

# Hypertension: the role of therapeutic carbohydrate restriction

*'The HF-DASH diet lowered blood pressure to the same extent as the DASH diet but also reduced plasma triglyceride and VLDL concentrations without significantly increasing LDL cholesterol.'* [Chiu et al. 2016](#)

## Nutrition Network

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## Introduction

Hypertension is considered a [primary, modifiable risk factor](#) for cardiovascular disease and a [diagnostic component](#) of the metabolic syndrome. Therapeutic carbohydrate reduction (TCR), particularly in the ketogenic range, can have meaningful effects on blood pressure via [multiple](#) mechanisms, which include [weight loss and improved body composition](#), reduced insulin resistance and sympathetic nervous system (SNS) activity, modulation of the [renin–angiotensin–aldosterone system](#) (RAAS), improved endothelial and vascular function, and reduced inflammation and oxidative stress. Insulin resistance also has the effect of [increasing salt sensitivity](#).

TCR promotes metabolic changes impacting blood pressure which may be significant. Close monitoring of patients who are [taking anti-hypertensive medications](#) is advised due to changes in metabolism that occur during this dietary transition. Consuming carbohydrates in excess raises insulin and requires that the body store excess carbohydrates (bound to water) as glycogen in the muscles and liver. In particular, ketogenic diets result in rapid fluid shifts during adaptation where natriuresis (excretion of sodium in the urine) and diuresis (increased urination) contribute to reductions in blood pressure. TCR improves insulin sensitivity, and a reduction in plasma insulin levels is thought to be a key contributor to metabolic shifts. Reduced circulating insulin via TCR combats sodium retention and excessive fluid retention. Different types of [fasting](#) or [time-restricted eating](#) may also improve hypertension via similar mechanisms related to reducing insulin resistance.

## Systematic Reviews and Meta-Analyses

1. Evans CE, Greenwood DC, Threapleton DE, Gale CP, Cleghorn CL, Burley VJ. Glycemic index, glycemic load, and blood pressure: a systematic review and Updated February 2025

- meta-analysis of randomized controlled trials. *The American Journal of Clinical Nutrition*. 2017;105(5):1176-1190. doi:[10.3945/ajcn.116.143685](https://doi.org/10.3945/ajcn.116.143685)
2. Santos, F.L. et al. (2012) 'Systematic review and meta-analysis of clinical trials of the effects of low carbohydrate diets on cardiovascular risk factors', *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, 13(11), pp. 1048–1066. Available at: <https://doi.org/10.1111/j.1467-789X.2012.01021.x>.
  3. Najafi, M. et al. (2025) 'The effects of low carbohydrate and high protein diet on the anthropometric indices, blood pressure, metabolic factors, and hormones related to metabolism: A systematic review and meta-analysis', *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 19(12), p. 103352. Available at: <https://doi.org/10.1016/j.dsx.2025.103352>.

## Trials/Studies

1. Saslow, L.R. et al. (2023) 'Comparing Very Low-Carbohydrate vs DASH Diets for Overweight or Obese Adults With Hypertension and Prediabetes or Type 2 Diabetes: A Randomized Trial', *Annals of Family Medicine*, 21(3), pp. 256–263. Available at: <https://doi.org/10.1370/afm.2968>.
2. Lim, Su Lin, Melissa Tay, Siew Min Ang, et al. 2024. 'Development and Pragmatic Randomized Controlled Trial of Healthy Ketogenic Diet Versus Energy-Restricted Diet on Weight Loss in Adults with Obesity'. *Nutrients* 16 (24): 4380. <https://doi.org/10.3390/nu16244380>.
3. Yancy WS, Westman EC, McDuffie JR, et al. A Randomized Trial of a Low-Carbohydrate Diet vs Orlistat Plus a Low-Fat Diet for Weight Loss. *Arch Intern Med*. 2010;170(2):136. doi:[10.1001/archinternmed.2009.492](https://doi.org/10.1001/archinternmed.2009.492)
4. Unwin, D.J. et al. (2019) 'Substantial and Sustained Improvements in Blood Pressure, Weight and Lipid Profiles from a Carbohydrate Restricted Diet: An Observational Study of Insulin Resistant Patients in Primary Care', *International Journal of Environmental Research and Public Health*, 16(15), p. 2680. Available at: <https://doi.org/10.3390/ijerph16152680>.
5. Walker, L., Smith, N. and Delon, C. (2021) 'Weight loss, hypertension and mental well-being improvements during COVID-19 with a multicomponent health promotion programme on Zoom: a service evaluation in primary care', *BMJ Nutrition, Prevention & Health*, p. bmjnph. Available at: <https://doi.org/10.1136/bmjnph-2020-000219>. [PDF](#)

*Individual responses to dietary composition can vary, so appropriate medical monitoring is advised. Patients who are taking medication should consult with their doctor, as the following [guidelines](#) (Society of Metabolic Health Practitioners) may need to be considered.*