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Empowering health: The role of dietary habits and physical activity in managing PCOS symptoms through effective lifestyle intervention

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Abstract

This Review investigates how lifestyle changes affect symptom control in patients with polycystic ovary syndrome (PCOS). Medical research has explored both nutritional approaches and physical activity techniques for the treatment of PCOS. Research shows that dietary plans that enhance insulin sensitivity and maintain hormonal stability, when combined with consistent exercise, lead to excellent PCOS symptom control. The combination of dietary improvements alongside exercise programs and individual behavioural support improves patient adherence while addressing psychological and social challenges. When interventions are customized to address the specific preferences and obstacles of individuals, they succeed better than one-size-fits-all methods. The review stresses that effective treatment for PCOS requires a complete solution relying on nutrition changes and exercise practice alongside patient knowledge development because medical experts still need to investigate extended outcomes and auxiliary techniques for PCOS therapy.

Keywords: Polycystic ovary, dietary habits, physical activity, lifestyle intervention

1. Introduction

Among women of childbearing age Polycystic ovary syndrome (PCOS) emerges as a leading endocrine condition which produces extreme amounts of male hormones besides causing missed periods and multiple cysts in the ovaries [1, 2, 3]. PCOS generates significant health consequences for women's reproductive systems combined with their metabolism and psychological state [2, 3]. Global clinical guidelines advocate lifestyle changes, including diet adjustments and exercise, as the primary treatment approaches [1, 2, 3, 6, 10]. The developed research analyzes scientific data which demonstrates how dietary practices combined with physical activity help manage PCOS symptoms through lifestyle change methods while examining both current strategy strengths and limitations.

1.1 The Impact of Dietary Habits on PCOS Symptoms

Multiple studies [6, 10, 14, 17] consistently demonstrate that food choices significantly impact the intensity of PCOS symptoms level. The literature strongly supports the findings that higher fat intake deteriorates metabolic health and makes insulin resistance worse. Since insulin resistance is a fundamental aspect of PCOS, it results in elevated androgen levels, disrupted ovulation, and an increased risk of developing type 2 diabetes and cardiovascular disease [6, 14]. Research suggests that dietary strategies aimed at improving hormone function by enhancing insulin sensitivity may be promising [1]. Research suggests that individuals with PCOS can derive advantages from various dietary strategies, as they should focus on consuming foods with low glycemic impact, high fiber content, and increased levels of omega-3 fatty acids and antioxidants [1]. Scientific teams investigated the effects of different dietary interventions, including Mediterranean ketogenic approaches, as well as low-carbohydrate and high-protein regimens. The studies yielded inconsistent findings and revealed challenges for participants in adhering to these nutritional plans [1, 12, 19].

Findings from 2020 investigations revealed that researchers still need to identify the ideal dietary regimen for individuals with PCOS, while additional investigations are necessary to evaluate the long-term effectiveness and health benefits of these dietary interventions [17]. Scientists require additional research to establish the complete influence of particular nutrients and phytochemical substances.

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Research indicates that women diagnosed with PCOS tend to have reduced Dietary Phytochemical Index (DPI) scores compared to their counterparts without the condition. This suggests that the diets of women with PCOS are deficient in phytochemicals. Pertaining to PCOS diagnosis and hormonal stability PCOS patients who scored higher in the Dietary Phytochemical Index displayed more favourable results [20]. Researchers identified a direct connection between PCOS management and diets that include an extensive range of plant-derived phytochemical sources. Manta *et al.* explored the glycaemic index (GI) and glycaemic load (GL) while reporting that diets rich in these measures might make insulin resistance in PCOS patients worse. The researchers showed that diets with reduced glycemic index (GI) and glycemic load (GL) could improve insulin responsiveness and regulate menstrual cycle patterns [21]. The research outcome demonstrates how individualized dietary treatments need to be established based on patients' metabolic profiles and dietary preferences [12].

Women with PCOS will encounter major difficulties when attempting dietary lifestyle modifications. Research by Arentz *et al.* revealed that despite a significant number of women reporting changes in their eating habits, only a small percentage (less than 13%) succeeded in reaching their health-related objectives [4, 5]. This result emphasizes the importance of comprehensive assistance that includes dietary guidance, informational resources, and behavioral strategies to enhance compliance [5, 23]. Additionally, the widespread occurrence of irregular eating habits and insufficient nutritional awareness among individuals with PCOS [18, 22, 24]. A weight-neutral strategy that focuses on promoting healthy eating behaviours rather than strict weight loss targets is recommended by experts [24]. The widespread reliance on dubious online nutritional resources highlights the critical need for evidence-based guidance from certified healthcare specialists [9, 10].

1.2 The Role of Physical Activity in PCOS Management

Research conducted in 2024 support physical activity as a significant factor that produces effective treatment outcomes for PCOS patients [2, 4, 25]. Findings establishes interactions between exercise-induced improvements in insulin processing alongside weight control benefits alongside enhanced metabolic activity and reproductive system functioning [1, 2]. Sports Science Australia recommends that adults perform either 150-300 minutes of moderate exercises or 75-150 minutes of vigorous exercise weekly with two strength training sessions each week [2]. The experts at health-related fields note that regular routine combining either 250 minutes of moderate exercises or 150 minutes of high-intensity physical activity produces beneficial health effects and helps reduce weight but one must exercise a minimum of 150 minutes [2]. Scientists now investigate the best combination of exercise elements for treating PCOS according to research published in [27, 28]. Reports suggest that vigorous physical exercises lead to the greatest changes in metabolism [25] yet other studies indicate low to moderate intensity physical activities provide longer-lasting fitness advantages [28].

Arentz *et al.* published research demonstrating that intensive workouts enhance a woman's ability to cope with PCOS symptoms but many struggle with physical activity goals more than altering their diet choices in PCOS management [4, 5]. The importance of psychological barriers for

maintaining exercise routine has emerged from this research [4, 5, 22]. Physical inactivity barriers like facility access restrictions together with time constraints and low motivation and negative body perceptions prevent many women from active exercise [22]. Exercise participation becomes difficult when PCOS patients develop mental health problems such as depression alongside anxiety conditions [2, 16]. The success of an intervention depends on a complete method which handles physical and psychological features of exercise behavior [16, 29]. Mobile health applications together with tailored exercise programs present a potential solution for overcoming these obstacles while also enhancing exercise adherence [29, 30, 16].

1.3 Combined Lifestyle Interventions and Their Effectiveness

Studies find that effective PCOS symptom management depends mainly on dietary adjustments coupled with exercise activities [1, 31, 32]. Medical studies presenting evidence about multiple advantages that result from integrated lifestyle modifications have recently emerged [16, 33, 34, 35]. Venkatraman *et al.* showed that adding yoga to strength training led to clear improvements in physical health and mental wellness and reproductive function [16]. The study from Souza *et al.* demonstrated how simultaneous interventions in diet and exercise and behavioral modification improved both PCOS symptom relief rates and quality of life levels [33]. The research demonstrates how essential it is to adopt integrated lifestyle assessments that analyze diverse behavioral elements working together.

Optimal results from lifestyle modification programs can be achieved through the harmonious combination of behavioral and educational strategies [1, 4, 5]. Numerous evidence-based approaches combine to boost awareness along with compliance and self-confidence which addresses psychological problems tied to PCOS [1, 5]. Research establishes Cognitive behavioral therapy's (CBT) success in weight management and general mental well-being [36, 37] along with smartphone applications who provide device-based assistance tools [29, 30]. Programs that emphasize lifestyle interventions face ongoing obstacles when keeping patients compliant and reducing participant dropouts [22, 36].

1.4 Specific Dietary Approaches and Their Efficacy

The management of PCOS has been studied through multiple food strategies that use specific rationales alongside particular limits. The medical field often recommends low-glycemic index diets because they help patients develop better insulin sensitivity based on evidence [1, 34]. People on these eating plans eat whole grains and fruits and vegetables and legumes but limit their intake of processed foods and sugary beverages and refined carbohydrates [1, 34]. Research demonstrates that the Mediterranean diet with its emphasis on fish along with fruits, vegetables, whole grains, olive oil and whole grains shows promise for improving metabolic markers and relieving PCOS symptoms [1, 19]. While ketogenic diets show potential for fast weight loss and better insulin response [1, 12, 19] their strict consumption requirements [12, 19] and lack of research into reproductive effects [19] limit their long-term usability.

Multiple scientific studies have investigated how restrictive carbohydrate intake combined with dietary protein increases affect women with PCOS [4, 5]. Scientific findings show that

certain dietary regimes potentially help control weight and regulate PCOS symptoms [4, 5]. Multiple studies work to determine the optimum macronutrient formula which treats PCOS yet this investigation continues [7]. The results from Rodriguez *et al.*'s mouse model of PCOS implied that low-protein diets along with moderate carbohydrates joined with fat content would benefit reproductive health [7]. Research must advance to establish the perfect combination of macronutrients for PCOS management because patients have distinct metabolic reactions to different diets along with their dietary choices [7].

1.5 Addressing Psychosocial Factors and Improving Adherence

Lifestyle modifications for PCOS need effective dietary plans and exercise schedules along with targeted approaches to psychological factors which determine patient adherence levels [29]. The psychological issues PCOS women experience with their self-perception and confidence reduce their motivation to maintain long-term lifestyle modifications [16, 22, 29]. The incorporation of psychological interventions including CBT or motivational interviewing stands as a crucial requirement for all lifestyle intervention programs [36, 37]. The path to better medical compliance requires solving eating disorders within the PCOS patient population and health education for patients alongside medical staff [18, 24, 29].

Different research investigations emphasize the need for individualized support programs and educational interventions [3, 8, 22]. Research shows customized lifestyle adjustments with person-specific goals and barriers lead to better results compared with general approaches [8]. The treatment of PCOS requires expert teamwork between individuals who specialize in nutrition and exercise in addition to mental health practitioners [3]. Mobile health apps contribute to better adherence and enhanced outcome effectiveness through their provision of personalized assistance combined with monitoring and educational components [29, 30].

1.6 Research Gaps and Future Directions

Even though researchers have gained significant ground toward understanding PCOS management through lifestyle changes many potential research directions are still available for exploration. More high-quality randomized controlled trials are needed to evaluate how well diet plans and exercise programs perform in both effectiveness and safety results across extended periods of time [17, 25, 27, 28]. Proofreading studies need to identify optimal macronutrient balances while examining specific nutrient and phytochemical effects and establishing the most effective strategies to address both physiological obstacles and behavioral adherence [7, 20, 22].

New research needs to investigate weight management approaches among distinct demographics including teenagers [38, 39, 40, 41] and women of different cultural backgrounds [37]. The evaluation of different complementary medical practices needs further study along with developing specific interventions that align with diverse cultural needs and provide convenient access for all populations. Studies dedicated to integrating technology solutions with enduring self-management practices will establish sustainable methods to handle PCOS symptoms by improving life-style behaviors [29, 30].

2. Conclusion

Managing PCOS symptoms and enhancing overall health outcomes relies heavily on lifestyle modifications, including changes in diet and exercise habits [1, 2, 3, 4]. Although various dietary approaches show potential, the ideal nutritional composition remains uncertain [7], necessitating further research to evaluate the long-term effectiveness and safety of the different methods [17]. Likewise, additional studies are required to determine the most effective exercise type, intensity, and duration [27, 28]. To maximize the impact of lifestyle changes and improve adherence, a holistic approach integrating dietary and exercise interventions with behavioral and educational support is crucial [1, 10, 22]. Successful PCOS management through effective lifestyle interventions also hinges on addressing psychological and social factors, enhancing health literacy, and customizing interventions to meet individual needs [3, 8, 22]. Ongoing research in these areas will contribute to the development of more effective and sustainable strategies, empowering women with PCOS to manage their symptoms better and improve their overall quality of life.

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