

Efficacy of dietary changes compared to current pharmacological treatments for PCOS



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Abstract

Polycystic Ovary Syndrome (PCOS) affects 5-10% of women between the ages of 15 and 44. These patients present with elevated androgenic hormones, excess hair growth, weight gain and menstrual disorders. Women with PCOS are at higher risk for infertility, metabolic syndrome and heart and vascular diseases. Standard treatment for these patients includes prescription oral contraceptives (OCP) and metformin, but OCP have side effects of increased coagulopathy and risk of cardiovascular disease in an already at risk population and other adverse side effects. As even a modest weight loss of 2-5% has been shown to reduce symptoms, this paper aims to examine if a nutrition-focused diet is equally or more effective for weight loss and reduction of PCOS symptoms compared to current pharmacological treatments.

Introduction

- **ETIOLOGY** of PCOS is unknown but genetics, obesity, excess insulin and low-grade inflammation have been shown to be factorial
- **COMPLICATIONS** include metabolic syndrome, cardiovascular disease, hypertension, elevated LDL, sleep apnea, depression, anxiety and endometrial cancer
 - Insulin resistance is common
 - >50% will develop diabetes or prediabetes before 40
- **TREATMENT** is 1st line lifestyle modification
 - standard treatment includes OCP and Metformin
 - 2-5% weight loss can restore menstrual regularity
 - 5-10% weight loss can reduce androgen levels and decrease symptoms
- **Can nutrition- focused diets create successful outcomes and reduce the need for pharmacological treatment?**



Methods

- Literature search through PubMed, OVID, Medline and Biomedical Reference Collection on EBSCOhost
- Initial search terms "PCOS" OR "Polycystic ovarian syndrome" AND "diet"
 - Filtered by articles published in the last 5 years
 - Inclusions: "clinical trial" and "Randomized control trial" in humans
 - Exclusions: studies strictly to increase fertility
 - Six articles were chosen based on their applicability, study design, and relevant outcome measures
- Comparison search terms "PCOS" and "Metformin"
 - Exclusions: Trials of metformin in combination with another Rx
 - The two most relevant articles were chosen to provide comparison data

Results

Ref	Study	Weight Change (kg)	BMI Change	HOMA-IR Insulin resistance	Insulin (µIU/ml)	Triglycerides	Free Androgen Index (FAI)	Testosterone
1	Asemi et al (2015) 8 wks DASH Diet	[S] -3.6±1.2 P=<0.001	[S] -1.3±0.5 P=>0.001	[S] -0.45±0.42 P=0.01	[S] -1.88±1.6 P=0.03	N/A	N/A	N/A
2	Foroozanfard et al (2017) 12 wks DASH Diet	[S] -4.3±1.4 P=0.01	[S] -1.6±0.5 P=0.01	[S] -0.9±2.0 P=0.02	[S] -25.2±51.0 P=0.02	N/A	[NS] -0.03±0.09 P=0.03	[NS] -0.1±0.5 P=0.63
3	Papakonstantinou et al (2016) 24 wks Meal frequency	[NS] 0 P=0.470	[N] -0.12 P=0.464	[N] -0.29 P=0.384	[N] -4.0 P=0.718	[NS] -0.07 P=0.372	N/A	N/A
4	Perelman et al (2017) 6 wks Substituting poly and mono-unsaturated fat for dietary carbohydrates	[NS] 0.4±0.5	N/A	N/A	[S] 194±148 P=0.02 AUCinsulin	[S] 64±162 P=0.37	N/A	N/A
5	Shishehgar et al (2019) 24 wks LGI diet	[S] -6.7±0.56 P=<0.001	[S] -2.62±0.20 P=<0.001	[S] 0.83±0.33 P=0.001	[NS] -4.77±1.157 P=0.55	N/A	[S] -4.47±1.1 P=<0.001	[S] -0.91±0.33 P=0.006
6	Pedersen et al (2018) 12 month Metformin	[S] -2.4kg P=<0.001	N/A	N/A	[NS]	[NS]	N/A	N/A
7	Yang et al (2018) 104 wks (24 mo) Metformin	N/A	[S] -5%	[NS] 0.09	[S]	[NS] +0.2 P=<0.01	N/A	[NS] 80.6 * 0.61

Discussion

- Strengths
 - Low glycemic index (LGI) diets, especially the DASH diet, showed significant reductions in weight, BMI, insulin resistance (HOMA-IR) and hs-CRP compared to controls.
 - Weight loss was greater in the 8-12 week dietary trials than in the 12-month metformin study. Significant reductions were seen in HOMA-IR in the dietary trials compared to the 24-month metformin study
 - Insulin resistance is clinically significant as it contributes to many of the symptoms seen in PCOS
- Limitations
 - Dietary studies are short-term, 8-12 weeks in length
 - Many current trials are done in the setting of fertility
 - High percentage of participants are lost to pregnancy/ follow up
 - Direct comparison was difficult due to vast difference in study length
 - No standardization of clinical success measures
 - Longer studies of metformin lack a control group due to concern over lack of medical intervention in long-term studies



Conclusion

- The literature review shows significant results for PCOS patients applying a nutrition-focused diet with reductions in weight, BMI, hs-CRP and insulin resistance.
- Longer term studies are needed to determine if this success is sustainable and whether patients would continue to see reductions.
- The outcomes of these short-term trials are promising for clinical practice.
- Close work with a dietician able to create a plan that incorporates patient's cultural and ethnic eating preferences and restrictions with these nutrition-based changes could make this an achievable alternative to prescription medications.
- Ultimately this literature review did not yield a definitive answer to the efficacy of a nutrition-focused diet vs pharmacological treatment, but it highlights an area worthy of more research