# Water and Diabetes: Prevention and Cure

Sanjay Kalra[1,2], Navneet Agrawal[3], Nitin Kapoor[4,5]

## Abstract

Water is ubiquitous in nature, and that is why, perhaps, it is not viewed as a nutrient. In the context of diabetes, water intake may have implications in increasing insulin resistance, development of complications, relation to anti-diabetic agents and also in prevention of diabetes.

In this brief article, we list various aspects of water nutrition, i.e., hydration that support its status as a mega- nutrient, as a preventative therapy against diabetes, and as a treatment modality for diabetes and its complications.

**Keywords:** Diabetes, diet, $H_2O$, heart failure, hyperglycemia, hyperosmolar coma, ketoacidosis, medical nutrition therapy, nephropathy, renal failure

**DOI: https://doi.org/10.47391/JPMA.11-23**

### Water as a nutrient

Water is essential for life, and hence, should be viewed as a nutrient. Various guidelines list recommended daily allowances (RDA) for water, but these should be interpreted in the context of local ambient temperature, humidity and outdoor exposure. Guidance from South Asian Nutrition institutes lists following RDA for water: 3150 ml for sedentary men and 2500 ml for sedentary women; 5200 ml for hard working men and 4200 ml for hard working women.[1] Keeping in view the quantity that is needed water should be viewed as a mega- nutrient.

### Water as Primary Prevention

Water intake has been shown to be associated with a 6% lower risk of new- onset hyperglycaemia.[2] Several mechanisms on how less water intake can cause hyperglycaemia are shown in figure. Therefore, its use should be promoted as a public health policy for diabetes prevention. Water intake should be encouraged as a healthy replacement for aerated drinks and processed juices as well as alcoholic beverages. This will also help reduce the burden of dehydration and heat exhaustion, which are so common in hot climates. Adequate electrolyte replenishment must also be promoted, through home-made or commercial medical-grade electrolyte drinks.

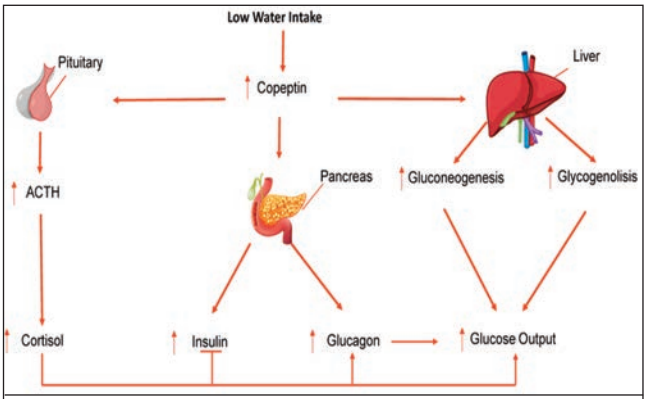


**Figure:** Mechanisms of how low intake of water can lead to hyperglycaemia.

### Water as Secondary Prevention

Water has a role in managing diabetes and preventing its complications. Water serves as a satiety-inducing and hunger- reducing intervention and should be consumed regularly. During meal sequencing, beverages such as water and soup should be taken before carbohydrate-rich meals.

Adequate water intake may also prevent, or mitigate the impact of, comorbid conditions such as urolithiasis and urinary tract infection.

Water is an important adjuvant therapy with some glucose-lowering drug. Person on SGLT2i (sodium glucose cotransporter 2 inhibitors) must be counselled to take extra water (350 ml/ day) to prevent dehydration.[3] Those who are prescribed oral semaglutide should be advised to ingest the tablet with a maximum of 100ml of water, and not consume more than that for at least 30 minutes.[4]

### Water as Tertiary Prevention

Advice about water and electrolyte intake is critical to the management of certain complications. Acute complications like diabetic ketoacidosis and hyperosmolar hyperglycaemic non ketotic coma have to be treated with appropriate hydration along with insulin and potassium.[5] On the other hand, persons with advanced diabetic nephropathy and heart failure need restrictions of water

[1]Department of Endocrinology, Bharti Hospital, Karnal, India. [2]University Center for Research & Development, Chandigarh University, India. [3]Department of Diabetology, Diabetes Obesity and Thyroid Centre, Gwalior, India. [4]Department of Endocrinology, Diabetes and Metabolism, Christian Medical College, Vellore, India. [5]Non communicable disease unit, Baker Heart and Diabetes Institute, Melbourne, Victoria, Australia.
**Correspondence:** Sanjay Kalra. e-mail: brideknl@gmail.com
ORCID ID. 0000-0003-1308-121X

and salt. Individualized and graded use of beverages is an important part of alimentary rehabilitation of patients with diabetic gastroparesis and diabetic diarrhoea as well. Thus, medical nutrition therapy must include knowledge of water intake while counselling patients with diabetes mellitus.[6]

## Summary

Water is a mega-nutrient, which can be used to prevent and manage diabetes and its complications. Health care professionals must utilize the economical and effective modularity and include discussion about hydration in their medical nutrition therapy (MNT) counselling in patients with diabetes. This will empower them to optimally use this cost effective nutrient in best interest of their metabolic health.

## References

1. NIN guidelines, Available at: https://www.nin.res.in/RDA_Full_Report_2020.html. Last accessed on 25 July 2022.
2. Roussel R, Fezeu L, Bouby N, Balkau B, Lantieri O, Alhenc-Gelas F, et al, DESIR Study Group. Low water intake and risk for new-onset hyperglycemia. Diabetes care. 2011;34:2551-4.
3. Kalra S, Baruah MP, Sahay R. Medication counselling with sodium glucose transporter 2 inhibitor therapy. Indian J Endocrinol Metabol. 2014;18:597-599.
4. Kalra S, Kapoor N. Oral Semaglutide: Dosage in Special Situations. Diabetes Ther. 2022 ;13:1133-7.
5. Agwu JC, Ng SM. Fluid and electrolyte therapy in childhood diabetic ketoacidosis management: A rationale for new national guideline. Diabetic Med. 2021;38:e14595.
6. Kapoor N, Sahay R, Kalra S, Bajaj S, Dasgupta A, Shrestha D, et al. Consensus on Medical Nutrition Therapy for Diabesity (CoMeND) in Adults: A South Asian Perspective. Diabetes Metab Syndr Obes. 2021;14:1703-28.