

Short-time Effectiveness and Safety of the Ketogenic Diet in Women with Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis

INPLASY202380102

doi: 10.37766/inplasy2023.8.0102

Received: 23 August 2023

Published: 23 August 2023

Corresponding author:

Hengjie Cao

chj1015@126.com

Author Affiliation:

Department of Gynecology,
Longhua Hospital, Shanghai
University of Traditional
Chinese Medicine, Shanghai, China.

Xia, JP¹; Cao, HJ²; Li, PQ³; Xu, LW⁴; Lin, GY⁵; Chen, SR⁶; Lin, H⁷; Hu, SF⁸.

ADMINISTRATIVE INFORMATION

Support - The Three-Year Action Plan for Further Accelerating the Development of Traditional Chinese Medicine Inheritance and Innovation in Shanghai (2021-2023).

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202380102

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 August 2023 and was last updated on 23 August 2023.

INTRODUCTION

Review question / Objective The aim of this study is to explore the short-time impact of ketogenic diet (KD) on the fertility and endocrine/metabolic parameters in women with Polycystic ovary syndrome (PCOS) by a meta-analysis.

Condition being studied Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women during reproductive age, with an estimated prevalence ranging from 6% to 15%. It is characterized clinically by oligo-ovulation or anovulation, hyper-androgenism, and the presence of polycystic ovaries. Often comorbid with insulin resistance, dyslipidemia, and obesity, it also carries significant risk for the development of cardio-vascular and metabolic sequelae, including diabetes and metabolic syndrome. In light of published evidences, one of the most therapeutic options prescribed to PCOS women with obesity or not, is lifestyle correction by diet and physical

activity. The ketogenic diet is a high-fat, low-carbohydrate, and appropriate protein diet. Related researches show that very-low carbohydrate diets such as ketogenic food could give better results than simple hypocaloric diets in terms of weight loss, with consequent improvement of fertility and endocrine/metabolic parameters in women with PCOS. However, there is no systematic review of the efficacy and safety of the short-time ketogenic diet on PCOS individuals, so we conducted this meta-analysis.

METHODS

Participant or population Patients with clinically diagnosed Polycystic ovary syndrome, without serious complications and comorbidities.

Intervention Ketogenic diet as primary intervention for at least 45 days.

Comparator No intervention or other dietary modification or general nursing.

Study designs to be included cohort study, clinical trials (with or without comparator).

Eligibility criteria To be eligible for inclusion in the meta-analysis, studies needed to meet the following criteria: (i) exposure: ketogenic diet, also known as high-fat low-carb diet and very low carbohydrate diet. (ii) participants: 18-45 years old woman with clinically diagnosed Polycystic ovary syndrome, without serious complications and comorbidities. (iii) outcomes analyzed: Anthropometric and endocrine parameters. (iv) study design: cohort study, clinical trials (with or without comparator).

Information sources We will electronically search the following six international and three Chinese databases for publications in the recent decade from 2012 to 2023: Web of Science, Sinomed, EBSCO, Scopus, PubMed, and Cochrane Library, China National Knowledge Infrastructure (CNKI), Wan Fang Digital Journals and VIP information (VIP). All the publications will be searched without any restriction on countries. Reference list of all selected articles will independently screened to identify additional studies left out in the initial search.

Main outcome(s) Anthropometric parameters: Body Weight or Body mass index (BMI)
Endocrine parameters: LH and FSH and total or free testosterone and progesterone.

Additional outcome(s) Anthropometric parameters: waist circumference (WC), Hip WHR (waist-to-hip) ratio, Fast Mass (FM) Metabolic parameters: insulin and C-peptide and fasting blood glucose, Homeostatic Model Assessment for Insulin Resistance (HOMAIR), lipid profile, such as serum triglycerides, total cholesterol. Endocrine parameters: AMH or sex hormone-binding globulin (SHBG). Safety Observation: liver and kidney function as well as the adverse effects the article reported.

Quality assessment / Risk of bias analysis Two authors (Peiqi Li and Hengjie Cao) will independently evaluate the quality of the included literature, mainly according to the Cochrane Collaboration's tool for assessing the risk of bias in clinical trials (RoB2). The Cochrane Risk of Bias tool contains five specific domains: randomisation process, deviations from the intended interventions, missing outcome data, measurement of the outcome, selection of the reported result. Two authors will grade the above contents as "low risk", "high risk" or "some concerns" and cross-check the obtained results. Any conflicts or

discrepancies will be resolved by discussion, or a third researcher (Jingping Xia) will be consulted to achieve agreement. Finally, a bias risk diagram will be drawn using RevMan 5.3 software.

Strategy of data synthesis Data from the included literature were synthesised and analyzed according to the Risk of bias tool (ROB 2). Metaanalysis of the included studies was performed using Review Manager 5.3.1. The Q-statistic and the index of inconsistency (I^2) test will be used for consistency testing. If the test result is $I^2 \leq 50\%$ and $p > 0.10$, we will use the fixed effects model; if $I^2 > 50\%$ and $P \leq 0.10$, the random-effects model will be used. $I^2 \geq 75\%$ is considered to be more heterogeneous, and meta-analysis will be used with caution. In case of significant heterogeneity among the included studies, the source of heterogeneity could be explored by sensitivity analysis and subgroup analysis. A funnel plot can be done with RevMan to detect publication bias in the included literature when there are more than 10 included papers.

Subgroup analysis Subgroup analysis will be performed based on the availability of sufficient data and the results of data synthesis. If heterogeneity exists, subgroup analysis will be conducted to determine the source of heterogeneity. Specific characteristics, including waveform and courses of PCOS, will be analyzed to determine whether they would cause heterogeneity.

Sensitivity analysis Sensitivity analysis will be performed to determine whether any single study with extreme findings had an undue influence on the overall results.

Country(ies) involved China.

Keywords Ketogenic diet; Polycystic ovary syndrome; Body mass index; Endocrine.

Contributions of each author

Author 1 - Jingping Xia.
Author 2 - Hengjie Cao.
Author 3 - Peiqi Li.
Author 4 - Lianwei Xu.
Author 5 - Guangyao Lin.
Author 6 - Siru Chen.
Author 7 - Hong Lin.
Author 8 - Shengfang Hu.