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Prevalence of Anxiety and Depression among Polycystic Ovarian Syndrome Women-An Review

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ABSTRACT:

Among reproductive-aged women, polycystic polycystic ovary syndrome (PCOS), a stigmatising

disorder. Anxiety and despair may develop in PCOS for a variety of reasons. Physical signs including acne, hirsutism, and obesity may be associated with certain mental illnesses, according to some studies. We still don't know much about its causes, how it develops over time, the full range of symptoms it might cause, and the numerous complications it can cause. Research on the frequency of anxiety and depression in polycystic ovary syndrome is inadequate. In order to help summarise the most relevant information about PCOS women's anxiety and sadness, our research will be of great use.

I. INTRODUCTION

If a woman's ovarian volume is more than 10 cm³ or if there are 20 or more follicles in at least one ovary that are 2-9 mm in diameter, she is diagnosed with polycystic ovaries. [1] Polycystic ovarian syndrome (PCOS) is characterised by abnormal menstrual cycles, absent or delayed ovulation, and

elevated testosterone levels. [2] In PCOS, aberrant hypothalamic-pituitary-ovarian axis activity may lead to the disease, however the specific cause and pathophysiology of this disorder are yet unknown. Improper gonadotropin production is a hallmark of polycystic ovary syndrome (PCOS), but it is more

often caused by ovarian dysfunction than the other way around. Furthermore, among the most reliable

One of the biochemical hallmarks of polycystic ovary syndrome (PCOS) is an elevated plasma testosterone level. the third

At least two of the following three characteristics are necessary for the diagnosis of polycystic ovary syndrome (PCOS), according to 2003 recommendations from the American Society for Reproductive Medicine (ASRM) and the European Society for Human Reproduction and Embryology (ESHRE):

- Oligomenorrhea or amenorrhoea caused by oligo-ovulation or anovulation
- Clinical signs of an excess of androgens, known as hyperandrogenism, or biochemical signs of an excess of androgens, known as hyperandrogenaemia
- Ovaries with polycystic characteristics, as seen by ultrasound

In a 2006 position statement [5] and its criteria in 2009 [6], the Androgen Excess and PCOS Society (AE-PCOS) emphasised that PCOS should be seen as a condition of androgen excess, according to the following definitions:

- Proof of hyperandrogenism by clinical and biochemical means

Polycystic ovaries and/or oligo-ovulation are symptoms of ovarian dysfunction.

- Resolving connected medical conditions

Polycystic ovarian syndrome (PCOS) is diagnosed when congenital adrenal hyperplasia, androgen-secreting tumours, or Cushing syndrome are ruled out, according to the Society of Obstetricians and Gynaecologists of Canada (SOGC) [7]:

- Anovulatory dysfunction
- Biochemical and clinical indicators of hyper androgenism
- Ultrasonographic evidence of polycystic ovaries (more than twelve tiny antral follicles per ovary)

Women with polycystic ovary syndrome had an anxiety prevalence of 34% to 57%.(8, 9).

Depressive symptoms are seen in 28% to 64% of PCOS patients.Citations [10,11] Possible explanations for the large variation in prevalence rates include the use of various procedures to measure mental illness, the ethnic and social makeup of the research populations, or both. Anxiety and despair may develop in PCOS for a variety of reasons. Physical signs including acne, hirsutism, and obesity may be associated with certain mental illnesses, according to some studies. [12] A recent meta-analysis and comprehensive review indicated that compared to age-matched control women, women with polycystic ovary syndrome were four times as likely to have depressive symptoms.in [13] Women with polycystic ovary syndrome (PCOS) had an increased risk of depressive symptoms, according to a subanalysis of individuals matched by body mass index (BMI). Previous research on PCOS and depression risk reported a significant incidence of depression that persisted 12–18 months after treatment ended. [14] Anxiety disorders, particularly GAD, are often linked to mood disorders. Women examined in primary care settings have an estimated incidence of anxiety disorders ranging from 5 to 8 percent. They found that anxiety symptoms were more common in women with polycystic ovary syndrome (14% vs. 1% in the control group). [16] Problematic anxiety may develop when it happens in the absence of a discernible trigger or when the trigger does not justify an anxious response. A lot of the time, people's anxiety is so bad that it starts to affect other parts of their lives. In most cases, GAD takes time to manifest and may go undiagnosed until it becomes very disruptive to daily life. The National Comorbidity Survey found that major depressive illness, panic disorder, specific phobias, social phobias, and anxiety disorders were all very prevalent among GAD patients. In references 17 and 18,

Research on the frequency of anxiety and depression in polycystic ovary syndrome is inadequate. In order to help summarise the most relevant information about PCOS women's anxiety and sadness, our review will be of great use.

II. ANXIETY AND DEPRESSION PREVALENCE IN POLYCYSTIC OVARIAN SYNDROME

The researchers Hollinrake E. et al. set out to

determine

the

assess the association between depression, hyperandrogenism, and other metabolic indicators; and compare the incidence of depressive disorders in women with polycystic ovary syndrome (PCOS) to that of controls. Feminine polycystic ovary syndrome (n = 103) diagnosed using the Rotterdam criteria. The control group consisted of 103 women who did not have polycystic ovary syndrome but were examined for an annual checkup at the same time. Use of the Beck Depression Inventory and the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PRIME-MD PHQ) were used.

Compared to controls, women with polycystic ovary syndrome had a higher chance of developing depressive disorders (new cases). The risk of depressive disorders in women with polycystic ovary syndrome (PCOS) was 4.23 (95% CI 1.49-11.98; $P < .01$), regardless of weight or infertility. The depressed PCOS participants showed signs of insulin resistance ($P < .02$) and a higher body mass index (BMI) as compared to the non-depressed PCOS subjects. They found that women with polycystic ovary syndrome had a substantially higher risk of depressive disorders (as classified by the Diagnostic and Statistical Manual IV) and suggested that this group undergo regular monitoring. [16]

Barnard L. et al. measured depression and quality of life in a sample of 1359 women with polycystic ovarian syndrome (PCOS) and healthy controls. They used a modified version of the polycystic ovary syndrome health-related quality of life questionnaire (PCOSQ) that included a subscale for acne. Among PCOS women, 71% who used anti-androgen (AA) medication and 67% who did not reported feelings of depression. Every one of the seven dimensions measured by the modified PCOSQ—emotional disturbance, weight, infertility, acne, menstrual symptoms, menstrual predictability, and hirsutism—was associated with a worse quality of life for PCOS women. Among women who took or did not take AA medication, weight was the most important factor influencing low quality of life. Quality of life was greater for women who used AA medicines compared to those who did not, regardless of illness. This massive research shows how important it is to routinely assess the mental health of PCOS women and furthers our knowledge of depression and quality of life in this condition. The year 19

In their study, Mansson M et al. recruited 49 women who met the Rotterdam criteria for polycystic ovary syndrome (PCOS) and 49 women who were age-matched controls found in the population registry. The researchers looked at sex hormone binding globulin and serum testosterone levels. Depression, social anxiety, and eating disorders were more common in PCOS women across the lifespan compared to the control group. The PCOS group had seven times the rate of suicide attempts compared to the control group. The usage of antidepressants and anxiolytics, both now and in the past,

among those with polycystic ovary syndrome. Structured clinical examinations corroborate the association between PCOS and psychiatric disorders, as shown in their research. As a result of this study's therapeutic implications, physicians caring for women with polycystic ovary syndrome (PCOS) should be cognizant that this population has an increased risk of common anxiety disorders, depression, and suicide attempts. [20]

Among 448 women with polycystic ovary syndrome (PCOS), Benson et al. found that 34% had HADS anxiety scores that were clinically relevant and 21% had HADS depression scores that were clinically relevant. The study included a nationwide online survey, quality of life measures (SF-12), and data on sociodemographics and clinical PCOS symptoms. Anxiety and PCOS were associated with a markedly worse quality of life ($P < 0.001$), especially for women who suffered from both anxiety and depression simultaneously ($P < 0.001$). It was determined that women with polycystic ovary syndrome may have a higher chance of developing clinically significant anxiety, and that it is rather frequent for anxiety and depression to occur together. A decrease in quality of life is associated with PCOS and anxiety. Clinicians should pay greater attention to anxiety problems in PCOS women because of their high incidence, significant consequences, and effective treatment options available with correct diagnosis. [21]

The purpose of this research was to identify factors

that put women with polycystic ovarian syndrome at increased risk of depression and to identify any conversions that may occur. A prospective longitudinal research was therefore carried out by Kerchner A et al. To diagnose major depressive disorder, anxiety syndromes, binge eating disorder, and other depressive disorders, the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire was used. A satisfaction survey and a knowledge quiz about polycystic ovarian syndrome were both administered to the subjects.

The second survey was filled out by 60 out of 103 participants. There was a 22-month mean (range 12-26 months) between the two polls. Forty percent, or 24 out of 60, were depressed. Ten of the females tested positive for major depressive disorder or another depressive syndrome, and fourteen of them were taking medication for their depression. Out of 60 total participants, 34(56.6%) had a mood condition; among them, 11.6% had anxiety syndromes and 23.3% had binge eating disorder.

They came to the conclusion that women with polycystic ovarian syndrome are at a much higher risk for mood disorders, as defined by the Diagnostic and Statistical Manual of Mental Disorders-IV. It has

The significance of frequent screening and proactive treatment of mental health issues in this group is highlighted by the significant conversion risk for depression during a 1- to 2-year period, along with other findings. [14]

Thirty women diagnosed with polycystic ovary syndrome (PCOS) and thirty healthy community members served as subjects in a research by Jedel E et al. People who are using psychotropic medication regularly were not included. In order to establish case-control status, all prospective participants had gynaecological examinations. The participants filled out the BSA-S and MADRS-S, which are self-report versions of the anxiety and depression ratings scales, respectively. In comparison to controls, women with polycystic ovary syndrome had a higher BSA-S score and higher scores on four specific symptoms: decreased sleep, concern, phobias, and pain. $P = 0.053$ indicates that there was no statistically significant difference in MADRS-S scores. Ultimately, it was determined that a number of anxiety symptoms were what set PCOS people apart from a control

group that was BMI-matched. If we want to help this at-risk population cope with anxiety, we need a clearer picture of the symptoms. [22] is a

Fewer details are available on the frequency of anxiety in polycystic ovarian syndrome (PCOS), however PCOS is linked to significant sadness, which lowers self-efficacy and affects quality of life. In a cross-sectional observational study of women with polycystic ovary syndrome (PCOS) living in the community, Deeks AA et al. looked closely at mood and discovered that anxiety was more common than depression, that anxiety was underdiagnosed, and that more women with PCOS who experienced infertility were depressed. [8]

In a study of women with polycystic ovarian syndrome (PCOS), Thomson RL et al. looked at how adding exercise to food restriction affected depressed symptoms and health-related quality of life (HRQOL). They recruited 104 overweight/obese PCOS women (aged $29.3 \pm$

0.7 years old; 36.1 ± 0.5 kg/m² for body mass index [BMI]. Out of the 49 women who started the intervention, 49 finished it; 14 did only aerobic exercise, 15 did both, and 20 did both plus strength training as well. With the exception of the body hair domain score, all groups lost weight and improved their depression and PCOS-specific HRQOL ratings by week 20. In terms of all outcomes, there was no discernible difference among the therapies. The results showed that the advantages of exercise and food restriction were comparable for

reduction of depression and improvement of health-related quality of life measures in obese and overweight women afflicted with polycystic ovary syndrome. [23]

A comparative cross-sectional research by Bhattacharya SM and Jha A indicated that compared to women without polycystic ovarian syndrome, those with PCOS had a much increased incidence of depression. Using the chosen socio-demographic, clinical, and biochemical variables, the research does not uncover sufficient evidence to explain the increased frequency of depression among PCOS patients. [10]

In their cross-sectional study, Pastore LM et al. compared 94 women with polycystic ovary syndrome (PCOS) and 96 women without (n=96) using the Body Esteem Scale and the Quick Inventory of Depressive Symptomatology-Self-Report, with participants matched by body mass index (BMI). Research methods used included negative binomial regression models, non-parametric tests, and Spearman correlations. Dissatisfaction with one's physical appearance and level of physical fitness were strongly associated with the severity of depressive symptoms in both the PCOS and non-PCOS groups.

Individual variations in body dissatisfaction ratings did not aid in detecting the severity of depression symptoms as the majority of the obese PCOS sample had low levels of body satisfaction and depressive symptoms. After accounting for age and body dissatisfaction, neither testosterone nor free testosterone was linked to the severity of depressive symptoms in PCOS women.

[24]

Gynecologic, reproductive, and metabolic comorbidities are present throughout a woman's life if she has polycystic ovarian syndrome, according to research by Dokras A. More recent research has shown that PCOS women are more likely to suffer from mood and anxiety issues. Independent of body mass index, PCOS is associated with increased risk of depression and higher depression ratings in women. There is presently no apparent relationship between hirsutism, acne, body image, and depression; nonetheless, health-related quality of life is affected by hyperandrogenism clinical characteristics. The correlation between biological hyperandrogenism, infertility, and depression is also little studied. Anxiety disorders are more common in women with polycystic ovary syndrome.

Among women with polycystic ovary syndrome (PCOS), gynaecologists play a pivotal role in the identification and treatment of depressive symptoms because of the reproductive years' high prevalence of depression. The unfortunate reality is that depressed women often say that their symptoms are "sleep

disruptions" or "fatigue," leading to a potential omission of the diagnosis. It is still not known what causes PCOS women to be more likely to experience anxiety and depression.

It is necessary to assess the impact of weight loss programmes or reductions in serum androgens on anxiety and depression ratings in PCOS. Only 41.1% of people with a mood disorder diagnosis actually got treatment, according to data from the National Comorbidity Survey app. [26]

Half to three quarters of depressed people get well after receiving therapy. Current studies emphasise that women with PCOS should be checked frequently for mood and anxiety problems and treated effectively using recognised medications, even if the optimal treatment options for this population have not been studied. These findings highlight the need of screening all PCOS women for mood and anxiety problems and providing proper treatment to those who test positive. [25] The

The purpose of the study by Moran LJ et al. was to compare the mental health of women diagnosed with polycystic ovarian syndrome (PCOS) using NIH and non-NIH diagnostic criteria to that of women who did not have PCOS. A cross-sectional observational research compared 27 control subjects with PCOS (n = 27), overweight premenopausal women (n = 29 NIH and n = 25 non-NIH), and a body mass index (BMI) of 25 kg/m². We compared the anxiety and sadness levels of women with PCOS (NIH or non-NIH) to those of women without PCOS. Women with non-invasive hyperandrogenism (NIH) and those without NIH PCOS were compared on health-related quality of life (HRQoL) categories pertaining to emotions, body hair, weight, infertility, and monthly issues.

Depression (P = 0.048) and anxiety (P = 0.007) were significantly worse in PCOS women than in PCOS-free women. Moderate anxiety was more common among women with NIH PCOS (P = 0.005) and non-NIH PCOS (P = 0.01) as compared to those without PCOS. Human Relative Quality of Life (HRQoL) measurements pertaining to infertility (P = 0.012), emotions (P = 0.02), and weight (P = 0.016) were lower in women with NIH PCOS.

The two PCOS phenotypes did not vary

significantly in terms of HRQoL domains pertaining to hair on the body or menstruation issues. Anxiety was predicted by both NIH ($P = 0.024$) and non-NIH ($P = 0.016$) PCOS status, but age ($P = 0.008$) and free androgen index ($P = 0.027$) were unrelated.

anticipated melancholy. They came to the conclusion that polycystic ovary syndrome is linked to low mood and anxiety. [27]

The goal of Acmaz G et al.'s symptom-based PCOS classification was to identify the factors that exacerbated mental health issues like sadness, anxiety, poor self-esteem, and social anxiety. The research included two sets of participants. One group included 47 healthy volunteers, while the other included 86 patients with polycystic ovary syndrome (PCOS). Every participant in the study was given a battery of tests, including the Liebowitz Social Anxiety Scale, the Rosenberg Self-Esteem Scale, the Short-Form 36, the Quality of Life Scale, the Beck Anxiety Inventory, and the Beck Depression Inventory. Obese people had significantly higher anxiety ratings and infertile people had significantly higher depression levels compared to other categories. In terms of pain, social functioning, emotional role function, emotional well-being, physical functioning, and physical role function, the oligomenorrhea-hirsutism group was the most impacted. Therefore, it was recommended that a multidisciplinary team, in addition to gynaecologists, assess these PCOS patients. [28] in

Women ranging in age from 18 to 50 were involved in the study by Banting et al., which comprised (n

at one point of time filled out a Hospital Anxiety and Depression Scale questionnaire, along with those who did not have polycystic ovary syndrome ($n = 64$). The final report indicated that compared to controls, women with PCOS had more severe feelings of anxiety ($p < 0.001$) and sadness ($p = 0.004$). Depression was found to be substantially less severe in women who were physically active compared to those who were inactive ($p < 0.001$). Anxiety levels were unaffected by participants' levels of physical activity, and there was no evidence of an association between polycystic

ovary syndrome and depression or anxiety.

In comparison to controls, women with polycystic ovary syndrome (PCOS) reported decreased rates of depression when they engaged in physical exercise. In terms of mental health, increasing physical activity may help with PCOS management. [29]

Anthropometric, metabolic, hormonal, clinical, and psychological factors were assessed in a study by Scaruffi E et al., which included sixty individuals with polycystic ovary syndrome. It became out that there were mental health issues: major depressive illness (16.3% of the population) and anxiety (10.2% of the population). Chronic stress was found in 55.1% of their depressed patients, according to the Rorschach test. Psychiatric illnesses are more prevalent in PCOS women compared to the general population. [30]

Psychological co-morbidities, including anxiety and sadness, are common among PCOS patients, according to research by Upadhyaya SK, Sharma A, and Agrawal A. Rarely can one find information in Indian literature on the frequency of these problems in PCOS patients. Consequently, they are interested in finding out how common anxiety and sadness are among PCOS patients. The researchers from the tertiary care center's obstetrics and gynaecology department carried out the cross-sectional observational study. A hospital anxiety depression scale was used to evaluate PCOS patients, while a semi-structured questionnaire was used to collect sociodemographic and clinical data. The data is shown as a percentage. According to the findings, 28% of PCOS patients experience anxiety, and 11% suffer from depression.

[12]

In this research, Tan J et al. included 100 healthy controls and 120 outpatients with polycystic ovary syndrome. A 36-item short-form health survey was used to measure health-related quality of life (HRQoL), a standardised questionnaire to assess general MH conditions (General Health Questionnaire-12-item version), an anxiety inventory (State-Trait Anxiety Inventory), and a depression inventory (Beck Depression Inventory). With respect to the study's continuous variables, the independent samples t-test was used. We used

logistic regression, Fisher's exact test, and Pearson Chi-square test for categorical data.

Patients with polycystic ovary syndrome (PCOS) had a greater prevalence of anxiety (13.3% vs. 2.0%) and depression (27.5% vs. 3.0%), as compared to controls (both $P < 0.05$). The HRQoL was lower in PCOS patients. Depression and anxiety were more common in PCOS patients who needed reproductive treatments than in those who did not (22.6% [12/53] vs. 5.9% [4/67]; $P = 0.008$).

sadness: 37.7% (20/53) compared to 19.4% (13/67), with a p-value of 0.026.

Final thought: polycystic ovary syndrome (PCOS) and associated symptoms might be precursors to mental health issues including anxiety and sadness. Psychological treatment should be explored for women with polycystic ovary syndrome (PCOS), and professionals should be concerned about their mental health. [31] in

According to a study by Laura GC and Dokras A, women who have polycystic ovary syndrome are more likely to experience anxiety and depression. This connection might be influenced in part by obesity, insulin resistance, and increased androgens. In conclusion, it is advised that women diagnosed with polycystic ovary syndrome have depression and anxiety screenings together. A small number of PCOS-

Certain therapies, such as lifestyle changes, oral cognitive pharmacology (OCPs), laser therapy, and pioglitazone, have had positive outcomes in alleviating symptoms of depression and anxiety. Women with polycystic ovary syndrome (PCOS) are already at a higher risk for many comorbidities; future research should investigate the processes that raise this risk and identify the most effective treatments for this group. [32]

Aiming to learn more about PCOS women's experiences with depression and health-related quality of life, Greenwood EA et al. The study

comprised 732 women diagnosed with polycystic ovary syndrome using the modified Rotterdam criteria. The subjects ranged in age from 18 to 40 years. Using the Primary Care Evaluation of Mental Disorders Patient Health Questionnaire, depression was assessed. After taking age, BMI, hirsutism score, and length of infertility into account, the correlation between depression and quality-of-life ratings was examined using multivariate linear regression models.

Mood ($P < .001$) and body hair ($P = .02$) were the two categories where depressed women reported a worse quality of life compared to non-depressed women.

weight ($P < .001$), menstruation issues ($P < .002$), and .02 for weight.

not being able to conceive ($P < .001$). When we accounted for demographic variables such as age, BMI, hirsutism score, and length of infertility, the negative effects on depressed women's quality of life remained across board. A worse quality of life due to symptoms of polycystic ovarian syndrome is linked to depression. Objective indicators, such as BMI, hirsutism scores, and length of infertility, do not account for the disruptions to health-related quality of life experienced by depressed women. [33]

In their research, Hamdi et al. enrolled 80 teenagers with polycystic ovary syndrome. A standardised depression and anxiety questionnaire was filled out by every participant. The effects of possible factors on the anxiety and depression scores of PCOS teenagers were examined using a multiple linear regression model. Adolescents with polycystic ovary syndrome (PCOS) had much greater levels of anxiety (particularly social and generalised anxiety disorders) and depression compared to controls. Teens with polycystic ovary syndrome were more likely to suffer from depression and generalised anxiety disorder if they had a higher body mass index (BMI), and from panic disorder if they had a higher modified Ferriman-Gallwey score. Adults with polycystic ovary syndrome were shown to have much greater

psychological anguish as comparison to teenagers who do not have polycystic ovary syndrome. Some clinical characteristics of polycystic ovary syndrome (PCOS), such as obesity and hirsutism, may have a connection to this emotional anguish.

Adolescents with polycystic ovary syndrome (PCOS) should undergo evaluation for both the physical and psychological effects of the condition.

on

page

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The purpose of the study by Chaudhari et al. was to investigate the frequency of mental health issues, the effect of PCOS symptoms on quality of life, and whether or not PCOS symptoms were connected with psychiatric morbidity. Seventy women between the ages of 18 and 45 who were diagnosed with polycystic ovary syndrome (PCOS) according to the Rotterdam criteria and who did not have any history of mental illness were evaluated for anxiety and depression using the Hamilton scales. We used binary logistic regression to look for a correlation between the symptoms and mental illness. Patients' quality of life ratings were compared with and without mental morbidity using a Mann-Whitney U-test. They discovered that among the sample, 38.6% had anxiety and 25.7% had depression. There found a correlation between anxiety and infertility or alopecia, and sadness and acne. Psychological quality of life was shown to be poorer in those with hirsutism. Compared to patients without polycystic ovary syndrome, those with mental illness had a much poorer QOL.

[35] in

III. CONCLUSION

An extended amount of knowledge has been learned about PCOS since it was initially described by Stein and Leventhal (1935). Yet, we are still lacking knowledge about many of its aspects, including its etiology, progression throughout life, spectrum of symptoms, and various morbidities. Supplementary studies are needed to bridge between the various susceptibility factors that might contribute to PCOS. The current diagnostic guidelines are still vague and might not detect patients with less severe non-classic phenotypes. Since proper diagnosis is a crucial step to initiate treatment and prevent future morbidities, further clinical research should seek not only to update and unify guidelines but also to provide an appropriate rationale for diagnostic tools that can detect all PCOS phenotypes. Early detection of long-term morbidities through appropriate screening tests constitutes an essential part of the management of this condition. Guidelines strongly

recommend lifestyle modifications as a critical part of the management.^[36]

In conclusion, we hope this review provided an updated summary that sheds light over the complex nature of PCOS. Future research has to focus on the missing blocks in our growing knowledge about this condition, for that physicians will be able to provide the finest care for patients.

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