REVIEW ARTICLE

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Stolen Femininity of Women with Polycystic Ovarian Syndrome: A Review

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ABSTRACT

Polycystic ovary syndrome is a common endocrine disorder among women of reproductive age worldwide and is increasingly recognized in Oman. Hormonal imbalances, particularly elevated androgen levels, underline many of its manifestations, leading to excessive male-pattern hair growth, acne, and oily skin. These visible manifestations can significantly affect self-esteem and body image. Furthermore, these hormonal imbalances disrupt the menstrual cycle, causing irregular or absent periods, and making natural conception difficult. As such, polycystic ovary syndrome deeply influences a woman's perceptions of her femininity and societal norms surrounding womanhood. This can be particularly distressing to women in Middle Eastern societies including Oman, where motherhood is highly valued. Recognizing this broad range of issues is important for developing culturally appropriate interventions to address both the physical and psychological consequences of this condition, thereby improving the quality of life of affected women.

Polycystic ovarian syndrome (PCOS) is a multifactorial endocrine disorder caused by elevated androgen levels.[1] It affects approximately 5–10% women of reproductive age, usually manifesting in adolescence.[2,3] However, the exact global burden of PCOS remains unknown, as up to 70% of cases are estimated to go undiagnosed.[4] A study among Omani medical students found a prevalence of 4.8%, with obesity being a strongly associated factor.[5] PCOS is also recognized as a leading cause of female infertility,[6] which can be particularly distressing in traditional Middle Eastern societies, including Oman, where motherhood is highly valued.

This review delves into the pathophysiology, physical and psychological manifestations, and management of PCOS. In particular, the article emphasizes the importance of patient education regarding the short- and long-term consequences of PCOS, and the importance of routine screening to address the psychological dimensions of this condition to facilitate effective lifestyle changes, and support the overall wellbeing of affected women.

Etiology and pathophysiology

GENETIC AND HORMONAL FACTORS

PCOS is distinguishable from other ovarian conditions by a combination of internal ovarian abnormalities, hyperinsulinemia, and abnormal androgen production by the ovaries or adrenal glands, although the precise etiology remains unknown.[7] Insulin resistance disrupts ovarian function by increasing androgen levels and causing anovulation. Levels of other hormones (e.g., prolactin, luteinizing hormone, follicle-stimulating hormone, and gonadotropin-releasing hormone) may also be altered.[8]

PCOS is believed to have a complex pathophysiology influenced by both genetic susceptibility and environmental factors, such as poor diet, lifestyle, or exposure to infectious agents.[9,10] Genetic factors play a significant role, but are challenging to pinpoint due to unreliable investigative measures and the heterogeneous clinical manifestations, even among family members.[7] Familial aggregation is evident: one study found that the daughters of women with PCOS have a five-fold chance of developing the condition.[11] Another noted a 50% risk in woman whose mother or sibling has PCOS.[12]

Propensity for PCOS has been linked to several genes that regulate gonadotropin secretion, ovarian function, and hormone action, including follicle-stimulating hormone beta-polypeptide, luteinizing

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hormone/ choriogonadotropin receptor, follicle-stimulating hormone receptor, anti-Müllerian hormone, and differentially expressed in normal and neoplastic cells domain containing 1A. Genome-wide association studies have also identified candidate metabolic genes such as thyroid adenoma-associated gene and insulin receptor gene in association with PCOS.[13,14]

There is also a notable link between PCOS and hyperinsulinemia, potentially resulting from two primary factors: an increase in hyperandrogenism and a reduction in the levels of sex hormone-binding globulin in the bloodstream.[15] Peripheral insulin resistance, associated with uterine and ovarian problems, also has a genetic basis.[16] Both male and female offspring of women with PCOS are at increased risk of developing insulin-resistant.[17,18]

Neurokinin B is a hypothalamic neuropeptide associated with regulation of gonadotropin-releasing hormone secretion, which is central to the control of the menstrual cycle and ovulation. In PCOS, an imbalance in the hormonal feedback system often leads to reproductive dysfunction, including irregular menstrual cycles and anovulation.[19]

Kit ligand (KL), also known as stem cell factor, is an intraovarian cytokine that plays a crucial role in folliculogenesis, the process by which ovarian follicles mature. KL interacts with its receptor, Kit, which is expressed on ovarian cells such as granulosa cells and thecal cells. KL signaling promotes the growth and development of oocytes and granulosa cells and is essential for proper follicle maturation. Dysregulation of KL signaling has been implicated in the pathophysiology of PCOS. The interplay of increased Neurokinin B levels and KL signaling provides insight into the complex and multifaceted nature of PCOS. Both mechanisms affect key processes involved in reproductive function.[20]

Lifestyle and environmental influences

Lifestyle factors also influence the development of PCOS, particularly unhealthy dietary habits.[16] The associated weight gain and obesity contribute to PCOS through metabolic and hormonal effects linked to insulin resistance and hyperinsulinemia.[21] Exogenous toxins accumulating in the follicular environment due to specific lifestyle choices, such as a diet rich in advanced glycation end-products and exposure to endocrine-disrupting chemicals, may also influence PCOS development.[22]

Chronic stress exacerbates the condition by triggering adipocyte hypertrophy and activating the hypothalamic-pituitary-adrenal axis, leading to cortisol release. This promotes gluconeogenesis, lipolysis, visceral fat accumulation, and increased insulin levels, primarily through the effects of glucocorticoids on pre-adipocyte formation.[23] While studies have associated PCOS with specific dietary components, such as saturated fatty acids and vitamin D deficiency, the exact role of nutrition remains unclear.[24] Prenatal exposure to the highly androgen-concentrated intrauterine environments in mothers with PCOS is also considered a contributing environmental factor.[25]

Clinical manifestations

Physical manifestations

As mentioned previously, women with PCOS exhibit a wide range of physical symptoms, including amenorrhea, oligomenorrhea, hirsutism, weight gain or obesity, anovulation, androgenic alopecia, acanthosis nigricans, and acne vulgaris.[1,26] They may also experience adverse reproductive (menstrual irregularity, subfertility or infertility), metabolic (insulin resistance, diabetes mellitus, cardiovascular risk), and psychological complications.[27]

In PCOS, the usual hormonal balance in the body is disrupted. Elevated androgen levels and the development of small fluid-filled cysts in the ovaries inhibit folliculogenesis and the development, maturation, and release of eggs. This can lead to missed or infrequent ovulation and subsequent menstruation, contributing to fertility problems.[28] Insulin resistance is also a common feature of PCOS, resulting in increased hunger and weight gain, especially around the abdomen.[29] The presence of metabolic comorbidities such as insulin resistance and obesity worsen existing PCOS symptoms by further disrupting the hormone balance. Increased androgen levels may lead to hirsutism, including male-pattern hair growth on the face and body, and male-pattern hair loss on the scalp.[30] Finally, elevated androgen levels stimulate the sebaceous glands in the skin to produce more sebum, clogging pores and contributing to excessive oiliness and the development of acne on the face, chest, and back.[31]

Psychological manifestations

PCOS significantly affects emotional well-being, impacting body image, self-esteem, and mental health. Several recent systematic reviews and meta-analyses have indicated that PCOS triggers emotional distress.[32]

One review unequivocally identified PCOS as an independent predictor of psychological disorders.[33] Two studies from India found a prevalence of 28% and 39% for anxiety and 11% and 25% for depression among women with PCOS.[34,35] In the Middle East, case-control studies conducted in Saudia Arabia indicated that women with PCOS suffered more frequently from stress, depression, and anxiety compared to controls.[36,37] An Omani study found heightened risk of depression, anxiety, and stress among women with PCOS.[38] Further, a qualitative study from Oman found that PCOS-related infertility was tied to feelings of loneliness, jealousy, and inferiority among affected women and often resulted in marital conflict and poor social relationships with family and friends. This was attributed to the high degree of cultural importance placed on childbearing in Arab societies.[39]

Similarly, qualitative research from Iran revealed considerable impact of PCOS on the health-related quality of life (QOL) and self-image of young women, giving rise to feelings of inferiority regarding traditional values of femininity and fertility, concern over marriage prospects, and loss of physical attractiveness.[40,41]

However, a case-controlled Iranian study found that four PCOS-associated symptoms—obesity, acne, hirsutism, and acanthosis—had no significant association with depression.[42] Contradicting results emerged from a study from South India, which found psychological distress to be significantly related to PCOS-associated obesity, infertility, acne, and hirsutism,[43] suggesting an individualized interplay of physiological, environmental, and cultural variables.

Although the exact mechanisms underlying increased vulnerability to psychological disorders remains unclear,[44] one potential cause could be stress response mediated by abnormal hypothalamic-pituitary-adrenal axis activity and circadian patterns.[45] The chronic, complex, and often frustrating nature of PCOS can also decrease a person's motivation and confidence, reinforcing the importance of routine screening for mood disorders and providing psychological support for PCOS patients.[46,47]

SPOTLIGHT ON INFERTILITY

The prevalence of infertility in women with PCOS varies worldwide. According to a retrospective cohort study from the UK, 66% of women with PCOS are infertile, including 17.5% with primary infertility.[48] A recent systematic review estimated the overall prevalence of infertility in the Middle East and North African region to be 22.6%, although there is no published information concerning the prevalence specifically among women with PCOS.[49] In married life, infertility in either husband or wife exacts a significant emotional toll on the affected couple, especially on the wife.[50] Saudi Arabian women experiencing infertility (from all causes) were twice as likely to report depressive symptoms compared to fertile women.[51] Moreover, infertility has been linked to significant impairments in QOL.[51] Some researchers have posited that psychosocial distress may be a cause, rather than a consequence, of infertility.[50,52]

Efforts to understand the psychological implications of infertility among women with PCOS have yielded conflicting outcomes.[53,54] While many affected women expressed apprehension about future childlessness, infertility did not emerge as the sole determinant of their psychological distress.[55] Studies comparing women with PCOS to those experiencing infertility for other reasons found that primary causes of increased depression and body dissatisfaction in the former group stemmed more from PCOS-associated symptoms and body image issues than infertility itself.[54,56] In particular, women with PCOS have reported challenges perceiving themselves as 'feminine', in part because subfertility and childlessness are seen to invalidate traditional gender roles.[53] In a British study, women with PCOS reported feeling 'freakish', 'abnormal', and like 'improper women' due to their male-like symptoms.[39]

Psychosocial experience of infertility is highly related to sociocultural context.[50] For example, a study among native Austrian and Muslim immigrant women, the latter group reported greater psychological distress associated with infertility.[57] Similarly, qualitative studies from the Middle East and Iran have highlighted the profound emotional impact of infertility among women with PCOS, with cultural expectations related to childbearing, marital pressure, and self-perception adding to their psychological distress.[39] Such variations emphasize the need for a culturally sensitive approach by healthcare providers to the psychological impact of PCOS-related infertility.

Management

LIFESTYLE MODIFICATION

The management of PCOS is highly individualized due to the wide variability in clinical presentations—ranging from fertility concerns and menstrual irregularities to

hyperandrogenic symptoms.[58,59] Lifestyle modification is the first course of action for most patients with PCOS, particularly in mild to moderate cases primarily weight reduction and controlling calorie intake.[46,60] Studies show that even a modest weight loss of 5–10% can restore regular menstrual cycles and reduce free testosterone levels, thereby decreasing the incidence of metabolic syndrome.[61] Tailored dietary plans, rich in fiber and low in saturated fats and carbohydrates, are generally recommended.[62,63] Physical activity is also significant for weight reduction and improved insulin sensitivity.[64] Exercise alone has shown potential to restore ovulation in women with PCOS through modulation of the hypothalamic-pituitary-gonadal axis.[65] The above initiatives should be accompanied by culturally appropriate mental health interventions. For example, cognitive-behavioral group therapy helped Taiwanese women with PCOS to reduce depression and improve self-esteem.[66]

PHARMACOLOGICAL INTERVENTIONS

In some cases, pharmacological interventions might be necessary. For women primarily concerned with menstrual irregularities, but not seeking to become pregnant, combined oral contraceptives or progestins are frequently recommended.[67] Metformin, with its insulin sensitivity-enhancing properties, is often prescribed alongside combined oral contraceptives to restore ovulation in patients with PCOS; this drug also shows short-term anti-hyperandrogenic effects.[68] Patients seeking relief from hyperandrogenism-related dermatological manifestations may benefit from aldosterone receptor antagonists or 5-alpha reductase inhibitors.[69] Treatment strategies vary for patients experiencing infertility, for whom medications for ovulation induction, such as clomiphene citrate and aromatase inhibitors become pivotal.[70,71]

CULTURAL CONSIDERATIONS

Healthcare providers in Gulf Cooperation Council countries including Oman should be trained to understand and respect the cultural nuances that affect how women in specific regions view PCOS and fertility. For instance, in many Arab and Asian cultures, the emphasis on family and having children may intensify feelings of inadequacy or failure among women experiencing subfertility. Sensitively addressing these concerns and providing psychological support along with fertility treatments can improve the overall care experience. Moreover, increasing awareness and education about PCOS, particularly its psychological impact, through community outreach programs or mass media campaigns can help reduce stigma and misconceptions. Educating affected women, families and partners about PCOS can also alleviate the social pressure on women who may face judgment or misunderstanding about their condition.

CONCLUSION

Addressing PCOS poses a significant challenge due to its multifaceted nature and complex pathophysiology, especially in the Arabian cultural context. The broad range of physical symptoms in PCOS profoundly impacts the QOL of affected individuals; in addition, psychological repercussions, notably a heightened risk of anxiety, depression, and stress, are critical considerations. Women with PCOS in Gulf Cooperation Council countries including Oman, face unique challenges encompassing concerns about appearance, gender identity, and sociocultural pressures, emphasizing the need for holistic care that addresses the complex interplay between medical and psychosocial aspects. Infertility, a significant outcome of PCOS, may intensify emotional distress and cultural sensitivity is key in addressing these concerns. Comprehensive care for PCOS demands a holistic and culturally sensitive approach, integrating lifestyle modification and pharmacological intervention with psychological support and patient education.

Disclosure

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