




Psychiatric disorders in women with polycystic ovary syndrome

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Abstract

Introduction and Objective. Polycystic ovary syndrome (PCOS) is one of the most common gynecological endocrine disorders affecting women in reproductive age. Hyperandrogenism, oligoovulation, and polycystic ovaries seen on ultrasonography are its defining features. Women affected by PCOS are more susceptible to diabetes and dyslipidemia, as well as mental problems. Regarding the connection between PCOS and mental health, there are presently a number of theories. The aim of this study is to present the current knowledge of psychiatric disorders in women with PCOS, focusing on pathophysiology, molecular etiology and treatment.

Review Methods. A comprehensive literature review was performed using the electronic databases: PubMed, and Google Scholar. Key words, such as: 'PCOS', 'polycystic ovary syndrome', 'psychiatric', 'psychiatric disorders' and various combinations of the above were used. The search was limited by the year 2010 for all keywords.

Brief description of the state of knowledge. It is known that PCOS is linked to an increased prevalence of depression, bipolar disease, anxiety disorder and eating disorder. The literature review shows that the gut-brain axis, neurotransmitter and neuroendocrine dysfunction play significant roles in pathogenesis of the co-occurrence of mental diseases and PCOS.

Summary. Despite the potential socio-economic impact psychiatric disorders may have on PCOS patients and society, only a limited amount of research has been undertaken to investigate this relationship. The need for screening tests for all women with PCOS for mental disorders and adequately treat women diagnosed with these conditions is emphasized.

Key words

PCOS, polycystic ovary syndrome, psychiatric, psychiatric disorders.

INTRODUCTION

PCOS – definition, epidemiology, pathophysiology, complications. According to the Amsterdam Criteria, PCOS is a heterogeneous disease [1–3] characterized by the formation of ovarian cysts [2], increased androgen levels and ovulation disorders. However, the presentation and course of the disease depend largely on the woman's age and the phenotype of the disease [3]. For this reason, the criteria for diagnosing the disease are different for young girls and for adult women, for whom the above-mentioned Amsterdam Criteria are used [2]. The treatment is therefore also selected individually [3]. According to various sources, 5–20% of women aged 15–49 are diagnosed of PCOS. [2, 4]. According to the WHO website, such discrepancies

result from the fact that up to 70% of women may not be aware that they have the disease. [5]. According to statistical research, between 2007–2017 the percentage of women of reproductive age suffering from PCOS increased by 1.455 [6]. In patients with PCOS, there occur numerous ovarian cysts and it is assumed that to diagnose PCOS there should be more than 20 such cysts [2]. Due to hyperandrogenism and insulin resistance, patients may experience problems with the menstrual cycle – lack of ovulation, irregular or absent bleeding during the menstrual cycle. PCOS patients are also more likely to suffer from endometrial cancer and diabetes II [4]. Hirsutism may also appears as male pattern hair, androgenetic alopecia and acne. Abdominal obesity affects approximately 50% of PCOS patients and, together with type II diabetes, is caused by insulin resistance [4, 7]. One in five women experience difficulty with sleeping, known sleep apnea. A large percentage of women suffering from PCOS are also diagnosed with depression and/or anxiety [7].

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Table 1. Causes of PCOS

Epigenetic	Toxic substances	Stress	Diet	Insulin resistance	Hiperandrogenism	Oxidative stress
Endocrine disorders in patients with PCOS may be related to the LH/choriogonadotropin receptor (LHCGR) and epoxide hydrolase 1 (EPHX1), which take part in steroidogenesis. Hypomethylation of LHCGR leads to greater sensitivity to LH. Hypermethylation of EPHX1 reduces the production of estradiol from testosterone – may impact on PCOS [1].	Endocrine disruptors (EDCs) can stimulate or inhibit the release of hormones by acting on their receptors. Higher amounts of EDCs are detected in patients suffering from PCOS. One example of an EDC is bisphenol A (BPA). BPA is very widespread, it can be found in some food packaging, PVC, and many others.[1]	Long-term stress causes adipocyte hypertrophy and proliferation. Additionally, it causes inflammation, which results in greater production of pro-inflammatory cytokines. Insulin resistance and increased insulin production are also caused by long-term stress [1]. In addition, stress affects the amount of sex hormones [8].	A diet rich in saturated fatty acids (SFA) cause inflammation, which leads to an increase in the amount of TNF- α and lower susceptibility to the action of insulin [1]. Additionally, there are studies indicating that PCOS patients have a less diverse microflora than healthy people [9].	In insulin resistance (IR), insulin loses its effect on most organs and the adrenal glands; therefore, the ovaries are still susceptible to this hormone [2]. The action of insulin causes enlargement of ovarian follicles, and increased secretion of hormones. In addition, hyperinsulinaemia affects receptors in the pituitary gland, which leads to secretion of more level of LH. Moreover, insulin affects fat tissue and inflammation, as already mentioned. [1].	Hyperandrogenism causes an increase in the level of unbound testosterone, which is converted to estrogen derivatives by adipose tissue, which causes an increase in the amount of LH [1].	Oxidative stress is an imbalance between oxidative processes, resulting in the formation of oxygen/nitrogen radicals, and antioxidant processes [10]. Reactive oxygen and nitrogen species (RONS) stimulate steroidogenesis in the ovaries. Moreover, RONS, by acting on the nervous system, can induce hunger [1]. High concentration of RONS also contributes to the destruction of DNA structure, fats and proteins produced in the body [1,10].

Psychiatric disorders in women with PCOS – general information, epidemiology. The Clinical features of PCOS, especially those impairing metabolic and reproductive functions, have always been hypothesized to have an adverse impact on the psychological well-being and overall quality of life of women. Several studies conducted on the subject have indicated that the problem is multi-dimensional, interconnected with both psychological distress and psychiatric disorders. However, the available data is inconsistent and it is impossible to unequivocally state a link between particular pathophysiological changes in PCOS and psychological issues. For instance, at present there seems to be no evidence of obesity in PCOS causing depression, and anxiety-related disorders in particular [11]. A systematic review and meta-analysis compiled by Dorkas et al. indicates a fourfold increased risk for abnormal depression scores in women with PCOS, compared with specifically selected control groups, independent of obesity [12]. Some studies have been conducted to assess the impact of high levels of androgens on the mental health of women. The most investigated connections concerned the relationship between PCOS and depressive disorder, generalized anxiety disorder, social phobia, obsessive-compulsive disorder, panic disorder, somatization and bipolar disease [13]. A large population-based study by Cesta et al. estimated the odds ratio for women with PCOS to be at least one psychiatric disease to 1.56. The study emphasizes a significantly elevated risk of depression, anxiety disorder, eating disorders, schizophrenia, personality disorders, tics, bipolar disorder, as well as autism spectrum disorder. Moreover, both brothers and sisters of women with PCOS had a higher adjusted odds ratio of autism spectrum disorders. Schizophrenia, as well as depressive and anxiety disorders, were found to be more common only in the sisters of patients.

It is worth noting, however, that odds ratios of prevalence of psychiatric diseases differed vastly from adjusted odds ratios, indicating the important role of existent psychiatric comorbidities in women with PCOS [14]. Literature also suggests that psychiatric diseases may be a starting point for states associated with PCOS, for instance, a study by Doretto et al. suggests that hypothalamic-pituitary-gonadal

axis secretion disturbances present in women with bipolar disorder, may compromise the menstrual cycle [15, 16].

The aim of the current study is to present an overview of the pathophysiology, molecular etiology and treatment of psychiatric diseases in women suffering from polycystic ovary syndrome.

STATE OF KNOWLEDGE

Anxiety disorders, obsessive compulsive disorder, depression, bipolar disease and eating disorders – definitions, general information. Anxiety is an organic response to stressful or dangerous situations. However, given its persistence and inadequate scale of response towards the stressor, it could be considered an inappropriate feeling. In this case, this response may be qualified as an anxiety disorder, which can be split into: separation anxiety disorder, medication/substance induced anxiety disorder, selective mutism, specific phobias, social anxiety disorder, panic disorder, agoraphobia, generalized anxiety disorder, other specified/unspecified anxiety disorders, and disorders due to other medical conditions [17, 18]. The most common physical symptoms of anxiety disorder include: accelerated heart rate, shallow breathing, tremor and increased muscular tension, diarrhoea and sweating. Somatic manifestations, such as tiredness, concentration difficulties, insomnia, and exasperation can be observed in the patient [17]. Occurrence of any anxiety disorder or depression and female sex are common risk factors for all of anxiety disorders [18]. Predispositions towards the development of an anxiety disorder could be a neurotic personality trait, with a low self-esteem level and chronic negative thinking [19]. Modifiable risk factors include alcohol abuse, use of tobacco or cannabis, poor living conditions, negative assessment of stressful situations during life, and use of excessive caffeine [20]. However, anxiety disorders could lead to the development of depression and substance abuse [18].

Obsessive compulsive disorder is characterized by the presence of so-called obsessions – persistent and bothering

thoughts and compulsions, manifested by compulsive and repetitive forced behaviours. Compulsions are a form of maintaining existing obsessions, although they themselves may be a burdensome problem, leading to anxiety. The characteristic themes of obsessive thoughts include apprehension of sickness or infection, unexpected aggressive thoughts, which sometimes include sexual or religious themes. Compulsive behaviours are classified as excessive hand washing, an urge to check multiple times whether some activities were performed correctly, and placing objects in particular order to maintain symmetry. As diagnostic criteria for obsessive compulsive disorder are qualified severe distress caused by the aforementioned actions, and interruption of normal daily activities, lasting at least one hour during the day [21, 22].

Depressive disorder is the major cause of psychiatric disability worldwide. According to the WHO, there is an increasing trend in the diagnosis of depression, which is acknowledged as being an intense and permanent low mood. It is proven that women suffer from depressive disorders twice as often as men [23]. There is a full range of symptoms of depression, e.g. insomnia or hypersomnia, sadness, anxiety, permanent tension, lack of appetite or increased appetite, loss of energy, pleasure and sexual interest. Somatization could also appear. Patients can report headaches, abdominal or chest pain, diarrhoea, sense of heaviness of limbs. Suicidal thoughts or suicide attempts can occur in severe depressive disorders [24].

Bipolar disease is a chronic illness in which different states of mood and energy are present. There are fluctuations between depression and mania or hypomania, which appear episodically. The main difference between mania and hypomania is intensification of mood and motor drive. Diagnostic criteria also differ – duration of mania is at least one week, while for hypomania the cut-off point is four days [25, 26]. According to DSM-5, the following types can be distinguished: type I bipolar disorder, type II bipolar disorder, cyclothymic disorder, other specified bipolar and related disorder, unspecified bipolar and related disorder, substance or drug-induced bipolar and related disorder, bipolar and related disorder due to another medical condition. In type I bipolar disorder, at least one manic episode is required to make diagnosis. Depression episodes are not required for diagnosis. In type II bipolar disorder a depression episode is required to have occurred at least once. Cyclothymic disorder is characterized by hypomania and depression; however, they have to be expressed in a manner insufficient to diagnose bipolar disorder of one of aforementioned types [25]. There are no pathognomonic features for depression in the course of bipolar disorder, although atypical symptoms can occur more often than in unipolar depression. A family history of manic episodes may prove important for diagnosis [25], and doctors should bear in mind that symptoms like agitation, anger, anxiety or difficulty in paying attention, may also be present [27].

Eating disorders are connected to wrong attitude towards eating and food, body shape and weight. This illnesses refers to both females and males, although the prevalence in females can be as much as up to three times higher than in men [28]. There are three general types distinguished in DSM-5:

anorexia nervosa, bulimia nervosa, and binge eating disorder. Patients with anorexia nervosa use a very strict diet or avoid eating altogether. They have a strong fear of gaining weight and deterioration of their body shape, which leads them to being underweight. In bulimia nervosa patients perform episodes of binge eating. After such episodes they usually provoke vomiting, perform incriminating physical exercise or take medicines without medical indication. Binge eating disorder is similar to bulimia nervosa, but compensatory actions are less expressed. Other eating-associated disorders include rumination disorder, avoidant-restrictive food intake disorder and pica [29].

Pathophysiology, molecular and genetic etiology of psychiatric disorders in women with PCOS. The multi-systemic endocrine-metabolic condition known as polycystic ovary syndrome (PCOS) is typified by ovulatory failure, hyperandrogenism, and polycystic ovarian morphologic characteristics. Manifestations of androgen excess, such as acne and hirsutism, can cause depression and considerable distress. Additionally, psychological problems such as anxiety, depression, and other mood disorders, as well as lower health-related quality of life scores, affect up to 40% of women with PCOS. As a result, the idea that PCOS is a gynaecological and dermatological condition has changed, and currently, PCOS is referred to as a multi-system disorder with psychological, reproductive and metabolic comorbidities [30]. Studies show that women with PCOS have a higher frequency of psychological problems, among them, depression, generalized anxiety disorder, eating disorders, obsessive-compulsive disorder, social anxiety, attention deficit hyperactivity disorder (ADHD), and personality disorders. More often than in the general population, bipolar affective disorder, schizophrenia, and other psychotic diseases, have also been linked to PCOS-afflicted women [13]. Numerous studies have demonstrated that women with PCOS have a decreased quality of life with many of them stating that the observed mood disorders are caused by distress associated to PCOS symptomatology. Obesity and insulin resistance have been demonstrated to contribute to not only reproductive symptoms, but also to psychological problems [31]. First of all, coexisting conditions like irregular menstruation and infertility can exacerbate psychological anguish and ultimately lead to a mental disease. In a similar way, changes in appearance, such as weight gain, acne, and losing hair on the scalp, may affect feelings about one's body and self-worth. The emotional difficulties suffered by PCOS patients, however, do not appear to be entirely explained by these physical symptoms, suggesting that additional processes may be involved [32]. Symptoms of mental disorders may be related to many factors, for example: neuroendocrine and neurotransmitter dysfunction, changed hormone levels or even food. Despite the fact that mental illnesses are recognized to be linked to PCOS, they are frequently inadequately managed or remain undiagnosed [33].

Neuroendocrine dysfunction. The hypothalamic-pituitary-ovarian (HPO) and hypothalamic-pituitary-adrenal (HPA) axes are two important regulation pathways of the neuroendocrine system. The release of gonadotropin-releasing hormone (GnRH) from the brain regulates the pituitary gland's synthesis of follicle-stimulating hormone (FSH) and luteinizing hormone (LH) in the HPO axis. The

rate and quantity of LH and FSH production are regulated by GnRH. The production of ovarian androgen and estrogen is then regulated by the LH and FSH. The GnRH pulse generator is aberrant in PCOS, which results in inappropriate LH and FSH output. Psychiatric problems may subsequently appear as a result of this neuroendocrine imbalance and the subsequent impacts of downstream hormonal signalling [33]. According to studies, women with PCOS have higher LH/FSH ratios, LH pulse frequencies, and LH pulse amplitudes. This imbalance plays a part in the hyperandrogenism that characterizes PCOS, which eventually impairs hypothalamic-pituitary feedback and causes additional dysregulation [30]. Research has demonstrated that in older women afflicted by PCOS, hyperandrogenism is heavily linked to greater risk of depression. Furthermore, it has been discovered that women with PCOS with anxiety had greater amounts of free testosterone than women with PCOS alone. The HPA axis controls dehydroepiandrosterone (DHEA) and glucocorticoid production. According to the findings, the PCOS group scored higher on anxiety, despair, and anger measures in addition to having higher DHEA-S levels. Additionally, the authors found a statistically significant positive correlation between all individuals' serum DHEA-S levels and anxiety scores. This correlation may be explained by the antagonistic action of DHEA-S to the GABA neurotransmitter [33].

Neurotransmitter dysfunction. Neurotransmitters are molecules produced at the synapses between neurons and are vital for controlling many body activities. Abnormal neuronal signalling pathways and neurotransmitter levels have been linked to the development of mental diseases. Similarly, neurotransmitter dysregulation is frequently seen in PCOS and patients with neuropsychiatric illnesses [33]. Numerous studies have reported that PCOS is characterized by altered levels of major neurotransmitters, including dopamine (DA), acetylcholine (ACh), norepinephrine (NE), epinephrine (E), γ -aminobutyric acid (GABA), serotonin (5-HT), and the opioid system, in all examined tissues [30]. Numerous mental illnesses, such as anxiety, depression, obsessive-compulsive disorder, and schizophrenia, have been linked to 5-HT, norepinephrine and DA signaling [33]. Dysregulation of neurotransmitter profile in PCOS may be the cause of the symptoms closely linked to PCOS women, such as increased hunger, food cravings, anxiety, mood swings, and poor self-esteem. Dysfunction of the opioid system may also have a role in impaired glucose tolerance, increased hunger, obesity and total food intake [30].

Gut-brain pathways. It has been established that the gastrointestinal system is a peripheral secretor of neurotransmitters and hormones that have a direct impact on the central nervous system. The gut microbiota can control the release of neurotransmitters and other signalling molecules and is essential for the regulation of the gut-brain axis [33]. The gut microbiome can affect how different metabolites, e.g. bile acids, amino acids, and short-chain fatty acids, are absorbed, as well as inflammatory mediators, gut-brain peptides (ghrelin and glucagon-like peptide 1 [GLP1]), and different neuromodulators (e.g. γ -amino butyric acid [GABA]) involved in mood regulation [32]. One important neurotransmitter that has been linked to such mental illnesses as anxiety is gamma-aminobutyric acid.

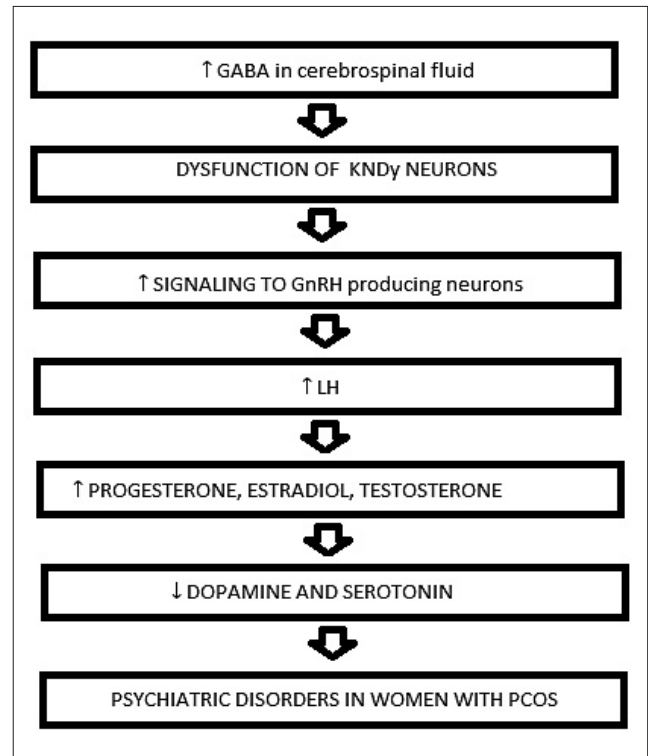


Figure 1. Neurotransmitter and neuroendocrine dysfunction

There is evidence to suggest that the gut-brain axis plays a role in the relationship between psychiatric illness and PCOS, because some strains of gut bacteria that have been demonstrated to change GABA concentrations have been identified in larger quantities in PCOS patients [33]. Additionally, gut hormones including ghrelin, PYY, GLP-1 and GLP-2, influence energy balance and intake in addition to emotional-affective behavior [30]. It has been demonstrated that women with PCOS produce less peptide YY, less cholecystokinin, and more ghrelin. Peptide YY belongs to the neuropeptide Y (NPY) family, which control mood, anxiety, stress tolerance, and energy homeostasis [33].

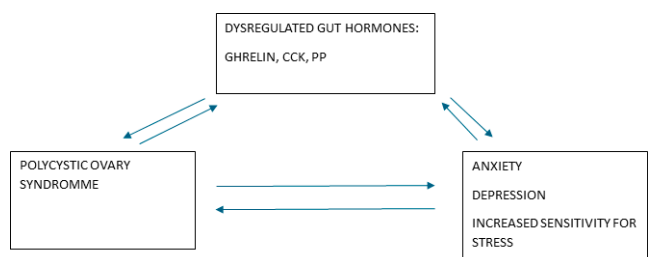


Figure 2. Gut-brain pathways

DEPRESSION, BIPOLAR DISEASE, ANXIETY DISORDERS AND EATING DISORDERS IN WOMEN WITH PCOS

Depression. PCOS appears more often in women of reproductive age, affected by mild or even moderate psychiatric disorders. The most common psychiatric disorder, which affects about 20% patients within two years, is depression. Psychiatric and neuropsychiatric disorders may be explained by several pathways. Many symptoms linked to PCOS, for example, irregular menstruation, weight gain or

acne, may lead to psychological distress and mental disorders as a complication [31]. Studies have indicated that black women with PCOS are more likely to experience depression than white women. Age, marital status, level of education, and place of work did not appear to have a significant impact on when depression first appeared. Morbid obesity affects as much as 80% of women with PCOS. There was a strong correlation between a higher depression score and obese women with PCOS. Depression develops in PCOS due to excessive cortisol release and a compromised glucocorticoid-mediated feedback system. Additionally, cortisol encourages the deposition of central fat and promotes lipid accumulation by activating glucocorticoid receptors in the visceral regions. This vicious cycle results in visceral and central obesity as well as metabolic diseases. Furthermore, the obese patient's sense of own femininity and depressive symptoms may be intensified by their belief that they are physically ugly [34].

Bipolar disease. Studies on the co-occurrence of bipolar affective disease and PCOS are few, and the findings are not entirely clear [13]. Most of them revealed a statistically significant correlation between a clinical diagnosis of bipolar illness and PCOS [31], and there seems to be an antipsychotic effect of estrogen, with the onset of psychotic symptoms being promoted by declining levels. A number of evaluations of the literature indicate that symptoms of persistent mental disorder in women worsen before, during, and after menopause. Because of their irregular ovulation, PCOS women may consequently be more susceptible to psychosis due to prolonged exposure to high amounts of unopposed estrogen. When they do ovulate, their estrogen levels suddenly decrease, simulating the postpartum condition. This may help to explain why women with PCOS are more susceptible to psychotic symptoms. Because antipsychotic medication causes hyperprolactinemia, women with psychosis frequently experience irregular or absent periods. Due to concomitant weight gain, hirsutism, acne, dental issues, alopecia, rash, tremor, stiff gait or voice changes, antipsychotic medicines have a detrimental influence on one's look. Comparable symptoms are linked to PCOS, which can result in low self-esteem, a negative body image, and a high frequency of anxiety and sadness [16].

Anxiety disorders. Anxiety disorders (generalized anxiety disorder, social phobia, and obsessive compulsive disorder) occur with a frequency of 5–8% in women treated in primary care. Regarding the frequency of anxiety disorders in women with PCOS, there is a dearth of information based on established screening techniques. Despite the modest number of published research at this time, they collectively imply that women with PCOS may experience a higher burden of anxiety symptoms [35].

Eating disorders. Among the most prevalent mental illnesses in women with PCOS are eating and mood disorders, which are most likely the outcome of intricate interactions between biological, socio-cultural, family, and individual variables. According to the diathesis-stress model of psychopathology, the susceptibility of a mental illness (biological) to manifest, occurs only in response to a specific level of stress. In fact, stress has a significant role in the development of eating disorders and depression. Binge eating may be used as a coping strategy for stress in cases of bulimia nervosa and

binge eating disorder because it provides momentary comfort. Stress has also been linked to low self-esteem and an unsatisfactory body image, which are major indicators of mood and eating disorders. Neuroendocrine pathways are disrupted by eating disorders, which results in changes to metabolic processes. Repeated binge eating can raise insulin levels by lowering sex hormone-binding globulin (SHBG) concentrations, which can raise free circulating testosterone. This leads to a vicious circle of obesity and androgens. Increased testosterone levels may encourage food cravings, perhaps through a lack of impulse control, which helps to explain the connection between PCOS and eating disorders [32].

Management and treatment of psychiatric disorders in women with PCOS. Maintenance of wellbeing and good mental health in women with polycystic ovary syndrome induces an additional therapeutic challenge for healthcare professionals, as it is crucial to take a multidisciplinary, complex approach when it comes to this particular patient group. As indicated previously, specific chronic comorbidities and symptoms present in women with PCOS increase the risk of occurrence of psychiatric diseases and psychological issues [36]. One of the most important methods of alleviation of psychological distress is modification of lifestyle. Maintenance of a balanced diet, physical activity and body weight control improve somatic symptoms of PCOS, such as acne and infertility, along with increasing ovulation rate [37]. It is worth noting, however, that co-existence of specific mental disorders, such as depression and anxiety, may prevent one from achieving satisfactory lifestyle modification, thus enhancing probability of negative clinical outcome in terms of deterioration of quality of life [38]. Banting et al. conducted a study with the aim of investigating the barriers and motivators regarding sustaining physical activity, particularly in women with PCOS. Based on Chi-Square goodness of fit analyses, women with PCOS indicated lack of confidence as a barrier to maintaining activity, fear of injury and physical limitations more often than the healthy control group in a statistically significant manner. Identification and exploration of these limitations may be an important starting point in the development of support strategies for women in order to help them sustain physical activity adjusted to their physical fitness, and adhere to a healthy lifestyle [39]. Moreover, studies suggest that infertility may enhance chances for depression by itself, regardless of the cause of the illness [40]. This information can hint that psychiatric disorders and lower quality of life in women in PCOS may be alleviated by the treatment of infertility itself (e.g. with clomiphene citrate, letrozole, metformin, laparoscopic ovarian drilling, gonadotropins); however, there is a need for more high-impact, large sample studies regarding the problem [37].

Studies suggest unanimously that there is a large demand for a more comprehensive approach when it comes to the psychological health of women during all of the stages of clinical assessment of polycystic ovary syndrome. Development of appropriate screening instruments and interventions may help medical professionals detect potential issues more easily, allowing them to offer individually tailored counselling, potentially alleviating adverse effects on the quality of life of patients [41].

SUMMARY

PCOS is linked with an increased risk of bipolar disorder, obsessive compulsive disorder, depression and anxiety. It is also connected with more severe symptoms of OCD, somatization, anxiety and depression. The clear conclusion on the cause of an elevated risk of mental illnesses among PCOS patients is still challenging. The higher risk of psychiatric diseases in patients with PCOS, including anxiety and depression, may be caused by hyperandrogenism: acne, male pattern baldness, hirsutism and deep voice. It is certain that these symptoms can degrade a women's quality of life and lead to stigmatization. Additionally the part played by obesity and insulin resistance in the comorbidity of psychiatric problems in women with PCOS is still being investigated. Pro-inflammatory cytokine concentrations may rise in chronic inflammatory conditions, which are frequently linked to obesity, and exacerbate feelings of anxiety and depression. Scientific research postulates a significant impact of gut microbiota imbalance, neuroendocrine and neurotransmitter disorders in the pathogenesis of mental illnesses accompanying PCOS. Further methodologically relevant studies on the underlying pathogenetic foundation of the mentioned comorbidities is warranted, as indicated by epidemiological studies. In order to identify and perhaps treat any co-occurring conditions, such as depression, anxiety disorders, and eating disorders, it is imperative that PCOS patients be subjected to screening testing. This is crucial for extending the education healthcare professionals about the elevated risk of somatization disorders and other less frequently checked psychiatric disorders. Making an appointment for a psychological assessment could be a helpful first step in identifying possible psychiatric illnesses, particularly for individuals who have recently been diagnosed with PCOS.

Furthermore, more research is necessary to determine the best course of care and long-term monitoring plans for women with PCOS, and the prevalence of other co-occurring psychiatric diseases. Raising awareness could also result in at-risk groups receiving preventive education and new treatment alternatives.

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