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DIETARY STRATEGIES FOR MANAGING OBESITY AND POLYCYSTIC OVARY SYNDROME (PCOS)

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José Ribamar Sousa da Cruz[1]

ABSTRACT

Obesity and polycystic ovary syndrome (PCOS) are often interrelated conditions, both exacerbated by insulin resistance and hormonal imbalances. Managing these conditions requires a multidisciplinary approach, with dietary interventions playing a central role. Two common dietary strategies explored for weight management in PCOS are hypocaloric and ketogenic diets, each with distinct mechanisms and benefits. Hypocaloric diets focus on reducing daily caloric intake, promoting gradual and sustainable weight loss, which can improve insulin sensitivity and reduce androgen levels, alleviating symptoms such as menstrual irregularities and acne. However, weight loss may be slower, and these diets do not directly address insulin resistance. On the other hand, ketogenic diets involve drastically reducing carbohydrate intake and increasing fat consumption, inducing ketosis, and leading to rapid weight loss. This approach has shown significant benefits for women with severe obesity and insulin resistance, improving metabolic markers like glucose and cholesterol levels and enhancing hormonal balance. However, the restrictive nature of the ketogenic diet may make long-term adherence difficult, and side effects such as “keto flu” can hinder its success. Research studies have demonstrated that both diets can be effective in managing PCOS, with the ketogenic diet offering faster results and the hypocaloric diet providing long-term benefits. Ultimately, the choice between these dietary strategies should be personalized, taking into account the patient’s metabolic profile, preferences, and health goals. Continuous professional monitoring is essential to ensure nutritional adequacy and prevent complications. A holistic, individualized approach, combining diet, exercise, and medical supervision, is essential for effectively managing obesity and PCOS.

Keywords: Obesity. PCOS. Hypocaloric Diet. Ketogenic Diet. Insulin Resistance.

[1] Dr.
Nutrólogo
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INTRODUCTION

Obesity and polycystic ovary syndrome (PCOS) are conditions that are often closely interrelated, both exacerbated by insulin resistance and hormonal imbalances. The management of these conditions involves a multidisciplinary approach, with dietary interventions playing a critical role. Among the most explored dietary strategies, hypocaloric and ketogenic diets stand out, each presenting distinct characteristics, benefits, and challenges that require careful and personalized analysis for each patient. The choice between these approaches should consider the individual's metabolic profile, food preferences, and lifestyle, always with appropriate professional supervision to prevent complications and ensure nutritional adequacy.

Hypocaloric diets primarily focus on reducing daily caloric intake, usually in a range of 500 to 1,000 calories below the amount needed to maintain body weight. The goal of this approach is to promote gradual and sustainable weight loss, which can improve insulin sensitivity and reduce androgen levels, hormones that are often elevated in women with PCOS. This progressive weight loss has the potential to relieve various symptoms associated with PCOS, such as menstrual irregularities and acne, while also improving metabolic risk factors, including blood glucose levels, lipid profiles, and blood pressure. The flexibility of this diet makes it easier to adhere to in the long term, making it an advantageous option for patients seeking sustainable results. However, the downside is that results may take longer to appear, which can demotivate some patients. Additionally, hypocaloric diets do not directly address insulin resistance, which is a central issue in PCOS.

On the other hand, ketogenic diets involve a drastic reduction in carbohydrate intake, with an emphasis on increasing fat consumption while maintaining moderate protein levels. This dietary pattern induces a state of ketosis, where the body starts to burn fat as the primary source of energy, instead of carbohydrates. This process results in faster weight loss compared to hypocaloric diets, which can be particularly advantageous for patients with severe obesity and insulin resistance, conditions commonly found in women with PCOS. Furthermore, ketogenic diets have shown significant benefits in improving insulin resistance and reducing androgen levels, which can alleviate PCOS symptoms such as menstrual irregularities and acne. However, the strict carbohydrate restriction may make long-term adherence difficult, and the exclusion of certain food groups can lead to nutritional deficiencies. Another challenge associated with this approach is the phenomenon known as "keto flu," which occurs in the early weeks of the diet and is characterized by

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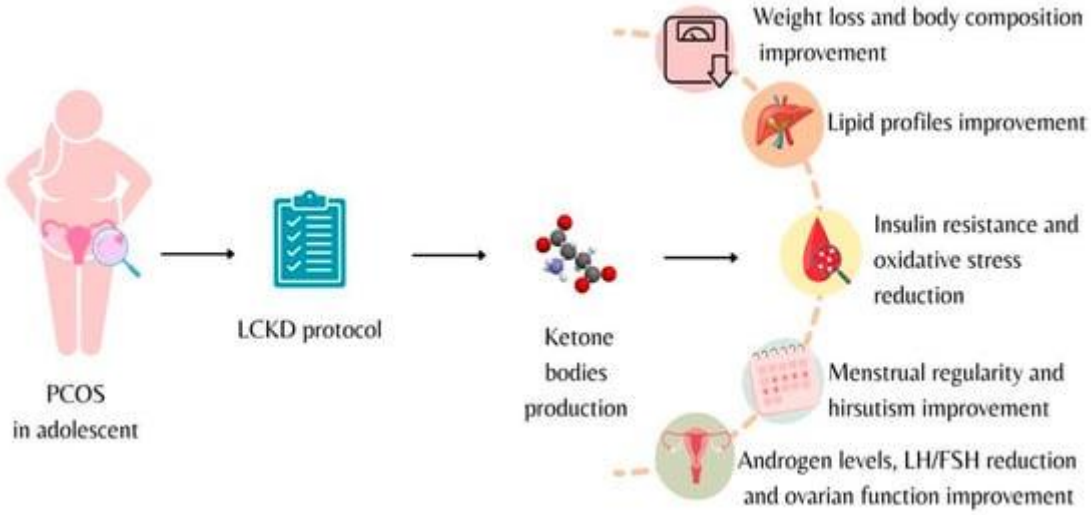
symptoms such as fatigue, nausea, and headaches. Although these symptoms are temporary, they can affect the patient's experience, especially during the initial stages of the diet.

Figure 1: Low-calorie ketogenic diet effects on adolescents diagnosed with polycystic ovary syndrome.



Source: Calcaterra et al. (2023).

Both dietary approaches offer considerable benefits, but they operate through different mechanisms and have varying levels of applicability. Hypocaloric diets are more suitable for long-term interventions, promoting sustainable weight loss, while ketogenic diets offer faster results and may be more effective in cases of severe obesity associated with insulin resistance. The choice between these strategies should be personalized, considering the patient's individual needs, health history, and food preferences. It is essential that monitoring be conducted by a healthcare professional to avoid complications and ensure that the diet is nutritionally balanced.

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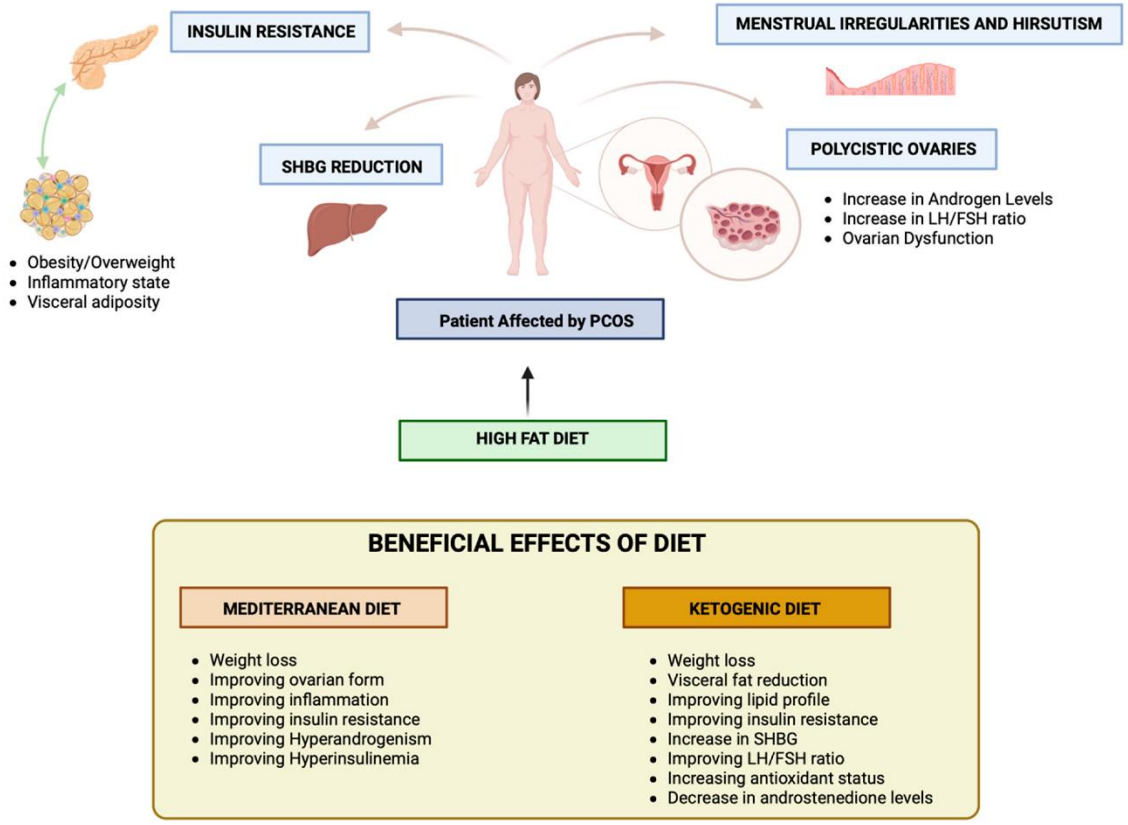
Figure 2: Effect of diet on Polycystic Ovary Syndrome.



Source: Calcaterra et al. (2024).

Several studies have investigated the effects of these dietary interventions in the treatment of PCOS. The research by Masood et al. (2023) compared the effects of a ketogenic diet and a hypocaloric Mediterranean diet in women with PCOS. The study showed that the group following the ketogenic diet had significantly greater weight loss (-10.9 kg) compared to the group following the hypocaloric Mediterranean diet (-5.1 kg). Additionally, the ketogenic diet group showed more significant improvements in metabolic markers, including total cholesterol, LDL, glucose, and insulin resistance (HOMA-IR), as well as improved hormonal balance, especially in androgen levels. These results indicate that the ketogenic diet was more effective in reducing triglycerides, cholesterol, and insulin resistance, as well as improving hormonal balance in women with PCOS. The study concluded that the ketogenic diet may be an effective intervention for improving health in women with PCOS.

Another relevant study, conducted by Naveed et al. (2024), evaluated the effects of a ketogenic diet in overweight women with PCOS. This prospective study included 320 participants who were randomized into two groups: one group followed the ketogenic diet, while the other followed a standard hypocaloric diet. The results showed a significant reduction in body weight (average weight loss of 8.5±2.3 kg), body mass index (BMI) (-

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3.2±1.1 kg/m²), and waist circumference (-10±4 cm) in the ketogenic diet group, compared to the control group, which showed less pronounced changes. Additionally, the ketogenic diet group showed improvements in menstrual regularity and metabolic health, highlighting the potential of this diet as an effective therapeutic intervention for managing PCOS.

Furthermore, the research by Calcaterra et al. (2023) investigated the effects of the ketogenic diet on regulating insulin sensitivity and glucose metabolism in women with PCOS, observing benefits in weight loss, hormone control, and metabolic balance. The review by Semenyna et al. (2023), which compared the ketogenic and Mediterranean diets, concluded that both diets offer benefits, but the Mediterranean diet appeared more promising for long-term management of PCOS and insulin resistance due to its adaptability and overall lifestyle improvements.

The review by Koliaki and Katsilambros (2022) on modern diets, such as intermittent fasting and ketogenic diets, also pointed out that, although these approaches show promising benefits, there is still no clear consensus on their superiority over traditional hypocaloric diets. The research suggests that further studies are needed to clarify the mechanisms of these diets and evaluate their long-term safety and efficacy in weight loss, body composition, and overall health outcomes.

These studies reinforce the idea that both the ketogenic and hypocaloric diets can be effective in managing PCOS, depending on the patient's characteristics and needs. A combination of a personalized approach and continuous medical monitoring is essential to ensure the best outcomes in the treatment of this complex condition.

In conclusion, the management of obesity and polycystic ovary syndrome (PCOS) represents a significant challenge in clinical practice due to the complex interplay of insulin resistance, hormonal imbalances, and metabolic dysfunctions that characterize both conditions. These interrelated factors necessitate a multidisciplinary approach to treatment, with dietary interventions playing a pivotal role in improving patient outcomes. The two primary dietary strategies explored in this context—hypocaloric and ketogenic diets—offer distinct benefits, mechanisms of action, and challenges that must be carefully considered when tailoring a treatment plan for individual patients.

Hypocaloric diets, with their emphasis on caloric restriction, provide a gradual and sustainable approach to weight loss, making them more suited for long-term management. This dietary strategy has been shown to improve insulin sensitivity, reduce androgen levels, and alleviate several symptoms of PCOS, such as menstrual irregularities and acne. Its flexibility makes it an appealing option for patients seeking to achieve and maintain a

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healthy weight over time. However, the slow and steady nature of the weight loss process may be discouraging for some individuals, and the diet does not directly address the underlying insulin resistance that is central to PCOS pathophysiology.

In contrast, ketogenic diets offer a more aggressive approach by drastically reducing carbohydrate intake and promoting fat consumption. This dietary pattern induces a state of ketosis, wherein the body shifts to burning fat for energy, leading to faster weight loss. For women with severe obesity and insulin resistance, commonly seen in those with PCOS, the ketogenic diet may offer significant advantages. It has been shown to improve insulin resistance, lower androgen levels, and provide faster relief from symptoms such as menstrual irregularities and acne. However, the restrictive nature of the ketogenic diet and potential nutritional deficiencies, especially in the long term, present challenges that require careful monitoring. The initial phase of the diet, known as "keto flu," can also be a barrier to adherence, with side effects like fatigue, nausea, and headaches.

Despite these challenges, both dietary approaches have been supported by scientific research as effective tools for managing PCOS, though their applicability depends largely on the individual's metabolic profile, lifestyle preferences, and specific health goals. The growing body of evidence underscores the importance of a personalized approach, in which factors such as the severity of obesity, the presence of insulin resistance, and the patient's overall health and dietary preferences are taken into account. For instance, studies have indicated that while ketogenic diets may yield more rapid improvements in metabolic markers, hypocaloric diets, particularly those aligned with Mediterranean principles, offer sustainable, long-term benefits without the need for drastic restrictions.

The studies reviewed herein, such as those by Masood et al. (2023) and Naveed et al. (2024), provide compelling evidence that dietary interventions can lead to significant weight loss, improve insulin sensitivity, and restore hormonal balance in women with PCOS. These studies suggest that the ketogenic diet, in particular, may be more effective in terms of weight loss and improving metabolic markers such as cholesterol, triglycerides, and glucose levels. At the same time, other research, such as that of Semenyna et al. (2023) and Koliaki and Katsilambros (2022), stresses the importance of more long-term investigations to assess the sustainability, safety, and efficacy of these diets in diverse populations.

Furthermore, it is crucial to acknowledge that no single dietary strategy is universally superior for all individuals. The choice between a hypocaloric or ketogenic diet should be made collaboratively with healthcare providers, ensuring that each patient's unique needs

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are met and that the chosen approach aligns with their preferences and health objectives. Continuous medical supervision is essential to monitor potential side effects, ensure nutritional adequacy, and adapt the dietary plan as necessary to avoid complications and maximize benefits.

The future of managing obesity and PCOS lies in an individualized, holistic approach that incorporates dietary interventions, physical activity, psychological support, and, when necessary, pharmacological treatments. As research in this area continues to evolve, it will provide deeper insights into how different dietary strategies interact with the underlying pathophysiology of PCOS and obesity, ultimately guiding clinicians to make more informed and effective treatment decisions. Until that time, the combination of evidence-based dietary strategies, patient-centered care, and ongoing professional guidance remains the cornerstone of managing these complex and often debilitating conditions.

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