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Research Article

Development of mental disorders in patients with polycystic ovary syndrome

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Abstract

Polycystic ovary syndrome is one of the most common hormonal disorders in women of reproductive age, causing alterations in the reproductive, metabolic, and psychological systems. Although its pathophysiology is not fully understood, it is possible to determine the symptoms through genetic, endocrine, and lifestyle factors. The aim of this study was therefore to analyze the association between depression and anxiety in women with PCOS. To this end, a qualitative, descriptive methodological approach was adopted through a literature review in the PubMed, Embase, and VHL databases. The inclusion criteria were: clinical trial articles, randomized or non-randomized, cohort studies, case-control studies, and open access, published in Portuguese, English, and Spanish, between 2018 and 2023 with topics associated with polycystic ovary syndrome, depression, and anxiety. The exclusion criteria were bibliographic and editorial reviews, as well as texts that were not available in full or free of charge. In this context, based on the bibliographic findings, polycystic ovary syndrome is a common disease among women of reproductive age characterized by hyperandrogenism, chronic anovulation, and the presence of polycystic ovaries on ultrasound. Metabolic alterations cause a variety of PCOS symptoms, including chronic anovulation or amenorrhea, infertility, hirsutism, and obesity. In this way, PCOS is related to body dissatisfaction, depression, anxiety, decreased sexual satisfaction, eating disorders, and lower health-related quality of life. In addition, the risk of depression and anxiety increases with prolonged exposure to hyperandrogenism. In addition, people with PCOS are four to seven times more likely to have moderate to severe depressive and anxiety symptoms. Therefore, women with PCOS experience significant social pressure, which maximizes the prevalence of mental disorders associated with the syndrome, such as anxiety and depression.

Introduction

Polycystic ovary syndrome (PCOS) is considered a hormonal disorder that affects women of reproductive age, with an incidence rate of 12% to 18% [1-3]. Most studies have linked PCOS to endometrial cancer, obesity, type 2 diabetes, depression, anxiety, non-alcoholic fatty liver disease, sleep apnea, and eating disorders [4,5]. In addition to gynecological and endocrine changes, there are psychiatric disorders evidenced in studies such as depression, anxiety, social phobia, eating disorders, and suicidal behavior [6,7].

Moreover, PCOS predisposes to psychological, reproductive, and metabolic alterations that can manifest and accompany

women with the condition throughout their lives. Another aggravating factor associated with the condition is binge eating, which could intensify the increase in body fat, metabolic disturbances and poor body image, psychosocial guilt, and anxiety [8-11]. Thus, women with this dysfunction have a higher amount of androgen hormones (male hormone), also known as hyperandrogenism, menstrual irregularity, and variation in ovarian morphology [12,13].

Although the pathophysiology of PCOS is not fully understood, there are indications that endocrine, metabolic, environmental, and genetic factors are present in the symptoms presented by the patients and they usually present themselves in adolescence, with menarche (first menstruation). According

to a few studies [14–16], adolescents with PCOS report anxiety and depression disorders associated with excess weight, eating, and other manifestations due to excess androgen hormones. However, manifestations such as infertility, acne, alopecia, seborrhea, menstrual irregularity, abnormal uterine bleeding, hirsutism, obesity, and oligomenorrhea are considered to be among the main ones.

Evidence illustrates that the symptoms of PCOS associated with depression, for example, arise from clinical manifestations such as infertility, cutaneous stigmata of hyperandrogenism, such as hirsutism and acne, and obesity. In addition, biochemical factors, including elevated circulating testosterone and insulin resistance, have been associated with depression, so in a population of 738 women rigorously characterized as patients with the syndrome, it was found that insulin resistance was more than twice as likely to be associated with depression [17,18].

Given the importance of the subject, the aim of this study is to evaluate the frequency of emotional disorders, specifically depression and anxiety associated with polycystic ovary syndrome, through a literature review.

Methodology

Characterization of the research

This article consists of a narrative literature review, of a bibliographic and descriptive nature, which aims to analyze the association between depression and anxiety in women with polycystic ovary syndrome.

Conducting the research

The research used Pubmed, Embase, and Science Direct databases, with the central question being “What are the incidence and possible factors related to the development of depression and anxiety in women with PCOS?”.

The database was searched using the following Health Science Descriptors (DeCS): “polycystic ovary syndrome”, “anxiety” and “depression” using the Boolean operators “AND” and “OR”. Thus, the search strategy used in all databases was: (“polycystic ovary syndrome” OR “polycystic ovarian syndrome” OR “PCOS”) AND (“anxiety” OR “depression”).

Selection of criteria

The parameters used in the development of the research had to include the association of depression and anxiety in women with PCOS in the title, abstract, and text. The inclusion criteria used were: articles published in Portuguese, English, and Spanish between 2018 and 2023, with full text available and free access. The search resulted in 916 articles in total, distributed as follows: PubMed ($n = 342$); Cochrane ($n = 218$), VHL ($n = 356$). To help exclude duplicates and include the articles that would make up the sample, selected based on the criterion of relevance to the topic, we used the free Rayyan platform (<https://www.rayyan.ai/>), a free online tool that helps researchers with the methodology of literature reviews,

systematic reviews and/or meta-analyses. Of the 916 articles, 498 were duplicates, 360 were excluded by reading the title and abstract when they dealt with divergent topics and 58 were included at this stage, as they met the inclusion criteria and discussed the subject of the research. After reading the full text and applying the criteria of relevance to the topic, the final sample consisted of 40 articles.

Presentation of results and synthesis of information

Once the articles that made up the final sample had been read in full, the information that met the article’s objective was collected for discussion of the findings in a dissertation. Of the 18 studies excluded after reading the full text, the main themes found were PCOS diagnostic factors and articles that mentioned depression and anxiety only as conditions that may develop but did not establish any relationship with the disease. Editorials and reviews were also excluded. The total number of articles analyzed was 40. In order to summarize the process of searching the databases and assessing the eligibility of the studies, which involves a stage of screening the articles, and reading the titles as described in the aforementioned topics, Figure 1.

Discussion

Polycystic ovary syndrome associated with mental disorders

Polycystic ovary syndrome is a common disease among women of reproductive age characterized by hyperandrogenism, chronic anovulation, and the presence of polycystic ovaries on ultrasound (Figure 2). Metabolic alterations cause a variety

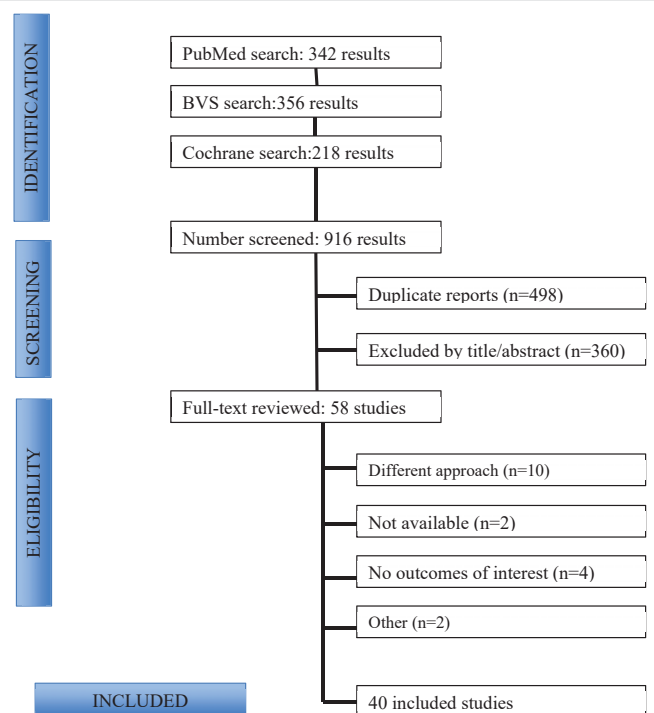


Figure 1: Selection process and eligibility of articles in the PubMed, VHL, and Cochrane databases.

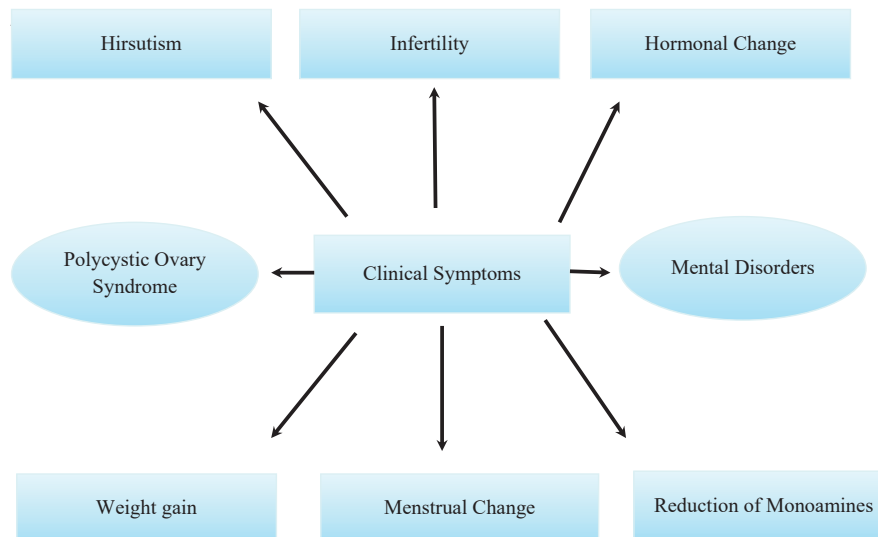


Figure 2: Relationship between PCOS symptoms and mental disorders.

of PCOS symptoms, which include chronic anovulation or amenorrhea in 75%–80% of cases, infertility in 75%, hirsutism (70%), and obesity (50%) [19–21].

Correspondingly, patients with PCOS have a higher incidence of type 2 diabetes, hyperlipidemia, early cardiovascular disease, obstructive sleep apnea, non-alcoholic fatty liver disease, depression, anxiety, low self-esteem, reduced libido, sexual dysfunction, and poor quality of life [22,24]. Thus, these patients often have depressive and anxiety symptoms, along with low self-esteem (related to body image issues and potential infertility) and lower-than-expected sexual function. Consequently, the pathophysiological mechanism of the syndrome contributes to the development of anxiety and depression. Thus, it is possible to note that clinical manifestations of hyperandrogenism such as menstrual abnormalities and excessive weight gain have a negative influence on quality of life [22,23].

In the meantime, according to a study [24], the prevalence of depression and anxiety in PCOS patients is 36.6%, compared to 14.2% in the control group. Similarly, some works [25,26] identified a prevalence of 36.6% of depressive symptoms, as well as 41.9% of symptoms characteristic of anxiety in patients with PCOS. It is worth noting that depression and anxiety are the most commonly reported disorders in the literature; however, other disorders have already been identified in patients with this clinical condition.

In an attempt to explain this association, some studies have sought to elucidate the pathophysiology of PCOS that influences the development of these symptoms. For example, a study points out that women with PCOS and anxiety had higher levels of free testosterone than PCOS patients without anxiety symptoms [22]. In addition, another research work [8] showed that inhibitory neurotransmitters such as serotonin and dopamine have reduced levels in PCOS patients, while glutamate levels are increased and this could explain the

pathophysiology of PCOS-related depression, but there are still no studies that fully elucidate the pathophysiology.

Furthermore, women with PCOS experience significant social pressure, which maximizes the prevalence of mental illnesses associated with the syndrome, such as anxiety (38.65%) and recurrent sadness (25.7%). Besides that, depression is considered by the World Health Organization (WHO) to be the most disabling disease in the world, which is three to eight times more prevalent in women with PCOS than in control groups [25].

Relationship of polycystic ovary syndrome with depression and anxiety

Regarding the hormonal disturbances that polycystic ovary syndrome causes, PCOS affects the psychological state of patients. Studies show that obesity, acne, and hirsutism are associated with a negative body image and low self-esteem, which corroborates with excessive anxiety and depression. Furthermore, in addition to metabolic changes, insulin resistance and impaired secretion of gastrointestinal tract hormones such as ghrelin and cholecystokinin are also risk factors for predisposition to the development of psychological disorders such as depression [27–30].

Previous studies have shown that PCOS is related to body dissatisfaction, depression, anxiety, decreased sexual satisfaction, eating disorders, and lower health-related quality of life. Also, the risk of depression and anxiety increases with prolonged exposure to hyperandrogenism [29–35].

As exemplified by a meta-analysis of observational studies showed that women with PCOS are four to seven times more likely to have moderate to severe depressive and anxiety symptoms [24]. Accordingly, PCOS-related depressive and anxiety symptoms are correlated with alterations in hormonal pathways, such as progesterone, deoxycorticosterone, and testosterone, which are possibly involved in mechanisms



underlying mood swings [36]. Thus, infertility caused by PCOS is intrinsically related to a greater susceptibility to anxiety and depression in patients with PCOS. A few studies [37–40] showed that infertile women with PCOS have a 28–64% chance of developing depression and 34%–57% of developing anxiety.

PCOS and postpartum depression

Furthermore, postpartum depression (PPD) is a disorder whose main feature is symptoms of depression that occur after the birth of the baby and affects a significant number of women, with a prevalence rate ranging from 10% to 25% worldwide [41,42].

It can be seen that women with polycystic ovary syndrome are more susceptible to gestational complications including changes in systemic blood pressure, gestational diabetes mellitus, and premature births than healthy women [37,41,43,45]. Thus, women with PCOS who are pregnant are subject to a 1.5 times greater risk of complications during and after pregnancy, including a higher prevalence of postpartum depression [43,44].

Thus to summarize, several studies [45–50] that include a systematic review and meta-analysis of observational studies, found that there is a 4.5% increased risk of postpartum depression in women with PCOS compared to those without. Therefore, patients with the hormonal and metabolic dysfunction of the syndrome have a higher prevalence of PPD quantified at 76%, which indicates that PCOS has a greater relationship between depressive mood and postpartum anhedonia [37,30].

Final considerations

Thus, PCOS is the most prevalent gynecological endocrine disorder affecting women of reproductive age and because it can present a variety of symptoms, such as obesity, insulin resistance, acne, and infertility, women with PCOS are susceptible to diseases such as mood disorders, diabetes and cardiovascular diseases. Among these, depression is the most common in PCOS and has a detrimental effect on quality of life.

Consequently, women with PCOS experience significant social pressure, which maximizes the prevalence of mental illnesses associated with the syndrome, such as anxiety and recurrent sadness. Therefore, the treatment of PCOS should be multidisciplinary, including dermatologists, endocrinologists, and gynecologists, and in view of the increased risk of anxiety and depression, mental health professionals should be part of the management team.

Conclusion

Hence, polycystic ovary syndrome is related to various disorders such as endometrial cancer, obesity, type 2 diabetes, depression, and anxiety. When PCOS is related to depression, it comes from the clinical manifestations of the syndrome itself, such as infertility, hyperandrogenism, and acne. Through this review, we aimed to correlate Polycystic Ovary Syndrome with psychiatric disorders such as depression and anxiety. In view of this, there is a need for more in-depth research into the

relationship between PCOS and mental disorders in order to develop therapies that can improve the quality of life of this group.

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