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Differences Between NIH and Non-NIH Phenotypes of PCOS: A Pilot Study Exploring Anxiety and Various Aspects of Self-Esteem

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Abstract

Objective: To assess whether patients with NIH (National Institutes of Health) phenotypes of PCOS (polycystic ovary syndrome) differ from those with non-NIH phenotypes in terms of trait anxiety, state anxiety, and self-esteem. Additionally, we investigated the variables influencing the sense of physical attractiveness in both study groups.

Materials and Methods: Forty-nine patients with NIH phenotypes of PCOS and 27 patients with non-NIH phenotypes were enrolled in the study. Each patient underwent gynecological and endocrinological diagnostic evaluation. For psychological assessment, we used the State-Trait Anxiety Inventory and the Multidimensional Self-Esteem Inventory.

Results: Patients with NIH phenotypes presented higher trait-anxiety scores (p=0.021). The groups did not differ in global self-esteem. However, patients with NIH phenotypes had lower scores on the identity integration (p=0.010) and body appearance (p=0.033) scales. NIH patients also had lower scores on the lovability (p=0.053) and competence (p=0.050) scales; however, these findings approached statistical significance. In the NIH group, trait anxiety (β=-0.428, p=0.001) and BMI (β=-0.345, p=0.009) were statistically significant negative predictors of the sense of physical attractiveness, while in the non-NIH group only trait anxiety (β=-0.670, p<0.001) was found to be a negative predictor of this aspect of self-esteem.

Discussion: Patients with NIH phenotypes of PCOS presented higher trait-anxiety scores and lower scores in some aspects of self-esteem. These differences may stem, at least in part, from the more pronounced symptomatology among patients with NIH phenotypes.

Conclusions: Differences in self-esteem and anxiety among patients with different PCOS phenotypes should guide the development of more personalized treatment programs.

polycystic ovary syndrome; anxiety; self-esteem; phenotype

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INTRODUCTION

Polycystic ovary syndrome (PCOS) is a common gynecological and endocrine disorder and a leading cause of female fertility problems [1]. Its prevalence ranges from 5% to 20%, depend-

ing on the diagnostic criteria used [2]. PCOS is characterized by the following symptoms: oligomenorrhea and biochemical or clinical hyperandrogenism (e.g., hirsutism, acne) [2]. Furthermore, PCOS is associated with many long-term health risks, such as type 2 diabetes, cardiovascular disease, dyslipidemia, obesity, and endometrial cancer [3]. Additionally, psychiatric disorders occur more often among patients with PCOS [4,5]. Suchta et al. reported a higher prevalence of eating disorders—particularly binge eating disorder—among women with PCOS, highlighting the need for routine psychological assessment in this population [6].

To date, several diagnostic criteria have been proposed for PCOS. In 1990, the National Institutes of Health (NIH) introduced criteria in which chronic oligo – or anovulation (OA) and clinical and/or biochemical hyperandrogenism (HA) were required for a PCOS diagnosis [7,8]. Then, in 2003, the Rotterdam criteria were introduced, adding the presence of polycystic ovaries on ultrasound (PCOM) as a third criterion. Since then, two of the three criteria mentioned above (OA, HA, and PCOM) have been sufficient for the diagnosis of PCOS, after the exclusion of other causes of hyperandrogenism (e.g., Cushing syndrome, congenital adrenal hyperplasia) [7,8]. Based on the 2003 Rotterdam criteria, the following PCOS phenotypes were distinguished: phenotype A (OA+HA+PCOM), phenotype B (OA+HA), phenotype C (HA+PCOM), and phenotype D (OA+PCOM) [7,8]. Phenotypes A and B are classified as "classic" NIH phenotypes, whereas phenotypes C and D are classified as non-NIH phenotypes [7,8]. In 2006, the Androgen Excess & PCOS Society presented criteria in which clinical and/or biochemical hyperandrogenism was required for the diagnosis of PCOS, thereby excluding patients with non-hyperandrogenic phenotype D [7,8].

A substantial proportion of publications on the psychological aspects of PCOS have compared patients with PCOS and control groups without PCOS [5,9-13]. Scaruffi et al. showed differences in personality traits between patients with PCOS and controls and described poorer body image and higher alexithymia in the PCOS group [9,10]. Alur-Gupta et al. found that patients with PCOS had higher body-image distress (BID) [11]. Moreover, they showed that BID was significantly correlated with anxiety and depression scores [11]. Głowińska et al., using the Multidimensional Self-Esteem Inventory (MSEI), reported that patients with PCOS had lower scores on the body appearance scale, while showing no differences in other aspects of self-esteem [12].

Only a few studies, however, have focused on the psychological aspects of different PCOS phenotypes. Moran et al. reported no differences between NIH and non-NIH phenotypes in terms of anxiety and depression [14]. Bazarganipour et al. found that patients with phenotype A had lower self-esteem and greater body dissatisfaction than patients with other phenotypes [15]. However, when assessing self-esteem, they used the 10-item Rosenberg Scale to evaluate overall self-esteem without exploring its specific aspects [15]. Bahadori et al. found that patients with phenotypes A and B had worse health-related quality of life (HRQoL) related to hirsutism [16]. In another article, the same authors reported that women with PCOS had elevated levels of anxiety and depression compared with healthy controls, with the most pronounced differences observed in those with phenotype B [17].

None of the above-mentioned articles examined personality traits or focused on more specific aspects of self-esteem.

OBJECTIVES:

The aim of our study was to compare patients with NIH and non-NIH phenotypes of PCOS in terms of state and trait anxiety. Moreover, we assessed various aspects of self-esteem. We also explored whether clinical aspects of PCOS and trait anxiety affect the self-appraisal of physical attractiveness in both NIH and non-NIH phenotypes of PCOS.

MATERIALS AND METHODS:

Study group

The study was conducted among patients referred for endocrinological evaluation to the Clinical Department of Gynecological Endocrinology and Gynecology of the University Hospital in Kraków. Initially, data were collected from

170 patients. At baseline, questionnaires were completed by patients referred to the department for comprehensive endocrine and gynecological diagnostic evaluation. Ninety-nine of the initially recruited patients were diagnosed with PCOS according to the 2003 Rotterdam criteria. Seventy-one patients received diagnoses other than PCOS (e.g., type 2 ovarian insufficiency, insulin resistance, thyroid dysfunction, hyperprolactinemia). Ultimately, 76 patients diagnosed with PCOS were included in the study. The qualified patients were divided into two groups: NIH phenotypes (OA+HA+PCOM, OA+HA) and non-NIH phenotypes (HA+PCOM, PCOM+OA). The inclusion criteria were age 18–40 years and a PCOS diagnosis according to the Rotterdam criteria. Patients with other causes of hyperandrogenism were excluded from the study. Additionally, patients with PCOS and coexisting hormonal disturbances, such as hypothyroidism or hyperprolactinemia, were excluded to limit the potential impact on body-related aspects of self-esteem. For 3 months before the study, none of the finally qualified patients had taken oral contraception, steroid hormones, or other drugs that could affect ovarian function. Pregnant women were also excluded from the study.

Clinical and biochemical assessment

The level of hirsutism was evaluated using the modified Ferriman-Gallwey scale, in which nine body areas were assessed on a 0–4-point scale for terminal hair growth distribution. F-G scores of 8 or higher indicate the presence of hirsutism [18].

Biochemical hyperandrogenism was defined on the basis of the free androgen index (FAI), total testosterone, and DHEA-S measured in fasting blood samples. FAI [total testosterone (nmol/l)/SHBG (nmol/l) × 100] was calculated for each patient. Laboratory assays of 17-hydroxyprogesterone (17-OH-P), prolactin, TSH, FT3, FT4, and cortisol allowed us to exclude other endocrine disorders. A lipid profile was performed for each patient. Each patient also underwent a gynecological examination.

Psychological measures

The State-Trait Anxiety Inventory (STAI) is composed of two separate self-report scales: STAI-S for state anxiety and STAI-T for trait anxiety. Trait anxiety refers to relatively stable aspects of personality that are not directly related to the external situation, whereas state anxiety refers to the current situation. Each scale includes 20 items with a four-point response format [19].

The Multidimensional Self-Esteem Inventory (MSEI) is based on the theoretical model of self-concept and self-esteem. The questionnaire contains 116 items rated on a five-point scale. It is composed of 11 scales, 9 of which refer to global self-esteem and its eight specific components: competence, lovability, likability, personal power, self-control, moral self-approval, body appearance, and vitality. Two additional scales are identity integration, which measures global self-concept cohesion, and defensive self-enhancement, which determines the need for social approval [20].

Statistical analysis

Descriptive statistics were used to describe sociodemographic characteristics as well as clinical and laboratory data. The Shapiro-Wilk test was used to assess the normality of data distribution. Student's t-test was performed to explore differences between normally distributed variables. The Mann-Whitney U test was used when the data were not normally distributed, and the Pearson chi-square test was used to analyze categorical data. We used Pearson correlation coefficients to determine correlations between trait anxiety, state anxiety, and MSEI scales. Stepwise linear regression was used to estimate the impact of BMI, hirsutism, and trait anxiety on the self-appraisal of physical attractiveness (Body Appearance scale) in both NIH and non-NIH groups. Statistical analysis was performed using PS Imago 9.0 (IBM SPSS Statistics).

Ethical approval

The local Research Ethics Board approved the study (approval ID: 1072.6120.388.2020). All participants received a complete description of the study and gave informed written consent before

entering the study. All procedures were conducted in accordance with the Declaration of Helsinki.

RESULTS

Patients with NIH phenotypes did not differ from those with non-NIH phenotypes in terms of place of residence, education, or marital status. In both groups, the majority of patients had postsecondary or higher education. In terms of place of residence, two main categories were distinguished in both phenotype groups: village residents and residents of large cities. Regarding marital status, there were also two dominant groups: single women and those in informal relationships. Patients with NIH phenotypes were statistically younger than those with non-NIH phenotypes (p=0.02) (Table 1).

Table 1. Socio-demographic characteristics, clinical and laboratory data.

	NIH phenotypes	Non-NIH phenotypes	
	(n=49)	(n= 27)	p
Age	23.37±4.40	25.59±4.14	0.020[a]
Education			0.098
Primary	2 (4.1%)	0 (0%)	
Secondary	3 (6.1%)	0(0%)	
Postsecondary	26 (53.1%)	10 (37%)	
Higher	18 (36.7%)	17 (63%)	
Place of residence			0.141
Village	19 (38.8%)	6 (22.2%)	
Small town (<20k)	4 (8.2%)	1 (3.7%)	
Medium-sized (30-150k)	7 (14.3%)	2 (7.4%)	
Big city (>150k)	19 (38.8%)	18 (66.7%)	
Marital status			0.270
Single	24 (49%)	12 (44.4%)	
Informal relationship	16 (32.7%)	13 (48.1%)	
Married	9 (18.4%)	2 (7.4%)	
BMI (kg/m²)	25.58±5.94	23.77±4.30	0.202
F-G score	12.08±5.83	7.74±5.88	0.001[a]
Total testosterone (nmol/l)	1.95±0.75	1.37±0.67	<0.001[a]
SHBG (nmol/l)	46.62±36.03	56.41±25.22	0.028[a]
FAI	6.14±4.31	3.01±1.98	<0.001[a]
DHEA-S (umol/l)	10.39±4.39	7.61±3.52	0.004[a]
Cortisol (ug/dl)	14.94±4.32	14.52±4.41	0.700
Prolactin (uIU/ml)	305.83±109.27	311.89±119.25	0.824
TSH (uIU/ml)	2.18±0.94	1.74±0.90	0.086
Total cholesterol (mmol/l)	4.74±0.89	4.18±0.60	0.001[a]
LDL (mmol/l)	2.44±0.95	2.03±0.44	0.035[a]
HDL (mmol/l)	1.85±0.48	1.59±0.48	0.334
Trigicerides (mmol/l)	0.96±0.48	0.81±0.24	0.222
Viatmin D (ng/ml)	27.31±12.26	27.34±14.08	0.728

[a] Indicates statistical significance

Patients with NIH phenotypes presented higher hirsutism scores (p=0.001), higher levels of testosterone (p<0.001), dehydroepiandrosterone sulfate (DHEA-S) (p=0.004), and FAI (p<0.001). NIH patients also had higher levels of LDL cholesterol (p=0.035) and total cholesterol (p=0.001). SHBG levels were lower among patients with NIH phenotypes (p=0.028) (Table 1).

Patients with NIH phenotypes presented higher trait-anxiety scores (p=0.021), whereas there was no difference between the groups in state anxiety. The NIH and non-NIH groups did not differ in global self-esteem. However, patients with NIH phenotypes demonstrated lower scores on the body appearance (p=0.033) and identity integration (p=0.01) scales. The differences between groups in the competence (p=0.05) and lovability (p=0.053) scales were close to statistical significance (Table 2).

Table 2. Comparison of STAI and MSEI results between NIH and non-NIH phenotypes of PCOS.

	NIH phenotypes (n = 49)	Non-NIH phenotypes (n = 27)	p
STAI-S (state-anxiety)	43.51±12.26	38.96±9.24	0.097
STAI-T (trait-anxiety)	48.47±10.24	42.59±10.56	0.021[a]
General Self-Esteem	26.47±7.72	29.81±8.79	0.090
Competence	32.18±6.39	35.15±5.87	0.050[b]
Lovability	32.18±7.87	36.04±8.75	0.053[b]
Likability	32.55±5.92	33.96±7.15	0.375
Personal Power	31.49±6.43	34.22±6.66	0.084
Self-Control	29.63±6.32	31.78±7.19	0.181
Moral Self-Approval	38.76±5.51	39.33±5.02	0.653
Body Appearance	26.92±7.35	30.74±7.35	0.033[a]
Vitality	27.43±7.55	29.48±7.97	0.270
Identity Integration	28.22±6.62	32.18±7.86	0.010[a]
Defensive self-enhancement	48.65±9.82	50.18±8.39	0.501

[a] Indicates statistical significance, [b] Close to statistical significance

In both groups, trait anxiety was negatively correlated with general self-esteem and the majority of its subscales. Among patients with non-NIH phenotypes, only moral self-approval was not correlated with trait anxiety. In patients with NIH phenotypes, trait anxiety was not found to be correlated with personal power or moral self-approval. In the NIH group, state anxiety correlated negatively with general self-esteem, competence, likability, self-control, vitality, identity integration, and defensive self-enhancement. Among non-NIH patients, state anxiety was correlated only with competence, personal power, self-control, and moral self-approval. Detailed results are presented in Table 3.

Table 3. Correlations between STAI-S and STAI-T scores and MSEI scores in patients with NIH and non-NIH phenotypes of PCOS.

	NIH phenotypes		non-NIH phenotypes	
Psychological variables	STAI-S	STAI-T	STAI-S	STAI-T
General Self-Esteem	-0,599**	-0,720**	-0,356	-0,712**
Competence	-0,297*	-0,377**	-0,415*	-0,643**
Lovability	-0,185	-0,575**	-0,322	-0,587**

Likability	-0,438**	-0,522**	-0,307	-0,622**
Personal Power	-0,227	-0,231	-0,469*	-0,665**
Self-Control	-0,507**	-0,544**	-0,470*	-0,709**
Moral Self-Approval	-0,146	-0,041	-0,433*	-0,313
Body Appearance	-0,271	-0,400**	-0,378	-0,582**
Vitality	-0,464**	-0,468**	-0,364	-0,577**
Identity Integration	-0,531**	-0,672**	-0,220	-0,621**
Defensive self-enhancement	-0,442**	-0,480**	-0,306	-0,530**

*p<0,05, **p<0,01

In stepwise linear regression, Model 1 for the NIH group explained 24.7% of the variance in the body appearance scale (F=8.872, df=2, 46, p<0.001). The values of standardized beta coefficients for the statistically significant predictors were as follows: trait anxiety, β=-0.428; BMI, β=-0.345. In Model 2, performed for the non-NIH group, trait anxiety was the only statistically significant predictor of self-appraisal of physical attractiveness (β=-0.670). The model explained 42.7% of the variance in the body appearance scale (F=20.376, df=1, 25, p<0.001) (Table 4).

Table 4. Stepwise regression analysis of predictors of physical attractiveness among patients with NIH and non-NIH phenotypes of PCOS

Group	Model	Significance of the model	Adjusted R square	Predictors
NIH (N=49)	Model 1 Body Appearance	F=8.872. p<0.001	0.247	STAI-T. β= – 0.428. p=0.001[a]
				BMI. β= – 0.345. p=0.009[a]
non-NIH (N=27)	Model 2 Body Appearance	F=20.376. p<0.001	0.427	STAI-T. β= – 0.670. p<0.001[a]

[a] Indicates statistical significance

DISCUSSION

Among patients with NIH phenotypes, the clinical and biochemical symptoms of hyperandrogenism were more pronounced, which is consistent with the results of other studies [7,22]. NIH patients also presented higher levels of total cholesterol and LDL cholesterol, which may indicate a higher cardiometabolic risk in this group [22]. Unlike in other studies [14,23], the NIH and non-NIH phenotypes in our study did not differ in BMI. Patients with NIH phenotypes were statistically younger, which may be due to the fact that women in this group sought diagnosis earlier because of more pronounced PCOS symptoms.

We found that patients with NIH phenotypes presented significantly higher trait-anxiety scores, with no statistically significant differences in state anxiety. These results are consistent with the studies conducted by Moran et al. [14] and Bahadori et al. [16], in which the HADS scale was used to measure the severity of anxiety and depression; this can be related to the state-anxiety scale used in our study [24]. In both articles, there was no difference in the severity of anxiety between different PCOS phenotypes [14,16]. In terms of trait anxiety, understood as a stable personality trait, NIH patients presented higher scores, which is an interesting new finding. Considering that the severity of PCOS clinical symptoms is more pronounced among patients with NIH phenotypes [7,23], and that these symptoms may have been present for a long time [25], we may assume that this can create greater distress, a sense of "feeling bad in one's own body", and thus strengthen the anxious component of personality. Additionally,

greater symptom severity in patients with NIH phenotypes may contribute to increased health – or fertility-related concerns. It is possible that these patients, upon observing their symptoms, suspected they might have PCOS prior to receiving a formal diagnosis. This, in turn, may also have contributed to the higher trait-anxiety scores observed in this subgroup.

In our study, patients with NIH phenotypes presented lower scores on the identity integration scale, which refers to the sense of internal coherence and integration of various aspects of personality [20]. PCOS symptoms such as hirsutism, acne, and menstrual irregularity can affect feminine identity [9] from the teenage years onwards [25]. Sari et al. reported that patients diagnosed with PCOS during adolescence were more likely to suffer from psychiatric disorders and presented higher levels of depression and greater body dissatisfaction in their teens [26]. The first occurrence of PCOS symptoms during adolescence may deepen an individual's sense of inadequacy, affect the overall process of feminine identity formation, and result in difficulties integrating individual aspects of personality. This process may be more pronounced in patients with "classic" phenotypes due to the greater symptom burden. On the other hand, we should bear in mind that a less integrated identity or a tendency to react with anxiety may favor dysfunctional ways of emotion regulation [27], which may contribute to a less favourable course of PCOS and thus to the development of "more severe" PCOS phenotypes through a vicious cycle.

Patients with NIH phenotypes had lower scores on the body appearance scale, which assesses self-appraisal of physical attractiveness. This can be explained by the more severe clinical symptoms of PCOS in this group. However, the sense of physical attractiveness among NIH patients may also be affected by psychological factors, such as trait anxiety or less integrated personality functioning. A study conducted by Głowińska et al. showed that patients with PCOS perceive themselves as less physically attractive compared with individuals without the condition [12]. Scaruffi et al. also emphasized disturbed body image in patients with PCOS [10]. Both of these studies compared patients with PCOS with healthy individuals [10,12]. Our results are also consistent with the findings of Bazarganipour et al., in which patients with one of the "classic" PCOS phenotypes presented greater body dissatisfaction than patients with non-NIH phenotypes [15].

The lovability scale describes the ability to express and receive love, to engage in satisfying relationships, and to feel that one can count on the support of loving people [20]. If, in addition to the previously described impact of PCOS symptoms on feminine identity, we consider other issues related to PCOS, such as fertility problems, which are more common among patients with NIH phenotypes [22], a set of features emerges that may lead patients with more severe forms of PCOS to perceive themselves as insufficient, as not meeting certain standards, and therefore as "not worthy of love". Most of these aspects were addressed in the accounts of women with PCOS in the study by Williams et al. [28].

The above-mentioned feeling of insufficiency can occur in many areas, which would also explain the lower scores on the competence scale among NIH patients. Competence refers to the feeling of being efficient, effective, and able to master a new task [20]. Patients with NIH phenotypes of PCOS may perceive their femininity as compromised, and their body image may have been affected for a long time by more severe PCOS symptoms compared with those in patients with non-NIH phenotypes [7]. Taking into account that individual aspects of self-experience are interconnected, NIH patients may also experience themselves as less valuable and therefore less able to act effectively and acquire new skills.

We also found negative correlations between trait anxiety and virtually every component of self-esteem (except moral self-approval and personal power). These correlations were similarly distributed in both groups. Self-esteem, or the sense of self-worth, is a relatively stable aspect of personality [29], which is also reflected in the stronger correlations of individual aspects of self-esteem with trait anxiety than with state anxiety.

In the stepwise linear regression analysis, we focused on the body appearance scale. In the NIH group, trait anxiety was the strongest negative predictor of the body appearance scale, while BMI was also a statistically significant

negative predictor of self-appraisal of physical attractiveness. In the non-NIH group, trait anxiety was the only statistically significant predictor of the sense of physical attractiveness. In both groups, hirsutism was not a significant predictor of the sense of physical attractiveness. These results indicate that the most important role in perceiving oneself as a physically attractive person is played by psychological factors, in this case anxiety as a personality trait. This can be related to Scaruffi et al.'s emphasis that personality traits may affect the results obtained by patients with PCOS in studies on body image, quality of life, or other psychological issues [9].

Differences between PCOS phenotypes regarding the impact of BMI on the subjective sense of physical attractiveness may result from the fact that patients with NIH phenotypes, who initially present more severe clinical symptoms of PCOS related to body appearance, may perceive their attractiveness as more dependent on factors strictly related to their body, such as BMI. Scaruffi et al. described that bodily functions have a central place in the minds of women with PCOS [10]. Expanding on this idea, we may say that bodily functions have an even more central place in the minds of patients with more severe NIH phenotypes of PCOS, and for this reason body-related factors such as BMI may have a greater impact on the sense of physical attractiveness in this group.

In summary, trait anxiety emerged in our study as the most important predictor of the sense of physical attractiveness, whereas PCOS symptoms, such as hirsutism, did not directly influence this aspect of self-esteem, or had a weaker influence, as in the case of BMI. However, we believe that the presence of PCOS symptoms, especially if they have been present since the teenage years, reinforces women's critical attitudes toward their own bodies. Young women who have not yet fully developed an integrated image of their own femininity may find it challenging to distinguish the appearance of new disease symptoms from the physiological changes associated with puberty, the acceptance of which is crucial in building identity and a sense of attractiveness.

This study has certain limitations. Firstly, it was performed in a limited population, which may reduce the generalizability of the results. Moreover, the comparable groups were unequal in size and differed in mean age. In future studies, pair-matched selection of participants for the compared groups could be more beneficial and provide a more reliable method of group selection. Secondly, the data were collected from patients representing one cultural background. This may limit the applicability of our results to other cultural settings, as the impact of specific factors on the sense of physical attractiveness or quality of life may vary across cultures [30,31]. Thirdly, the differences between NIH and non-NIH phenotypes in the lovability and competence scales were close to statistical significance and require verification in future studies. Fourth, we did not collect detailed information on when and under what life circumstances the first PCOS symptoms appeared. This might be a limitation when discussing the potential long-term impact of PCOS symptoms on various aspects of self-esteem or trait anxiety.

Despite the above-mentioned limitations, we believe that our study may make a valuable contribution to research on the psychological aspects of PCOS. First, we conducted a comparison between NIH and non-NIH phenotypes of PCOS. As mentioned in the introduction, most previous studies compared patients with PCOS with healthy controls, without focusing on differences within the PCOS group itself. Moreover, we demonstrated a significant impact of personality factors on the sense of physical attractiveness, while PCOS symptoms such as hirsutism did not directly affect this aspect. This suggests that there is no simple correlation between PCOS symptoms and the sense of physical attractiveness. However, it appears that PCOS symptoms present over a longer period may negatively affect self-image, contributing to the perception of oneself as unattractive. The chronicity of PCOS may contribute to the formation of critical attitudes toward oneself, feelings of insufficiency, or a sense of not meeting certain standards.

CONCLUSIONS

Considering the psychological differences across various PCOS phenotypes may be helpful in creating more personalized healthcare protocols

that integrate medical management with psychological interventions. Such a comprehensive approach to treating patients with PCOS could improve treatment outcomes and potentially reduce the long-term health risks associated with PCOS. Further research with a larger sample size is needed to explore the psychological aspects of different PCOS phenotypes in greater depth.

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