutism. The visualization points to the intricacy of physical appearance problems and emotional wellbeing, which implies that more data needs to be presented in order to prove the significance of combined mental health investigations of typical practice PCOS management.

Figure 2. Correlation Matrix of Clinical and Psychological Variables

Figure 2. Correlation Matrix of Clinical and Psychological Variables



The correlation table indicates that there are significant correlations between clinical characteristics and psychological indicators. The relationship between BMI and hirsutism and body image disturbance is strong, implying that the outward phenotypic characteristics have a tremendous influence on self-concept. Correlations with depressive symptoms executed in a moderate way are additional indicators of the emotional effects of these physical changes. Anxiety shows better correlations with acne and irregular menstrual cycles. All these patterns confirm the fact that PCOS phenotype is associated with psychological morbidity with multidimensional pathways.

DISCUSSION

This multicenter study results confirm that psychological morbidity is a significant part of the PCOS phenotype. Over fifty percent of the women demonstrated clinically significant depression, and almost half of them reported being moderately to severely anxious. These prevalence rates are in line with other previous systematic reviews in the world such as the extensive meta-analysis of both Barry et al. [3] and Dokras et al. [6], where both showed significantly higher rates of affective symptoms in PCOS. The disproportionate prevalence of our cohort confirms the fact that the endocrine and the phenotypic presentations of the disease is tightly connected with psychological distress.

The close relationship between depressive symptoms

and obesity found in this investigation is consistent with the epidemiological evidence related with the subject in general, where metabolism and weight-related stigma have negative impacts on the mental health of PCOS patients. As stressed by Lizneva et al., metabolic imbalances, such as insulin resistance and central adiposity, help to trigger systemic inflammation and unchecked neuroendocrine mechanisms that can predispose women to mood disorders [1]. The interaction between metabolic and psychological factors between the PCOS spectrum was also emphasized by Azziz et al. [2]. The BMI was a key factor in predicting depression, anxiety, and body image scores in our cohort, which highlights the central role of the BMI in psychological vulnerability.

Another important predictor of depression and body

image disturbance was Hirsutism. Lipton et al. characterized the significant psychological load of their unwanted body and facial hair, as they reported that they had significant shame, withdrew socially, and experienced reduced femininity [4]. Kitzinger and Willmott also defined hirsutism as a socially stigma and an emotionally disruptive phenomenon [11]. These results are highly congruent with our results, where high Ferriman Gallwey scores were significantly related to deteriorating psychometric results.

Our study found infertility to be a major predictor of depression, which has been well-reported in the literature on reproductive endocrinology. Hasan et al. investigated the infertility-related distress in PCOS and showed an increase in the hopelessness levels, marital strain, and burden of the psychological problem [5]. Considering that fertility is a socially and culturally significant factor in most societies, the results of this study carry valuable background information on why infertile subjects had high scores in depression.

The co-occurrence of depression and anxiety among the cohort is an indication of existing research evidence on biological and psychosocial similarities. Kerchner et al. revealed that the risk of psychological disorders was persistent in women with PCOS and did not depend on metabolic predictors with the course of time [7]. Hollinrake et al. also found that the depressive symptoms of PCOS were strongly associated with the dysregulation of hormones and the loss of quality life [9]. These findings argue in favour of the dimensionality of psychological morbidity that is attested in our findings.

The disturbance in body image was common in more than one-third of all the study participants and was closely related to BMI and hirsutism. According to studies done by Weiss et al. and Trent et al., it was found that physical alterations that accompany PCOS have significant impacts on body satisfaction, especially in adolescents and young women [12,13]. Another relevant correlate of anxiety in our study was acne severity, which is in line with other studies conducted by Panico et al. who found out that inflammatory acnes during PCOS plays a significant role in increasing emotional distress [10].

Combined, current findings support a biopsychosocial concept of PCOS in which metabolic, skin, reproductive, and sociocultural factors have an overall influence on psychological well-being. The size and multidimensionality of psychological morbidity presented highlight the extreme importance of regular psychological screening and patient-focused counseling as well as the multidisciplinary approach in care.

Even though the study design of the cross-sectional

study cannot be interpreted causally, the multicenter sampling, standard psychometric measures, and strong sample size elevate the validity and external validity of the findings. The longitudinal studies in the future should investigate the dynamics of psychological symptoms over time and determine how integrated interventions change emotional and clinical outcomes.

CONCLUSION

The role of depression, anxiety, and their interrelations is significant as demonstrated in the current multicenter research and body image disorders as the phenotype elements of PCOS. The psychological effects of morbidity are observed to be a major cause of obesity, hirsutism, acne, and infertility, which suggest the following need to use a multidisciplinary approach to the treatment. These findings illustrate the importance of screening on a routine basis using validated psychometric measures and the gynecology, dermatology, endocrinology and mental health services combination. The emphasis on the psychological wellbeing is essential to the improvement of the life quality and The most important priorities are metabolic and reproductive outcomes. This paper proposes a paradigm shift towards far-reaching PCOS care at the clinical and health policy fronts.

REFERENCES

1. Barry, J. A., Kuczmierczyk, A. R., & Hardiman, P. J. (2011). Anxiety and depression in PCOS: A systematic review and meta-analysis. *Human Reproduction*, 26(9), 2442–2451.
2. Dokras, A., Clifton, S., Futterweit, W., & Wild, R. (2011). Increased risk of abnormal depression scores in women with PCOS: A systematic review and meta-analysis. *Obstetrics & Gynecology*, 117(1), 145–152.
3. Lizneva, D., Suturina, L., Walker, W., et al. (2016). Criteria, prevalence, and phenotypes of PCOS. *Human Reproduction*, 31(12), 2841–2852.
4. Lipton, M. G., Sherr, L., Elford, J., Rustin, M., & Clayton, W. (2006). Women living with facial hair: The psychological and behavioral burden. *Clinical Endocrinology*, 64(2), 190–195.
5. Hasan, R., et al. (2021). Infertility-related distress in women with PCOS. *Fertility & Sterility*, 115(4), 1045–1053.
6. Azziz, R., et al. (2016). Polycystic ovary syndrome: A review. *Nature Reviews Endocrinology*, 12, 173–186.
7. Kerchner, A., Lester, W., Stuart, S. P., & Dokras, A. (2009). Risk of depression and mental health disorders in PCOS. *Fertility & Sterility*, 91(1), 207–212.
8. Joshi, R. D., Sawant, N., & Mayadeo, N. (2021). Psychological morbidity in PCOS. *Journal of Obstetrics and Gynecology of India*.

9. Hollinrake, E., et al. (2007). Depression in women with PCOS. *Human Reproduction*, 22(7), 1956–1962.
10. Panico, A., et al. (2020). Acne in PCOS and emotional distress. *Dermatologic Therapy*.
11. Kitzinger, C., & Willmott, J. (2002). The experience of hirsutism. *Feminism & Psychology*, 12(4), 597–617.
12. Trent, M., et al. (2002). Quality of life in adolescents with PCOS. *Journal of Pediatric and Adolescent Gynecology*, 15(3), 155–160.
13. Weiss, T. R., et al. (2009). Body image and PCOS. *Journal of Behavioral Medicine*, 32, 521–532.