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Polycystic Ovary Syndrome – A Clinical and Psychosocial Perspective

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrinopathies among women of reproductive age, characterized by a complex etiology and diverse clinical presentation. The aim of this paper is to present the current state of knowledge regarding the definition, diagnostic criteria, and differential diagnosis of PCOS, as well as to discuss treatment methods-both non-pharmacological and pharmacological. Particular attention is given to psychological aspects, which are often overlooked in clinical practice, despite their significant impact on the course of the disease and the quality of life of affected women. Women with PCOS more frequently experience depressive and anxiety disorders, along with low self-esteem, which can substantially hinder effective treatment and worsen prognosis. This paper emphasizes the need for a holistic approach to PCOS patients, taking into account not only somatic symptoms but also psychological and emotional needs, as a prerequisite for effective and long-term therapy.

Keywords: Polycystic ovary syndrome, mental health, depression, anxiety, emotional distress, lifestyle, physical activity, diet, reproductive health, body image, self-esteem

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age, encompassing a wide spectrum of clinical, metabolic, and reproductive symptoms. It is estimated that PCOS affects between 5% and 15% of women worldwide, although the actual prevalence may be higher due to the heterogeneity of symptoms and diagnostic challenges [1]. PCOS is associated with numerous clinical issues, including menstrual irregularities, difficulties in conceiving, excessive hair growth (hirsutism), as well as metabolic complications such as insulin resistance, obesity, metabolic syndrome, type 2 diabetes, and an increased risk of cardiovascular disease [2,3]. Although the primary manifestations of PCOS involve hormonal and metabolic disturbances, increasing attention is being paid to the psychological and social dimensions of the disorder [4]. Women with PCOS are more likely to experience depression, anxiety disorders, low self-esteem, as well as body image issues and reduced quality of life. These disturbances can significantly impact disease progression, treatment effectiveness, and the overall daily functioning of affected women [5].

PCOS DIAGNOSIS

Despite the relatively high prevalence of polycystic ovary syndrome (PCOS), its diagnosis remains a clinical challenge due to the heterogeneous presentation and the absence of a single, universally accepted diagnostic test. In 2023, updated international guidelines were published by a global panel of experts, including representatives from ESHRE (European Society of Human Reproduction and Embryology), ASRM (American Society for Reproductive Medicine), and the AE-PCOS Society. These evidence-based guidelines aim to standardize the diagnostic and therapeutic approach to PCOS worldwide. The new recommendations introduce

several key modifications intended to improve diagnostic accuracy and reduce overdiagnosis of the syndrome.

According to the 2023 guidelines, the diagnosis of PCOS in adult women is based on modified Rotterdam criteria, which require the presence of at least two out of the following three features:

- Oligo- or anovulation, manifested by irregular or absent menstrual cycles;
- Clinical and/or biochemical signs of hyperandrogenism, such as acne, hirsutism, or elevated androgen levels;
- Polycystic ovarian morphology (PCOM) on ultrasound, defined as ≥20 follicles in at least one ovary (using a transducer ≥8 MHz) or an ovarian volume >10 cm^3.

A thorough diagnostic approach to PCOS requires a comprehensive clinical evaluation, including a detailed medical history and appropriate testing. History taking should focus on menstrual cycle regularity and symptoms of hyperandrogenism, such as hirsutism, acne, or androgenic alopecia. Physical examination may include the use of the Ferriman-Gallwey scale to assess the severity of hirsutism.

Hormonal evaluation should include measurement of total and free androgens, SHBG, LH, FSH, prolactin, and TSH levels. It is also essential to assess metabolic parameters, such as fasting glucose and insulin levels, lipid profile, as well as measurement of body weight, waist circumference, and calculation of BMI. Proper diagnosis of PCOS requires not only confirmation of diagnostic criteria but also exclusion of other conditions with a similar phenotype. Differential diagnosis should include non-classic congenital adrenal hyperplasia, hyperprolactinemia, hypothyroidism, Cushing's syndrome, and androgen-secreting tumors of adrenal or ovarian origin. Careful differential diagnosis is critical for implementing appropriate treatment and preventing long-term metabolic and reproductive complications.

The guidelines also emphasize the importance of early identification of risk factors for depression, anxiety, and eating disorders as an integral part of health assessment in women with PCOS [1]. An increasing body of research suggests that effective PCOS management should be holistic, addressing not only hormonal regulation and weight control but also the psychological well-being of patients [6].

INFERTILITY AND REPRODUCTIVE ASPECTS

Due to the complex nature of polycystic ovary syndrome (PCOS), which involves dysfunction of the hypothalamic-pituitary-ovarian axis, insulin resistance, and hyperandrogenism, the condition affects both the quality of ovulation and the ability to conceive and maintain a pregnancy. The primary reproductive issue in PCOS is the absence of ovulation (anovulation) or its irregularity (oligo-ovulation), which leads to infrequent or irregular menstrual cycles. Additionally, PCOS is associated with an increased risk of spontaneous miscarriage, poor oocyte quality, and elevated serum luteinizing hormone (LH) levels. These miscarriages may also be linked to hyperinsulinemia, which further disrupts reproductive function. [7]

Infertility is one of the most common and burdensome complications associated with PCOS. It is estimated that 70–80% of women with the syndrome experience difficulties conceiving. [8,9] Reproductive problems often negatively impact partner relationships, especially in societies

where motherhood holds strong cultural significance. Studies show that infertility related to PCOS correlates with increased levels of anxiety, depressive symptoms, and reduced quality of life. [10]

Contemporary therapeutic options significantly improve the chances of pregnancy in women with PCOS. The most commonly used methods include pharmacological ovulation stimulation using letrozole or clomiphene citrate, treatment of insulin resistance with metformin, and, in cases where first-line methods fail, the use of assisted reproductive technologies (ART), such as intrauterine insemination (IUI) or in vitro fertilization (IVF). [11]

PSYCHOLOGICAL AND PSYCHIATRIC ASPECTS OF PCOS

Women with polycystic ovary syndrome (PCOS) often struggle with a range of psychological issues, which may be both primary and secondary to the symptoms of the condition. Numerous studies confirm that women with PCOS are significantly more likely to develop mood disorders, including depression and anxiety, compared to the general population. Reports also indicate an increased risk of eating disorders, low self-esteem, and problems with body image. Mental health screening may be warranted and can facilitate early therapeutic intervention. [4]

Depression

Depression is one of the most frequently reported mental health disorders in women with polycystic ovary syndrome (PCOS). The etiology of depression in the context of PCOS is complex and multifactorial, involving both biological and psychosocial factors. Among the biological mechanisms potentially contributing to depression in women with PCOS are insulin resistance, chronic low-grade inflammation, and disturbances of the hypothalamic-pituitary-ovarian axis leading to hormonal instability (including hyperandrogenism). Elevated androgen levels, especially testosterone, may affect the functioning of the central nervous system and negatively impact mood. [6]

Somatic symptoms of PCOS-such as acne, hirsutism, overweight, or infertility - can further lower self-esteem and contribute to a negative body image. The sense of lack of control over one's health, stress related to ongoing treatment, and social pressure concerning fertility may exacerbate psychological distress in these patients.

Numerous studies have shown a higher prevalence of depressive symptoms in women with PCOS compared to the general population. According to a meta-analysis by Brutocao et al. (2018), which included 24 studies involving 167,912 women, women with PCOS have nearly a threefold increased risk of clinical depression (OR = 2.79; 95% CI: 2.23–3.50) compared to women without the diagnosis. [12] Similar findings were reported by Cooney et al. (2017), who found significantly higher levels of moderate to severe depressive symptoms in PCOS patients. [13] Another meta-analysis, conducted on a sample of 4,002 women across 19 eligible studies, reported a mean prevalence of depression in PCOS patients of approximately 31%, although diagnostic tool variation influenced the results. [14]

Anxiety Disorders, Stress, and Reduced Quality of Life

Women with polycystic ovary syndrome (PCOS) are also at increased risk for anxiety disorders, including generalized anxiety disorder (GAD) and panic attacks. A meta-analysis conducted by Dokras et al. (2012) showed that women with PCOS are significantly more likely to experience generalized anxiety disorders. The prevalence of GAD across the analyzed studies was 20.4% in the PCOS group compared to 3.9% in the control group. [15]

Another meta-analysis by Cooney et al. (2017) found that the risk of experiencing anxiety symptoms was more than twice as high in women with PCOS than in those without the condition. [16]

Impact of Physical Symptoms (Hirsutism, Obesity, Acne) on Mental Health

Polycystic ovary syndrome (PCOS) plays a significant role in shaping women's body image and self-esteem. Numerous studies have shown that PCOS symptoms contribute to a decreased sense of attractiveness, which correlates with higher levels of body dissatisfaction and reduced quality of life. [17] Research conducted by Benetti-Pinto et al. (2015) indicates that women with PCOS are significantly more likely to have a negative perception of their bodies compared to healthy women, regardless of body mass index (BMI). Physical changes associated with androgenization are particularly difficult to accept, as they are often perceived as "masculinizing," leading to feelings of shame and low self-worth. [18]

The consequences of this self-perception are multifaceted. Women with PCOS are more likely to avoid social situations that involve body exposure (e.g., swimming pools or gyms), are less likely to engage in close interpersonal relationships, and may experience difficulties in intimate settings due to fear of judgment by their partner and feelings of inadequacy. [19] In many cases, this leads to social isolation, withdrawal, and reduced participation in daily life, which over time can increase the risk of developing anxiety and depressive disorders. [20]

Negative body image often coexists with symptoms of depression and anxiety, forming a significant component of the vicious cycle of psychopathology. Therefore, treatment of PCOS should address not only hormonal and metabolic aspects but also psychological dimensions through the inclusion of cognitive-behavioral therapy, psychoeducation, and support aimed at fostering body acceptance and building a positive self-image.

Eating Disorders

Eating disorders are an increasingly recognized problem among women with polycystic ovary syndrome (PCOS) and represent an important psychological aspect of this condition. Women with PCOS exhibit a significantly increased risk of disordered eating behaviors such as emotional eating, binge eating disorder (BED), bulimia nervosa (BN), and night eating syndrome (NES). These issues may be related to attempts to control body weight, frustration with unsuccessful weight loss efforts, low mood, and negative body image. [21, 22]

Studies show that women with PCOS are 2 to 3 times more likely to experience eating disorders compared to the general population. [22, 23] In a meta-analysis by Cooney et al. (2024), including 20 studies with a total of 28,922 women with PCOS and 258,619 control participants,

women with PCOS were found to be significantly more prone to developing eating disorders (OR: 1.53; 95% CI: 1.29–1.82). In studies where PCOS was diagnosed using the Rotterdam criteria, the risk was even higher-nearly threefold compared to the control group (OR: 2.88; 95% CI: 1.55–5.34). Notably, there was a significantly higher prevalence of BN, BED, and NES, while no significant increase was found for anorexia nervosa. Additionally, elevated scores on eating disorder screening tools (e.g., EDE-Q) were negatively correlated with quality of life as measured by the PCOSQ ($r = –0.57$), highlighting the substantial impact of these disorders on patients' overall well-being. [24]

Eating disorders can significantly hinder effective PCOS treatment. They negatively affect the implementation and maintenance of lifestyle changes-such as dietary modification and regular physical activity-which are fundamental to non-pharmacological therapy. [25] Moreover, coexisting depressive and anxiety symptoms can lower motivation for treatment and adherence to therapeutic recommendations. If left untreated, eating disorders increase the risk of obesity, insulin resistance, and type 2 diabetes, further exacerbating the course of PCOS.

Therefore, screening for eating disorders should be a routine part of the clinical assessment in women with PCOS, particularly in cases of difficulty losing weight or in the presence of psychological symptoms. Optimal management should be interdisciplinary, involving not only gynecologists and endocrinologists but also clinical dietitians and mental health professionals. Integrating psychotherapeutic support (e.g., cognitive-behavioral therapy) with pharmacological and dietary treatment can significantly improve treatment outcomes and quality of life in women with PCOS. [26]

TREATMENT

Given that symptoms in patients with polycystic ovary syndrome (PCOS) can vary greatly in severity and manifestation-resulting in a highly diverse clinical picture-therapeutic approaches must be tailored to the individual needs and expectations of each patient. This personalized strategy also aims to prevent long-term complications associated with the syndrome. Treatment of PCOS typically involves a combination of pharmacological therapy and non-pharmacological interventions. [1]

Non-Pharmacological Management

In the treatment of polycystic ovary syndrome (PCOS), lifestyle modification plays a crucial role and includes proper diet, regular physical activity, and psychological support. Treatment should begin with these changes, especially in patients who are overweight or obese. In women with normal body weight, the goal is to prevent weight gain [27].

Lifestyle changes are an effective method for improving metabolic and hormonal parameters as well as quality of life in patients with PCOS. Dietary interventions such as low-glycemic index diets, Mediterranean diets, fiber- and omega-3-rich plans, as well as ketogenic diets, have shown beneficial effects on insulin sensitivity and hormonal balance [28]. Regular physical activity—both aerobic and resistance exercise-contributes to improved insulin sensitivity, weight reduction, and enhancement of metabolic and reproductive parameters [29,30].

According to current guidelines, the minimum recommended amount of physical activity is 150 minutes of moderate-intensity exercise per week or 75 minutes of vigorous activity, or an equivalent combination of both, along with muscle-strengthening exercises on at least two non-consecutive days per week [31]. Even a modest weight loss-around 5%-may lead to the restoration of ovulation and improvement in fertility [32]. However, it should be emphasized that maintaining weight loss is essential to achieve long-term health benefits [33].

Pharmacological Management

When non-pharmacological treatments prove ineffective, pharmacological therapy is introduced and tailored individually, depending on the desired therapeutic effect. In women who are not planning to conceive in the near future, the goal is to alleviate symptoms and reduce the risk of complications; therefore, combined oral contraceptives (COCs) are recommended. In selected cases, anti-androgens such as spironolactone or finasteride may be used alone, as they effectively reduce symptoms associated with elevated androgen levels. However, anti-androgen therapy requires concurrent use of reliable contraception due to the potential teratogenic effects of these medications on fetal development.

Metformin is particularly recommended for women with PCOS accompanied by insulin resistance or metabolic disorders. By improving insulin sensitivity, metformin reduces insulin and androgen levels, which contributes to the regulation of menstrual cycles, alleviation of hyperandrogenic symptoms, and improvement of the metabolic profile. Metformin may be used alone or in combination with other drugs, such as clomiphene, particularly in women with infertility and clomiphene resistance.

When the goal of treatment is to improve fertility, the most commonly used medication for ovulation induction is clomiphene citrate, which works by modulating estrogen receptors in the hypothalamic-pituitary-ovarian axis. If clomiphene proves ineffective, the next step is to consider ovulation induction using gonadotropins, and if this therapy also fails, assisted reproductive technologies, such as in vitro fertilization (IVF), may be used. [34]

Psychological and Therapeutic Support

Polycystic ovary syndrome (PCOS), as a significant psychological burden, necessitates the inclusion of psychological support within the framework of comprehensive care for patients with PCOS. Psychotherapeutic interventions can play a key role in improving quality of life, reducing the severity of depressive and anxiety symptoms, and supporting the treatment of eating disorders and difficulties with body image acceptance. One of the most effective psychotherapeutic approaches used in women with PCOS is cognitive behavioral therapy (CBT), which has been shown to effectively reduce symptoms of depression, anxiety, and negative body image. [10] CBT can also enhance the effectiveness of lifestyle interventions by improving dietary adherence and increasing physical activity.

A study conducted by Cooney et al. in 2018 found that the combination of cognitive behavioral therapy (CBT) with lifestyle modification (LS) was more effective in treating women with PCOS than lifestyle modification alone. The CBT+LS group showed greater weight loss, improved quality of life (PCOSQ), and a better stress response (lower heart rate after a stressor) compared to the LS group. [35] For women with PCOS and comorbid eating disorders (e.g., BED, BN), therapies aimed at normalizing eating behavior and restructuring distorted body image are also employed. Increasingly, mindfulness-based techniques are being implemented, which have been shown to reduce stress levels, improve emotional self-regulation, and reduce symptoms of compulsive eating. [36,37]

Additional benefits may be gained through participation in therapeutic or support groups, which facilitate experience-sharing and help counteract the social isolation often observed in this patient population. [38] Another important component of care for women with PCOS is psychoeducation, which increases awareness of the disease mechanisms, potential psychological challenges, and available treatment methods, while also strengthening the sense of agency and engagement in the therapeutic process. In some cases, couples therapy may also be indicated, especially when PCOS negatively affects intimate relationships or fertility. [39,40] The implementation of an integrated therapeutic approach that combines gynecological and endocrinological care with psychological and dietary interventions currently represents the recommended standard in the treatment of women with PCOS. This approach not only improves metabolic outcomes but also has a significant positive impact on mental health and overall well-being in women affected by the condition. [1]

Summary

A holistic approach is essential in the treatment of patients with polycystic ovary syndrome (PCOS), addressing not only somatic symptoms but also psychological and psychiatric aspects. Therefore, the integration of psychological and psychiatric care with endocrinological and gynecological treatment is crucial for effective PCOS management. A comprehensive strategy-including psychotherapeutic support, psychoeducation, and, when necessary, psychiatric pharmacotherapy-facilitates better coping with the condition, enhances adherence to medical recommendations, and improves overall health outcomes. Thus, a holistic approach forms the foundation of effective and long-lasting therapy for women with PCOS. [5]

Disclosure

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References:
1. Teede HJ, Tay CT, Laven JJE, Dokras A, Moran LJ, Piltonen TT, Costello MF, Boivin J, Redman LM, Boyle JA, Norman RJ, Mousa A, Joham AE. Recommendations From the 2023 International Evidence-based Guideline for the Assessment and Management of Polycystic Ovary Syndrome. J Clin Endocrinol Metab. 2023 Sep 18;108(10):2447-2469. doi: 10.1210/clinem/dgad463. PMID: 37580314; PMCID: PMC10505534.
2. Stankiewicz M, Norman R. Diagnosis and management of polycystic ovary syndrome: a practical guide. Drugs. 2006;66(7):903-12. doi: 10.2165/00003495-200666070-00002. PMID: 16740005.
3. Yildiz BO, Knochenhauer ES, Azziz R. Impact of obesity on the risk for polycystic ovary syndrome. J Clin Endocrinol Metab. 2008 Jan;93(1):162-8. doi: 10.1210/jc.2007-1834. Epub 2007 Oct 9. PMID: 17925334; PMCID: PMC2190739.
4. Dybciak, P.; Raczkiewicz, D.; Humeniuk, E.; Powrózek, T.; Gujski, M.; Małecka-Massalska, T.; Wdowiak, A.; Bojar, I. Depression in Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis. *J. Clin. Med.* **2023**, *12*, 6446. https://doi.org/10.3390/jcm12206446
5. Dokras A, Stener-Victorin E, Yildiz BO, Li R, Ottey S, Shah D, Epperson N, Teede H. Androgen Excess- Polycystic Ovary Syndrome Society: position statement on depression, anxiety, quality of life, and eating disorders in polycystic ovary syndrome. Fertil Steril. 2018 May;109(5):888-899. doi: 10.1016/j.fertnstert.2018.01.038. PMID: 29778388.

6. Jiskoot G, Dietz de Loos A, Beerthuizen A, Timman R, Busschbach J, et al. (2020) Long-term effects of a three-component lifestyle intervention on emotional well-being in women with Polycystic Ovary Syndrome (PCOS): A secondary analysis of a randomized controlled trial. PLOS ONE 15(6): e0233876. https://doi.org/10.1371/journal.pone.0233876
7. Jiskoot G, Dietz de Loos A, Beerthuizen A, Timman R, Busschbach J, et al. (2020) Long-term effects of a three-component lifestyle intervention on emotional well-being in women with Polycystic Ovary Syndrome (PCOS): A secondary analysis of a randomized controlled trial. PLOS ONE 15(6): e0233876. https://doi.org/10.1371/journal.pone.0233876
8. Teede HJ, Misso ML, Costello MF, et al. *Recommendations from the international evidence-based guideline for the assessment and management of polycystic ovary syndrome.* Fertil Steril. 2018;110(3):364–379.
9. Goodarzi MO, Dumesic DA, Chazenbalk G, Azziz R. Polycystic ovary syndrome: etiology, pathogenesis and diagnosis. Nat Rev Endocrinol. 2011 Apr;7(4):219-31. doi: 10.1038/nrendo.2010.217. Epub 2011 Jan 25. PMID: 21263450.
10. Dokras A. Mood and anxiety disorders in women with PCOS. Steroids. 2012 Mar 10;77(4):338-41. doi: 10.1016/j.steroids.2011.12.008. Epub 2011 Dec 9. PMID: 22178257.
11. Legro RS, Brzyski RG, Diamond MP, Coutifaris C, Schlaff WD, Casson P, Christman GM, Huang H, Yan Q, Alvero R, Haisenleder DJ, Barnhart KT, Bates GW, Usadi R, Lucidi S, Baker V, Trussell JC, Krawetz SA, Snyder P, Ohl D, Santoro N, Eisenberg E, Zhang H; NICHD Reproductive Medicine Network. Letrozole versus clomiphene for infertility in the polycystic ovary syndrome. N Engl J Med. 2014 Jul 10;371(2):119-29. doi: 10.1056/NEJMoa1313517. Erratum in: N Engl J Med. 2014 Oct 9;317(15):1465. PMID: 25006718; PMCID: PMC4175743.
12. Brutocao C, Zaiem F, Alsawas M, Morrow AS, Murad MH, Javed A. Psychiatric disorders in women with polycystic ovary syndrome: a systematic review and meta-analysis. Endocrine. 2018;62(2):318–25. DOI: 10.1007/s12020-018-1692-3
13. Cooney LG, Lee I, Sammel MD, Dokras A. High prevalence of moderate and severe depressive and anxiety symptoms in polycystic ovary syndrome: A systematic review and meta-analysis. Hum Reprod. 2017;32(5):1075–91. DOI: 10.1093/humrep/dex044
14. Dybciak, P.; Raczkiewicz, D.; Humeniuk, E.; Powrózek, T.; Gujski, M.; Małecka-Massalska, T.; Wdowiak, A.; Bojar, I. Depression in Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis. *J. Clin. Med.* **2023**, *12*, 6446. https://doi.org/10.3390/jcm12206446
15. Dokras A, Clifton S, Futterweit W, Wild R. Increased prevalence of anxiety symptoms in women with polycystic ovary syndrome: Systematic review and meta-analysis. Fertility and Sterility 2012; 97(1): 225–230.
16. Cooney LG, Lee I, Sammel MD, Dokras A. High prevalence of moderate and severe depressive and anxiety symptoms in polycystic ovary syndrome: a systematic review and meta-analysis. Hum Reprod. 2017 May 1;32(5):1075-1091. doi: 10.1093/humrep/dex044. PMID: 28333286.
17. Bazarganipour F, Ziaei S, Montazeri A, et al. Health-related quality of life in patients with polycystic ovary syndrome (PCOS): a model-based study reflecting the impact of depression, anxiety and body mass index. Health Qual Life Outcomes. 2012;10:150.) (Trent ME, Rich M,

Austin SB, Gordon CM. Quality of life in adolescent girls with polycystic ovary syndrome. Arch Pediatr Adolesc Med. 2002;156(6):556–560.
18. Benetti-Pinto CL, Ferreira SR, Antunes A Jr, Yela DA. Health-related quality of life in women with polycystic ovary syndrome: associated factors. Health Qual Life Outcomes. 2015;13:131.
19. Hahn S, Janssen OE, Tan S, et al. Clinical and psychological correlates of quality-of-life in polycystic ovary syndrome.Eur J Endocrinol. 2005;153(6):853–860.
20. Kerchner A, Lester W, Stuart SP, Dokras A. Risk of depression and other mental health disorders in women with polycystic ovary syndrome: a longitudinal study. Fertil Steril. 2009;91(1):207–212.
21. Pirotta S, Barillaro M, Brennan L, Grassi A, Jeanes YM, Joham AE, Kulkarni J, Couch LM, Lim SS, Moran LJ. Disordered Eating Behaviours and Eating Disorders in Women in Australia with and without Polycystic Ovary Syndrome: A Cross-Sectional Study. J Clin Med. 2019 Oct 14;8(10):1682. doi: 10.3390/jcm8101682. PMID: 31615157; PMCID: PMC6832459.
22. Yüksel S, Gencer FK, Alptekin FB, Saglam NGU. Disordered Eating in Young Women with Polycystic Ovary Syndrome. Reprod Sci. 2024 May;31(5):1303-1310. doi: 10.1007/s43032-023-01435-1. Epub 2023 Dec 28. PMID: 38155280.
23. Lee I, Cooney LG, Saini S, Smith ME, Sammel MD, Allison KC, Dokras A. Increased risk of disordered eating in polycystic ovary syndrome. Fertil Steril. 2017 Mar;107(3):796-802. doi: 10.1016/j.fertnstert.2016.12.014. Epub 2017 Jan 16. PMID: 28104244.
24. Cooney LG, Lee I, Sammel MD, Dokras A. Risk of eating disorders and disordered eating in women with polycystic ovary syndrome: a systematic review and meta-analysis. *Fertil Steril.* 2024;121(2):254–265. doi:10.1016/j.fertnstert.2023.11.002
25. Karjula S, Morin-Papunen L, Auvinen J, Jokelainen J, Franks S, Tapanainen JS, et al. Psychological distress is more prevalent in women with PCOS symptoms: 15-year follow-up. *J Clin Endocrinol Metab.* 2017;102(6):1861–1869.
26. Karjula S, Morin-Papunen L, Auvinen J, Jokelainen J, Franks S, Tapanainen JS, et al. Psychological distress is more prevalent in women with PCOS symptoms: 15-year follow-up. *J Clin Endocrinol Metab.* 2017;102(6):1861–1869.) (Tay CT, Teede HJ, Hill B, Loxton D, Joham AE. Increased prevalence of eating disorders, low self-esteem, and psychological distress in women with PCOS: a community-based study. *Psychol Med.* 2019;49(7):1132–1141
27. Moran C, Arriaga M, Rodriguez G, Moran S. Obesity differentially affects phenotypes of polycystic ovary syndrome. Int J Endocrinol. 2012;2012:317241. doi: 10.1155/2012/317241. Epub 2012 Jul 8. PMID: 22829818; PMCID: PMC3399368.
28. Gautam R, Maan P, Jyoti A, Kumar A, Malhotra N, Arora T. The Role of Lifestyle Interventions in PCOS Management: A Systematic Review. Nutrients. 2025 Jan 16;17(2):310. doi: 10.3390/nu17020310. PMID: 39861440; PMCID: PMC11767734.
29. Norman RJ, Davies MJ, Lord J, Moran LJ. The role of lifestyle modification in polycystic ovary syndrome. Trends Endocrinol Metab. 2002 Aug;13(6):251-7. doi: 10.1016/s1043-2760(02)00612-4. PMID: 12128286.

30. Moran LJ, Brinkworth G, Noakes M, Norman RJ. Effects of lifestyle modification in polycystic ovarian syndrome. Reprod Biomed Online. 2006 May;12(5):569-78. doi: 10.1016/s1472-6483(10)61182-0. PMID: 16790100.
31. Cowan S, Lim S, Alycia C, Pirotta S, Thomson R, Gibson-Helm M, Blackmore R, Naderpoor N, Bennett C, Ee C, Rao V, Mousa A, Alesi S, Moran L. Lifestyle management in polycystic ovary syndrome - beyond diet and physical activity. BMC Endocr Disord. 2023 Jan 16;23(1):14. doi: 10.1186/s12902-022-01208-y. PMID: 36647089; PMCID: PMC9841505.
32. Cowan S, Lim S, Alycia C, Pirotta S, Thomson R, Gibson-Helm M, Blackmore R, Naderpoor N, Bennett C, Ee C, Rao V, Mousa A, Alesi S, Moran L. Lifestyle management in polycystic ovary syndrome - beyond diet and physical activity. BMC Endocr Disord. 2023 Jan 16;23(1):14. doi: 10.1186/s12902-022-01208-y. PMID: 36647089; PMCID: PMC9841505.
33. Clark AM, Thornley B, Tomlinson L, et al. Weight loss in obese infertile women results in improvement in reproductive outcome for all forms of fertility treatment. *Hum Reprod* 1998; 13: 1502-1505.) oraz Clark AM, Ledger W, Galletly C, et al. Weight loss results in significant improvement in pregnancy and ovulation rates in anovulatory obese women. *Hum Reprod* 1995; 10: 2705-2712.
34. Norman RJ, Davies MJ, Lord J, Moran LJ. The role of lifestyle modification in polycystic ovary syndrome. Trends Endocrinol Metab. 2002 Aug;13(6):251-7. doi: 10.1016/s1043-2760(02)00612-4. PMID: 12128286.
35. Teede HJ, Misso ML, Costello MF, Dokras A, Laven J, Moran L, et al. International evidence-based guideline for the assessment and management of polycystic ovary syndrome 2018. *Med J Aust*. 2018;209(4):179–185. doi:10.5694/mja18.00624
36. Cooney LG, Milman LW, Hantsoo L, Kornfield S, Sammel MD, Allison KC, Epperson CN, Dokras A. Cognitive-behavioral therapy improves weight loss and quality of life in women with polycystic ovary syndrome: a pilot randomized clinical trial. Fertil Steril. 2018 Jul 1;110(1):161-171.e1. doi: 10.1016/j.fertnstert.2018.03.028. Epub 2018 Jun 13. PMID: 29908771; PMCID: PMC6443091.
37. Bafghi, Z.R., Ahmadi, A., Mirzaee, F. et al. The effect of mindfulness-based art therapy (MBAT) on the body image of women with polycystic ovary syndrome (PCOS): a randomized controlled trial. BMC Psychiatry 24, 611 (2024). https://doi.org/10.1186/s12888-024-06057-8
38. Cousin L, Bailey C, Grant P. Mindfulness-based interventions for women with polycystic ovary syndrome: a pilot randomized controlled trial. *Mindfulness*. 2021;12:1095–1105. doi:10.1007/s12671-020-01560-6.
39. Rasoulzadeh Bidgoli M, Kordi M, Tadayon M, et al. The impact of group counseling on body image and self-esteem in women with polycystic ovary syndrome: a randomized controlled trial. *Arch Psychiatr Nurs*. 2020;34(2):54–59. doi:10.1016/j.apnu.2019.12.004.
40. Khademi A, Alleyassin A, Aghahosseini M, et al. The impact of PCOS on marital satisfaction and the role of counseling interventions. *Int J Fertil Steril*. 2015;9(3):411–420. doi:10.22074/ijfs.2015.4282.