International Journal of Research in Medical Sciences
Agarwal T et al. Int J Res Med Sci. 2025 Aug;13(8):3429-3437
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: https://dx.doi.org/10.18203/2320-6012.ijrms20252416

Systematic Review

The interplay between cognitive impairment and mental health in women with PCOS: a systematic review

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Received: 25 June 2025
Revised: 16 July 2025
Accepted: 22 July 2025

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ABSTRACT

Polycystic ovary syndrome (PCOS) is one of the most common endocrine disorders affecting women of reproductive age. While its physical symptoms such as irregular menstruation, acne and infertility receive considerable attention, the cognitive and psychological burdens associated with PCOS often go unnoticed. This study conducted a systematic narrative review to synthesize the existing literature on the cognitive and mental health implications of PCOS. A comprehensive search across PubMed, Scopus and Web of Science was performed for studies published between 2015 and 2025. Using PRISMA guidelines, we identified 52 initial records, from which 12 high-quality studies were included. Both subjective tools (like psychological inventories) and objective assessments (e.g., MoCA, EEG, ERP) were analyzed to understand the interplay between PCOS and cognitive or emotional well-being. Findings revealed consistent patterns of cognitive impairments in attention, memory and executive functioning among women with PCOS. Neurophysiological data, such as reduced P300 amplitudes and abnormal EEG rhythms, supported these clinical symptoms. Simultaneously, a high prevalence of anxiety (up to 42%) and depression (around 37%) was reported, often aggravated by body image issues, infertility and sociocultural stigma. Notably, cognitive decline and psychological distress appeared interlinked, forming a feedback loop that intensifies suffering over time. A person's emotional and mental well-being are intricately related to polycystic ovary syndrome (PCOS). A multidisciplinary strategy is urgently needed to treat polycystic ovary syndrome (PCOS), which includes cognitive screening and psychological assistance as part of standard treatment.

Keywords: Cognitive dysfunction, Hormonal imbalance, Neuropsychological assessment, Psychological distress, Polycystic ovary syndrome

INTRODUCTION

Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of childbearing age and it can have long-lasting effects on mental health. People are starting to realize that PCOS has an effect on mental health and cognitive performance, in addition to its typical symptoms like polycystic ovary syndrome, hyperandrogenism and irregular menstrual cycles. Women with PCOS often report that they have mood swings, anxiety, depression and cognitive decline. This suggests that the condition affects both the brain and behavior in complicated, interconnected ways.[1] Polycystic ovary syndrome (PCOS) causes hormonal problems that affect the HPG and HPA axes, which are important for the brain. Higher levels of cortisol and androgens, which can happen because of these problems, have been linked to problems with memory, attention and executive function. For example, women with PCOS had much lower levels of serotonin and higher levels of cholinesterase activity, which were linked to worsen performance on memory and attention tasks.[2] These changes in the body are similar to reports of cognitive fatigue, slower reaction times and difficulties in attention in people with PCOS, even when

they don't have any other health problems.[3,4] Mental health comorbidities in PCOS are notably higher compared to the general population. Anxiety and depression have prevalence rates as high as 42% and 37%, respectively, among women with PCOS, driven in part by visible symptoms such as hirsutism, acne and infertility-related stress.[1,5] Adolescents with PCOS are particularly vulnerable, as early exposure to hyperandrogenism during critical neurodevelopmental windows may impair emotional regulation and social cognition.[6]

The cognitive-emotional load is further compounded by subjective well-being and self-esteem challenges. PCOS significantly diminishes women's perceptions of life satisfaction and self-worth, particularly in sociocultural contexts where femininity and fertility are central to identity.[7] Research suggests a cyclic interaction when poor mental health exacerbates cognitive difficulties, which in turn amplify psychological distress. Women with PCOS exhibit higher levels of cognitive distortion and interpersonal dependency, making them more susceptible to suicidal ideation, particularly in the face of infertility and body image dissatisfaction.[8]

Importantly, interventions such as cognitive behavioral therapy (CBT) have demonstrated robust efficacy in reducing depression and anxiety in women with PCOS, thereby indirectly enhancing cognitive performance and quality of life.[1] However, despite growing awareness, significant gaps remain in routine mental health screening and neurocognitive assessments in PCOS care.

In essence, PCOS is not merely a gynecological or metabolic issue it is a neuropsychological condition that warrants holistic management approaches. Understanding the intertwined nature of cognitive decline and mental health in PCOS can pave the way for more compassionate, informed and interdisciplinary care strategies.

PCOS: are we so focused on physical symptoms that we forget to consider the mind

Cognitive impairment in polycystic ovary syndrome

People have mostly talked about the physical symptoms of polycystic ovary syndrome (PCOS), like irregular periods, acne, being overweight and not being able to get pregnant. But new research shows that we shouldn't ignore the emotional and mental effects that PCOS has on women. Polycystic ovary syndrome (PCOS) can cause women to have mild cognitive problems that make it hard for them to remember things, focus and make decisions. These mental problems aren't just happening on their own; they're connected to the hormonal imbalances and psychological stressors that come with the condition. For example, women with PCOS have been shown to react more slowly and have a harder time focusing, which could mean that their executive functioning is not working right, possibly because their androgen and cortisol levels are too high.[3] Neurophysiological studies back this up even more by showing changes in brain activity patterns and lower P300 amplitudes, which is a sign of cognitive decline in PCOS patients even when they don't have any other health problems.[9] Also, having chronic stress, anxiety and depression induced by PCOS affect mental health, also making one tired and lose focus.[10] These results show how important it is for doctors and researchers to look at PCOS from a biopsychosocial point of view, which means that the mind is just as affected as the body.

Mental health problems associated with polycystic ovary syndrome

In addition to its obvious effects on skin health and menstrual cycles, polycystic ovary syndrome (PCOS) has far-reaching effects on mental health that are often not noticed. More and more studies show that women with polycystic ovary syndrome (PCOS) are more likely to be depressed, worried and stressed. These mental health problems are closely linked to the hormonal and metabolic problems that come with polycystic ovary syndrome (PCOS). They are not just reactions to physical signs like acne or hirsutism. Studies show that anxiety affects almost 42% of women with PCOS and depression affects about 37% of them. These numbers are much higher than those of women who don't have PCOS.[1,5]

These mental health problems are often made worse by worries about not being able to have children, not being happy with how your body looks and having health anxiety all the time. Teenagers and young adults with PCOS are especially at risk because hormones during important times of brain development can affect how they control their emotions and understand social situations in bad ways.[6] Many women also face challenges like low self-esteem, social withdrawal and interpersonal dependency, which can lead to more severe outcomes, including suicidal ideation.[7,8] The distress is not just emotional it's biological too. Elevated cortisol, insulin resistance and serotonin dysregulation all contribute to a physiological landscape ripe for mental health deterioration.[2]

Women with PCOS often have to deal with emotional issues, in addition to the physical symptoms. Hormonal imbalances and societal pressures about look and fertility can lead to anxiety, depression and low self-esteem.[8,11] These mental health struggles deserve as much attention as the physical aspects of PCOS.

It is observed that routine PCOS care does not adequately address mental health assistance. Therefore, healthcare systems that address the whole person, mind and body, are desperately needed. By acknowledging and supporting women's psychological challenges and expanding access to treatments such as cognitive behavioral therapy (CBT), we can alleviate mental discomfort and enhance overall well-being.[1] PCOS is as much a psychological condition as it is a physical one and it's time the world sees it that way.

METHODS

This research used a systematic narrative review method, along with systematic search techniques, to gather and summarize what is already known about how polycystic ovary syndrome (PCOS) affects women's thinking and mental health. A systematic literature search was performed utilizing academic sources such as PubMed, Scopus and Web of Science, encompassing papers published from 2015 to 2025. Search queries encompassed combinations of keywords like "PCOS," "Polycystic Ovary Syndrome," "cognitive dysfunction," "psychological impact," "depression," "anxiety," and "cognitive impairment." PRISMA flow diagram was followed to express the paper.

Two independent evaluators implemented established inclusion and exclusion criteria. The studies included observational and assessed cognitive or psychological outcomes in women diagnosed with PCOS. Control groups of non-PCOS women were incorporated when relevant. Studies that only looked at hormonal or metabolic results, without considering cognitive or psychological factors, as well as repeated studies and those not reviewed by experts, were excluded. Reference lists of chosen papers were meticulously examined to uncover supplementary pertinent sources. This flexible approach allowed for a thorough yet careful understanding of the psychological and brain-related aspects of PCOS while keeping the benefits of a review.

Research questions

What are the specific cognitive impairments (e.g., memory, attention, executive functioning) reported in women diagnosed with PCOS? What mental health conditions (e.g., anxiety, depression, low self-esteem) are most commonly associated with PCOS and what is their prevalence in affected women? What is the relationship between cognitive functioning and psychological distress in women with PCOS? Specifically, do cognitive deficits correlate with higher levels of anxiety and depression.

Research objectives

To systematically examine the nature and extent of cognitive impairments (e.g., memory, attention, executive function) in women diagnosed with PCOS. To identify the prevalence and types of mental health conditions (e.g., anxiety, depression, low self-esteem) associated with PCOS. To explore the interrelationship between cognitive functioning and psychological distress in women with PCOS, with a focus on understanding bi-directional mechanisms and physiological underpinnings.

RESULTS

The growing body of literature underscores significant cognitive and psychological disruptions in women with Polycystic Ovary Syndrome (PCOS). Across the reviewed studies, clear impairments in memory, attention and executive functioning are consistently observed, with women with PCOS demonstrating poorer performance on standardized neuropsychological assessments compared to control groups.[10] In particular, the disturbances in cognitive and neuropsychological activity is evident, often accompanied by high scores on mood and cognitive failure questionnaires.[2] The pathophysiology behind these deficits is multifactorial. For instance, altered neurotransmitter levels such as decreased serotonin and elevated cholinesterase activity were identified in PCOS subjects, suggesting biochemical underpinnings to the cognitive impairments.[2] Disruptions in the hypothalamic-pituitary-adrenal axis and high levels of glucocorticoids, which make the hippocampus work less well, could make these changes worse.

Electrophysiological studies give us more information. For example, EEG and ERP data show that women with PCOS have higher theta and lower alpha power, which are signs of problems with attention.[4] The P300 component, which is a neural marker of cognitive processing, was also found to be delayed and have a lower amplitude in women with PCOS. This supports the idea that cognitive processing is slower and less effective. Adolescents and young adults with PCOS showed distinctive gaze and emotional recognition deficits tied to early hyper androgen exposure, suggesting that PCOS can impact social cognition and emotional processing during critical neurodevelopmental periods.[6]

Furthermore, studies report higher rates of depression, anxiety and lowered self-esteem in women with PCOS, often mediated by BMI, hirsutism and acne.[5,7] Collectively, these findings affirm the neuropsychological burden borne by PCOS patients and emphasize the need for integrated biopsychosocial interventions.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram illustrates the step-by-step process followed in selecting studies for this review. A total of 52 records were initially identified through databases and registries (50 from databases and 2 from registers). After removing 11 duplicates, 9 unique records remained for screening. Out of these, 5 records were excluded during the screening phase. The remaining 4 were reviewed in detail, but 2 could not be retrieved and one was excluded due to lacking cognitive ability data. In the end, only 1 new study met the inclusion criteria and was added to the review.[12]

No additional studies were identified through websites, organisations or citation searches, despite screening 167 records from these sources. Along with 9 previously included studies, the final review incorporated a total of 12 studies. This careful and transparent screening ensures that the included studies are both relevant and of high quality, strengthening the validity of the review's findings (Figure 1).

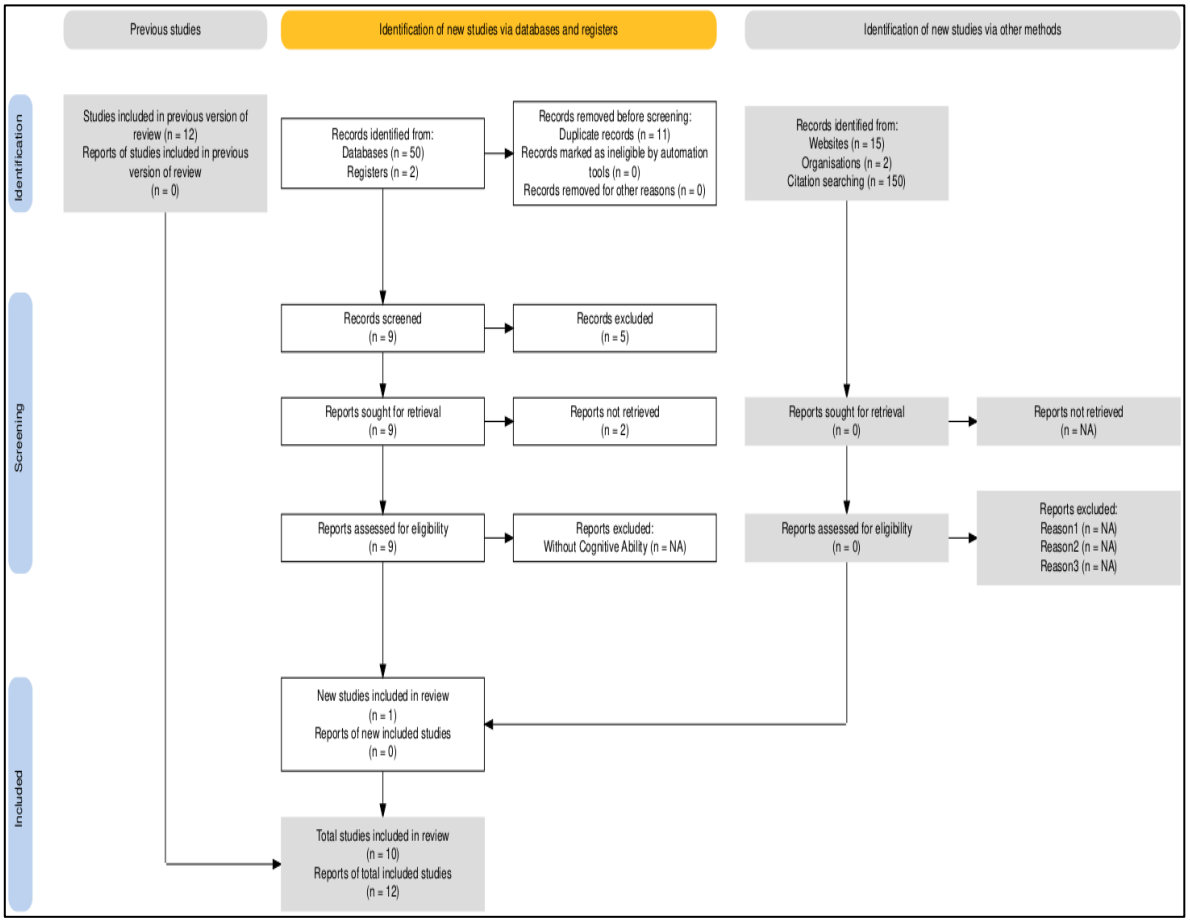

Figure 1: Prisma flow diagram.

According to studies, metabolic disturbances, including insulin resistance, obesity and hormonal derangements, are strongly associated with both cognitive impairment and psychiatric disorders in PCOS. These metabolic dysfunctions affect physical health and lead to high levels of anxiety, depression and stress, which feedback on cognitive deficits. There is a connection between the hyperactivity of stress hormones and changes in neurotransmitters especially decreased serotonin or increased cholinesterase which could lead to cognitive and psychological symptoms in PCOS.[2]

Overall, the reviewed studies show that PCOS is associated with measurable reductions in cognitive performance and significant psychological distress, both of which are affected by underlying metabolic and hormonal factors. These discoveries validate the need for including cognitive and psychological consequences in the approach to managing PCOS to balance these comprehensive effects. The figures in the paper offer a comprehensive visual overview of the research landscape on PCOS and its cognitive-psychological effects. Figure 1, a PRISMA flow diagram, details the systematic screening process, showing how 52 records were narrowed down to 12 final studies through steps such as duplicate removal and eligibility assessment.

Subjective and objective findings: a comparative analysis (Table 1).

A big difference in the literature that was looked at has to do with the tools used to measure cognitive and psychological outcomes in PCOS. Self-report inventories (like the STAI and Beck Depression Inventory) were often used because they were easy to get and use. These measures gave us a lot of information about how women saw their mental health, but they were often biased because of things like mood, stigma or cultural factors that made them report too little or too much.

On the other hand, objective tests like neuropsychological assessments, EEG and ERP showed clear and repeatable evidence of cognitive problems. For instance, research using ERP showed longer P300 latencies and lower amplitudes, which suggests that women with PCOS process information more slowly and have trouble paying attention. EEG studies backed this up by showing unusual theta and alpha wave activity, which means that cognitive processes were not working properly. When we looked at both subjective and objective data, we saw a clear pattern: self-reports showed higher levels of anxiety, sadness and cognitive complaints, which were backed up by measurable problems with tasks related to memory, attention and executive functioning. However, in some

cases, subjective discomfort was reported even when there were no major objective problems. This shows how important it is to use both types of assessments for a full evaluation.

Table 1: Summary of included studies.

Author	Size of sample	Result	Tool	Findings	Insights
Lujan et al	N=119, PCOS (n=79), Controls (n=40)	Spatial ability, manual dexterity	Mental Rotation Task, Purdue Pegboard, Identical Pictures Task	PCOS group performed worse on spatial and manual tasks	Reproductive and metabolic features are independent predictors of cognition
Sundararaj et al	N=20, PCOS (n=10), Controls (n=10)	Hearing sensitivity and auditory working memory	Pure tone audiometry, EHFA, digit span & sequencing tasks	Poorer high-frequency hearing, reduced memory scores in PCOS	PCOS impacts both auditory sensitivity and working memory, emphasizing early screening
Chadha et al	N=30 young adult females with PCOS (aged 25 to 35)	Health-related quality of life (HRQoL	Polycystic Ovary Syndrome Questionnaire (PCOSQ)	All five PCOSQ domains (emotions, body hair, weight, infertility, menstruation) were adversely affected.	Weight had the greatest negative impact; emotional and psychological distress was common; HRQoL should be monitored in PCOS patients.
Showkath et al	N=67, PCOS (n=37), Controls (n=30)	Cognitive dysfunction, anxiety, depression	MoCA, STAI, BDI, EEG, ERP (P300)	Reduced MoCA scores, increased anxiety/depression, reduced alpha/increased theta	Objective evidence of subclinical cognitive impairment via EEG and ERP
Ananthasubramanian et al	N=384 (Survey); 75 (Neuropsych tasks); 30 (Biochemical)	Cognitive Function, Neurotransmitters, Enzymes	CFQ, MFQ, Stroop, Corsi and ELISA for serotonin	Reduced cognitive scores, serotonin; increased cholinesterase in PCOS	Metabolic enzymes and neurotransmitters linked with cognitive impairment
Bansal et al	N=104 PCOS	Depression, Anxiety, Stress	DASS-21	High prevalence of psychological distress in PCOS	BMI, hirsutism and acne significantly linked to depression
Naz et al	N=850 PCOS, 974 controls (from 16 studies)	Cognitive Domains: Memory, Attention, Executive Functioning	Various cognitive assessments across studies	PCOS is linked with cognitive decline, e.g., spatial memory, psychomotor speed	Hormonal, metabolic and psychological pathways suggested in cognitive dysfunction
Davis et al	N=130 (65 with PCOS, 65 without PCOS)	Cognitive Distortion, Interpersonal Dependency, Suicidal Ideation	Dysfunctional Attitude Scale (DAS), Interpersonal Dependency Inventory (IDI), Suicidal Ideation Scale	Significant negative correlation between Cognitive Distortion and Interpersonal Dependency/Suicidal Ideation. No significant difference in measured outcomes between PCOS and non-PCOS groups.	Inclusivity across gender identities in PCOS research; emphasizes the need for larger, more diverse samples for generalisation.
Majidzadeh et al	N=92 (46 PCOS, 46 controls)	Cognitive Function	MoCA (Montreal Cognitive Assessment)	The PCOS group scored significantly lower than the controls	Cognitive impairments in PCOS linked to hormonal imbalance
Rao et al	N=90 (43 cases, 47 controls)	Emotional distress, social cognition	PANAS, SDQ, EQ/SQ, RET, CAM, Eye-Tracking	Higher negative affect, social-emotional problems and reduced empathy in PCOS	Hyperandrogenism during neuroplastic periods linked to

Continued.

Author	Size of sample	Result	Tool	Findings	Insights
					impaired social cognition
Kansal et al	N=100 (PCOS + Control)	Subjective well-being, self-esteem	SWB scale, rosenberg self-esteem scale	PCOS group showed lower SWB and self-esteem	Socio-cultural factors moderated the impact of PCOS symptoms
Khan et al	N=173 (101 PCOS, 72 controls)	Focused and divided attention (accuracy, RT)	Flanker task, posner cueing task	PCOS group had slower reaction times and more errors, especially in focused attention	Attention impairments in PCOS due to endocrine-related neural disruptions; highlighted need to assess attention in cognitive evaluations of PCOS

DISCUSSION

The review provides not only insights bu also reveals limitations in the current literature regarding cognitive and psychological effects associated with polycystic ovary syndrome (PCOS), suggesting a need for further research in this area. Studies have indicated that PCOS increases the risk of cognitive dysfunctions (memory impairment, attention and executive functioning) and psychological distress (anxiety, depression and lower quality of life) in women. However, such insights are limited by small sample sizes, methodological inconsistencies and lack of diversity in study populations. Overcoming these limitations will be fundamental for further elucidation of PCOS pathology in terms of mental health and cognition, as well as well-being-oriented interventions in this arena, where new treatments are lacking.

A major limitation, however, is the reliance on cross-sectional study designs, which capture data at a single point and prevent firm conclusions regarding the causal relationship between the incidence or diagnosis of PCOS and cognitive or psychological impairments. This design flaw limits the ability to delineate cognitive and psychological symptoms that are attributable to the direct effects of the hormonal and metabolic derangements associated with PCOS from those that are a secondary consequence of unhealthy lifestyles, comorbidities and chronic stress.

Longitudinal studies that follow symptom trajectory over time, clarify the long-term latencies of hormonal and metabolic changes and therapeutic interventions as moderators of cognitive and psychological outcomes are therefore critical. Also, not having long-term data makes it hard to find important times for intervention, especially during key phases like adolescence or menopause when hormonal changes are more noticeable.

One major problem in this regard is the almost exclusive use of self-report measures to operationalize constructs related to psychological states like anxiety and depressive symptoms. Although these tools are convenient and widely used, they introduce subjectivity and may not accurately represent the lived experiences of women with PCOS. Self-reported data are subject to biases, including underreporting or overreporting of symptoms, driven by personal perceptions, stigma or cultural norms. Using neurocognitive tests, biomarkers, MRI, EEG, etc., could help in reflecting cognitive and psychological health in the PCOS population in a more uniform and precise way.

Another major issue is the lack of diversity in study populations. Most of the studies are conducted in the context of urban, homogenous populations from the same geographic area and do not address the differences in the presentation of PCOS and its cognitive and psychological consequences in various ethnic, cultural and socioeconomic settings. Constrained by this small window of analysis, these studies lead to findings that are not generalizable and overlook the contribution of environmental, societal and lifestyle factors to the experience of women suffering from PCOS. Broadening research collaborations to include larger, all-inclusive populations will help ensure that future discoveries can be generalized to a wider subsector of women affected by PCOS.

The small number of participants in these studies makes it hard to trust the results about how common and serious cognitive and psychological issues are in women with PCOS. As a result, larger, more representative samples are needed to accurately capture the variability of symptoms in this population and to identify subgroups that may be at heightened risk for adverse outcomes.

In addition, the exclusion of specific populations from research, like pregnant women and older women with PCOS, confines the current body of knowledge and overlooks significant vulnerable groups whose experiences and outcomes are likely to be substantially different from those tested.

To date, existing research is biomedically oriented with limited recognition of the role of psychosocial factors in the lived experiences of women with PCOS and how psychosocial factors may feed into their physical health. To overcome these limitations, there is a need to adopt more rigorous study designs, larger and more diverse sample sizes and advanced diagnostic tools. Longitudinal studies are especially important for understanding symptom trajectory and the long-term effects of treatment.

Future studies can address many of these limitations and elucidate the relationship between PCOS, cognition and mental health, which can ultimately provide the basis for targeted, effective and evidence-based interventions that will improve the quality of life in women suffering from PCOS.

Research questions and analysis

Cognitive impairments reported in women with polycystic ovary syndrome

Women with PCOS frequently demonstrate.

Impairments in memory, attention and executive functioning

Documented across multiple neuropsychological assessments and supported by EEG/ERP findings (e.g., reduced P300 amplitudes and delayed latencies).

Cognitive fatigue, attentional lapses and slower reaction times

These are linked to elevated androgen and cortisol levels, as well as neurotransmitter dysregulation (e.g., low serotonin, high cholinesterase).

Reduced scores on montreal cognitive assessment

Indicating subclinical cognitive decline, especially in attention and visuospatial domains.

Altered EEG activity

Increased theta and reduced alpha power biomarkers associated with cognitive impairments.

Mental health conditions commonly associated with polycystic ovary syndrome

The review identifies high prevalence of several psychological conditions among women with PCOS.

Anxiety (up to 42%) and depression (up to 37%)

Often linked to hormonal imbalances, chronic stress and body image concerns.

Low self-esteem and interpersonal dependency

Especially when PCOS symptoms affect perceived femininity and social functioning.

Suicidal ideation

Highlighted in women with high cognitive distortions and poor coping mechanisms.

Emotional dysregulation and social cognition deficits

Particularly in adolescents exposed to early hyperandrogenism.

Relationship between cognitive functioning and mental health in polycystic ovary syndrome

The literature emphasizes a bi-directional and cyclical interaction.

Cognitive impairments (e.g., poor attention, memory issues) are both affected by and contributors to psychological distress (e.g., depression, anxiety).

Physiological links neuroendocrine changes such as elevated cortisol and decreased serotonin simultaneously impact mood regulation and cognitive performance.

Subjective reports of distress often correlate with objective cognitive deficits, indicating a convergent impact on both mental health and brain function. Stress and poor mental health may exacerbate existing cognitive vulnerabilities, creating a feedback loop of deteriorating well-being.

Women with PCOS experience a significant dual burden of cognitive dysfunction and mental health disorders, including anxiety and depression. The evidence supports a biopsychosocial model, where hormonal and metabolic dysregulation simultaneously affect mood and cognition, often creating a feedback loop. Recognizing and addressing these co-occurring impairments is critical for improving outcomes in PCOS care.

Practical implications

Cognitive and psychological findings regarding PCOS indicate an urgent need for a multifactorial and multidisciplinary approach. Because PCOS has a variety of physical, mental and emotional symptoms, patients need care that involves teamwork from different medical experts like endocrinologists, psychiatrists, psychologists and neurologists to meet both their physical and mental health needs.

If you suffer from PCOS-related cognitive and psychological issues, you may find relief through specific targeted treatments. Modifications to one's diet and level of physical activity on a regular basis have the potential to

improve one's mood and cognitive function by altering metabolic markers.

In order to tackle the significant prevalence of anxiety, despair and low self-esteem among PCOS women, it is crucial to provide them with psychological therapy and mental health care.[5] These interventions include cognitive-behavioral therapy (CBT), mindfulness-based approaches and stress management techniques designed to alleviate psychological symptoms and improve overall quality of life.[7]

As there is a link between cognitive dysfunction and psychological discomfort in women, cognitive and psychological tests should be a regular part of PCOS care. Regularly checking for cognitive decline can help us catch it early and do something about it to keep our brains sharp. People with PCOS often have depression, anxiety and stress, which can make it hard to think clearly. Because of this, it's important to have regular mental health checkups to find and treat these problems.[4] Incorporating cognitive assessments and psychological health evaluations into the standard care framework could enable healthcare providers to adopt a more holistic approach, ultimately addressing the complex challenges faced by women with PCOS and enhancing their long-term health and quality of life.

Limitations

However, we must give due consideration to the specific limitations in the available literature. One major limitation of many studies is the small sample sizes employed, which limits the extent to which the findings can be generalized. Small sample sizes in studies lead to weaker statistical results and less accurate estimates of how common and serious cognitive and psychological issues are in people with PCOS.[4]

A predominant reliance on cross-sectional study designs further hinders the current body of research. Cross-sectional studies assess data at a one-time point, preventing us from investigating causal associations between PCOS, cognitive dysfunction, and psychological distress. Longitudinal studies are needed to evaluate the trajectory of cognitive and psychological symptoms over time in women with PCOS and to determine whether hormonal and metabolic changes over the long term exacerbate mental health and cognition in women with PCOS.[10]

Furthermore, all these psychological states, including anxiety and depression, are also prevalent through self-report measures; therefore, self-report measures are prone to introduce bias. While self-report tools are convenient, they may introduce subjectivity and might not accurately capture the psychological experiences of PCOS patients, which can lead to underreporting or overreporting symptoms. Also, this lack of diversity in study populations often representing a small geographic location or recruitment of urban participants has impaired the extrapolation of findings to the wider population of PCOS, which is likely heterogeneous in terms of cultural and socioeconomic backgrounds.[5]

These limitations show that future studies need to use larger and more diverse groups of people over time to better understand the cognitive and psychological effects of PCOS, including how much they can vary and their complexity.

Research gaps and future directions

The research remains limited because cognitive dysfunction in PCOS is less studied, meaning a lot is not known about the underlying principles in the context of their importance. While consistent cognitive domain findings are lacking, few studies have specifically examined PCOS's effects on cognition despite a need to further address memory, attention, executive functioning and visuospatial skills. Further mechanistic studies are needed, as the precise pathophysiological mechanisms underlying the linkages of metabolic disturbances, hormonal changes, inflammation and cognitive dysfunction are not yet understood. In addition, there is a notable gap in studies examining which cognitive changes occur across PCOS phenotypes and age groups, as many exclude adolescents, older women or pregnant women.

Little data exists on the effect of therapeutic approaches (pharmacological, lifestyle and psychological treatments) on cognitive and psychological outcomes in PCOS. The lack of long-term studies following cognitive changes over time hinders the understanding of disease trajectory and the effectiveness of interventions. Lack of a clear understanding of the role of underlying mechanisms in cognitive dysfunction (e.g., chronic inflammation and hypoxic states) These studies often include small sample sizes and homogeneous populations, limiting the generalizability of results (nearly half of studies are conducted on young women aged 18–25), with little regard for ethnic, cultural or socioeconomic differences.

Environmental and cultural determinants such as family structure, culture and socioeconomic status remain largely unexplored in their impacts on mental health and cognitive outcomes in PCOS. The biases, thanks to purposive sampling and data collection using the online platform, are potential limitations and the unique population of pregnant women with PCOS hinders subgroup analyses. Most studies do not use advanced diagnostic tools (e.g., MRI) to study structural or functional change, nor do they have biomarkers to add to the psychological evaluations. Moreover, more comprehensive cognitive domains (e.g., verbal reasoning, problem-solving and emotional cognition) should also be investigated, as well as the long-term effects of hyperandrogenism on neurocognitive development.

Longitudinal data are imperative to evaluate the changes in cognitive deficits, MCI to dementia transitions and the development of metabolic and psychopathological features in PCOS over some time. Neuroimaging studies to shed light on the relationship between alterations in hormonal exposure and changes in the brain (structural) were also absent. Additionally, the psychosocial consequences of women receiving treatment for PCOS signs, especially concerning their self-esteem, wellness and life span quality, are not studied thoroughly. To address these gaps, larger studies with more demographic diversity that incorporate advanced neuroimaging methods, more thorough cognitive testing and consideration of cultural and environmental factors are needed.

CONCLUSION

The review of the relevant research findings reflects a significant relationship between PCOS and cognitive dysfunctioning. PCOS has far reaching detrimental effects on physical and mental health is well recognized but focus of recent studies has been on examining cognitive functioning of PCOS affected women. The studies have established a link between hormonal and metabolic disruptions caused by PCOS and cognitive impairments. There is a complex interplay between mental health and cognitive functioning. PCOS has pervasive negative effects upon mental health and cognitive functioning. Further, poor mental health and impaired cognitive functioning aggravate each other creating a serious threat to the well being of the PCOS affected women. Researches have stressed upon the need of psychological intervention directed at cognitive aspect of the PCOS women. Present review underscores the need of comprehensive and coordinated interventions on part of health professionals from various streams to mitigate the multipronged negative effects faced by women having PCOS.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Agarwal T, Singh S. The interplay between cognitive impairment and mental health in women with PCOS: a systematic review. Int J Res Med Sci 2025;13:3429-37.