IJTI | INTERNATIONAL JOURNAL OF THERAPEUTIC INNOVATION

Review article

Diuresis's importance in maintaining health and managing illness

Vishnu Prasad Yadav[1], Vimal Kumar Yadav[1], Atul Shukla[1], Prabha Manjari Shukla[1], Ajay Kumar Shukla*[1], Pushpendra Kumar[2], Aarti Tiwari[3]

[1] Dr Rammanohar Lohia Avadh University, Ayodhya, Uttar Pradesh, India
[2] Faculty of Pharmacy, Uttar Pradesh University of Medical Sciences, Etawah, Uttar Pradesh, India
[3] Department of Pharmacy, Guru Ghasidas Vishwavidyalaya is a central University in Bilaspur, Chhattisgarh, India

Corresponding author: Ajay Kumar Shukla, ✉ashukla1007@gmail.com, **Orcid Id**: https://orcid.org/0000-0001-5689-3467

Received - 28-10-2025**, Revised** - 28-11-2025, **Accepted** - 29-12-2025 **(DD-MM-YYYY)**

Refer this article

Vishnu Prasad Yadav, Vimal Kumar Yadav, Atul Shukla, Prabha Manjari Shukla, Ajay Kumar Shukla, Pushpendra Kumar, Aarti Tiwari, Diuresis's importance in maintaining health and managing illness. International Journal of Therapeutic Innovation, November-December 2025, V3 – I6, Pages - 36 – 39. Doi: https://doi.org/10.55522/ijti.v3i6.0137.

ABSTRACT

Type and scope of diuretics: Diuretics are a group of drugs used to treat various diseases, including heart failure, hypertension (high blood pressure), glaucoma, liver and kidney diseases, or excess fluid accumulation in the body. Doctors have been prescribing them for decades. They come in many different shapes and sizes, including potassium-sparing diuretics, thiazides, loop diuretics, carbonic anhydrase inhibitors, osmotic diuretics and natural diuretics. On the contrary, long-term application of these diuretics would inevitably bring about some toxic effects. Side effects of these drugs include electrolyte imbalance, changes in blood pressure, and treatment for disease conditions that are related to excess fluid retention in the body. To maximise the management of numerous medical conditions, diuretic use should be known by healthcare staff and understand how to cause diuresis with its associated removal of excess fluid from the body. Healthcare providers can also make informed decisions on treatment regimens for their patients if they understand diuretics and how they work. Now new modern lifestyle, each person needs to be alert and know how much water to drink daily and which type of food is healthy for our kidney system. In this article, everything is covered and discussed related to kidney function and health issues.

Keywords: Carbonic anhydrase inhibitors, Potassium-sparing diuretics, loop diuretics, Thiazides, Osmotic diuretics, Elevated blood pressure, Heart failure.

INTRODUCTION

The process by which the kidneys create and release more urine is known as diuresis. It is necessary to maintain fluid balance, electrolyte equilibrium, and overall homeostasis in the body. Numerous factors, such as prescription medications, lifestyle choices, and underlying medical conditions, can cause diuresis. Understanding how diuresis promotes health and helps manage particular illnesses is essential. Diuretic medicine is used to treat edematous symptoms in most types of renal insufficiency, nephrotic syndrome, liver cirrhosis, and heart failure. An abnormal accumulation of fluid in the spaces between connective tissue cells is called oedema. It's intriguing to see that the fluid produced by various illnesses differs slightly in composition. As oedema is believed to be more of a symptom of an underlying sickness than a distinct medical diagnosis, treatment for it usually focuses on treating the underlying condition, such as poor kidney or heart function. Diabetic insipidus, hypertension, hypercalcemia, acute renal failure, and hypercalciuria are a few non-edematous illnesses that benefit from diuretic therapy. Usually, diuretics function by increasing the body's excretion of water and salt by the kidneys. As a result, there is less "pushing" on the arterial walls, which lowers blood pressure and stroke volume and decreases plasma volume and the volume of blood inside the arteries. Diuretics are drugs that stimulate the production of urine, aiding in the body's elimination of surplus water, salts, metabolic products, and poisons [1-5].

Diuretic drugs

Diuretics are a popular class of antihypertensives with a wide range of applications in clinical practice. Nevertheless, under certain circumstances, such as the previously

mentioned concomitant use of nonsteroidal anti-inflammatory drugs, their beneficial and antihypertensive effects may be counteracted. Dietary variables may also be quite important. Consuming too much salt prevents the diuretics' "acute" phase of volume loss and cardiac output, which may be required for the longer-term, "chronic," vasodilatory phase associated with diuretic treatment. This prevents the diuretics' antihypertensive effects. Large-scale clinical trials with CTDN, INDAP, amiloride-HCTZ, triamterene-HCTZ, and SPIR in the context of congestive heart failure and end-stage renal disease have extensively examined the potential to reduce CVEs. The best way to use diuretics in a variety of circumstances is to select the appropriate medication and dosage, particularly for salt-sensitive hypertension, which is prevalent in the elderly, obese, and Black populations. Since diuretics stimulate renin in a dose-dependent manner, angiotensin-converting enzyme inhibitors and aldosterone receptor blockers should work better when taken in the presence of low-renin hypertension. Diuretics are required to treat resistant hypertension, which affects around 5% of people and is a major source of morbidity and death. Potassium-saving diuretics are presumably underutilised. Due to the growing number of patients who are sensitive to salt, the SPRINT study suggests an SBP target of less than 120 mm Hg in many cases (i.e., obese and elderly patients). As a result, it is anticipated that diuretics will be used more often in the future to treat hypertension. The degree of variation across diuretic types depends on their efficacy. The variation in potency is explained by the distinct sites on the kidney structure where diuretics operate. Among the several types are [https://www.healthline.com/health/diuretics] [6-8].

Loop diuretics

The strongest types of diuretics are loop diuretics, which include furosemide, bumetanide, and torasemide. They work mainly by preventing the reabsorption of salt and chloride, increasing the excretion of sodium and chloride. Loop diuretics are a common treatment for heart failure. The tremendous efficacy of loop diuretics is due to their particular mechanism of action, which involves the loop of Henle, a portion of the renal tubule in the kidneys. Due to the high potency of loop diuretics, it is advisable to utilise a less potent diuretic whenever feasible. Signs and symptoms:

In addition to pulmonary oedema, the patient has a history of congestive heart failure (CHF).

Oedema surrounding the liver, heart, or kidney has not responded well to other diuretics.

Hypertension and other diuretics have not worked.

Thiazides

Thiazides are the diuretics most frequently prescribed. The most common course of treatment for them is hypertension. These drugs not only lower fluid retention but also encourage blood vessels to relax. Thiazides impact the distal convoluted tubule. They don't work as well as loop diuretics do. They increase glucose and uric acid levels while also excreting salt, chloride, potassium, and water (diuretics are used when kidney function is compromised; these drugs are only effective in patients with acceptable renal function). After thiadiazides were synthesised in the late 1950s, they largely replaced the preceding generation of diuretics. Compared to some other diuretics, they are more practical because they can be taken orally in the form of pills [8].

Potassium-sparing

Potassium-saving diuretics work by lowering distal tubule sodium reabsorption, which lowers potassium output. In the distal tubule, potassium is released into the growing urine together with sodium reabsorption. Uses in therapy: These drugs are probably being taken to keep the patient from becoming hypokalemic when taking a thiazide or loop diuretic.

Carbonic anhydrase inhibitors

Carbonic anhydrase inhibitors work by increasing the excretion of sodium, potassium, bicarbonate, and water from the renal tubules. Carbonic anhydrase inhibitors are used to treat glaucoma prevention and mountain sickness, and an unapproved condition (acetazolamide). [https://patient.info/doctor/ diuretics]

Osmotic diuretics (mannitol)

Mannitol is used as an osmotic diuretic in hospital settings to treat cerebral oedema. For them to work, the nephron lumen must be under osmotic tension. It has no discernible impact on the amount of electrolytes expelled.

core of medical care for cerebral oedema and traumatic brain injury patients with elevated intracranial pressure (ICP). Furthermore, mannitol promotes diuresis in patients with acute renal failure and aids in the body's removal of toxic substances and metabolites. Hypertonic saline is not considered a diuretic, even though it is used to treat high ICP in a way comparable to mannitol and occasionally shows higher efficacy [https://www.naturaltherapypages.com, http://www.hellooonurse.com].

Natural diuretics

Diuretics can influence heart failure, hypertension, cirrhosis, and nephritic syndrome, among other conditions that change the volume and composition of bodily fluids. Due to their greater effectiveness and less danger of side effects, natural products are a great substitute and a substantial source of diuretics. But a number of these plants that are used in traditional medicine require a detailed assessment of their toxicity and effectiveness. Despite the abundance of articles indicating that plants or plant-derived materials may function as diuretic agents, very few studies have looked into the mechanism of action of medicinal plants [8-14].

Examples of natural diuretics include

Nigella sativa, also referred to as black cumin, black seed, or black caraway, is a naturally occurring diuretic that may be equally effective as a typical prescription diuretic. Nigella

sativa increases the output of urine, which consequently reduces potassium and salt levels.

Hibiscus

Apart from its diuretic properties, the hibiscus sabdariffa plant prevents the body from losing potassium. Hibiscus sabdariffa is also known as red sorrel and roselle. It is commonly used as a dietary supplement or as a tea. Hibiscus tea is made by steeping dried hibiscus flower petals in boiling water. Alcohol is a well-known diuretic that makes you pee more. But because alcohol has many detrimental effects on health, it should always be consumed in moderation.

Dandelion

a common wildflower found throughout the Northern Hemisphere. Ginger: Both dandelion and ginger are commonly used in purportedly cleaning teas and beverages due to their diuretic qualities. Nevertheless, not enough research has been done on their effects on people.

Parsley

A study found that giving rodents extract from parsley seeds significantly increased the amount of urine the rats generated. For many years, individuals have used parsley as a diuretic at home. Dieresis appears to be caused by parsley's inhibition of the Na+-K+ pump, which would decrease Na+ and K+ reabsorption and enhance osmotic water flow into the lumen.

Caffeine

Caffeine occasionally may have a mild diuretic effect. Caffeine can be found in tea, coffee, soda, and energy drinks. Regular users of caffeine-containing beverages run the risk of developing a tolerance to it and not seeing any changes [https: //www.medicalnewstoday.com/articles/313001].

Diuretics are used in the treatment of a wide range of conditions. These include chronic heart failure (also treated for congestive heart failure with aldosterone receptor antagonist diuretics), hypertension (also treated for hypertension with diuretics), hyperaldosteronism, oedema, and hypokalemia, as well as glaucoma, kidney disease, liver disease, etc. [https://naplexstudyguide.com/diuretics-pharmacology]

Some common complications where diuretic drugs are discussed under below

Fluid balance

One of the main functions of diuresis is to control the body's fluid balance. It keeps interstitial fluid and blood plasma, among other bodily fluids, at the appropriate volume. Diuresis helps to ensure that excess fluid is eliminated, which lowers the risk of fluid overload and the conditions it is linked to, such as hypertension and oedema. Diuresis promotes cardiovascular health by helping to eliminate excess water from the body and helping to maintain optimal blood volume and pressure [14-20].

Electrolyte regulation

Electrolyte control and diuresis are closely linked, particularly when it comes to the excretion of sodium, potassium, and chloride ions. The excretion functions of the kidney that maintain body osmotic balance, pH and maintain homeostasis condition into the body [14-20].

Detoxification and waste removal

Toxic substances are filtered, and suitable nutrients are retained and removing the toxic substances from the body. This process is done by our kidneys [14-20].

Management of edematous conditions

Oedema means the retention of fluid in the body. retention of fluid in the body indicates an unhealthy condition of the kidneys. These unhealthy conditions of the kidney affect the other organ functions are liver and heart. Therefore, one needs to manage by taking plenty of water and healthy food items and lifestyle [20-25].

Blood pressure control

Diuresis also helps to regulate blood pressure. Blood pressure may rise as a result of increased blood volume brought on by excessive fluid retention. By promoting diuresis, which lowers blood pressure and decreases blood volume, the body can eliminate excess fluid. Because diuretics raise urine production and lower blood pressure, they are frequently prescribed medications for the treatment of hypertension. Hypertension is the most common lifestyle disease in India. Most people are suffering from hypertension and diabetes, and other diseases, taking both types of drugs. These people require alerting the fitness of the body and the involved exercise, meditation, herbs, low diet and nutraceuticals for the management of diabetic syndrome [26-28].

CONCLUSION

The importance of diuresis in maintaining electrolyte balance, detoxifying the body, maintaining fluid balance, and treating edematous illnesses cannot be overstated. Diuresis improves overall health by allowing surplus fluid, electrolytes, waste, and toxins to be expelled. When medical professionals are well-versed in the importance of diuresis, they can treat a wide range of medical conditions with efficacious interventions and therapies. To maximise diuresis and improve their health, people can also make informed decisions regarding their fluid consumption, lifestyle modifications, and drug use.

REFERENCES

1 Aparecida Livero F, Vergutz Menetrier J, Luiz Botelho Lourenco E, 2017. Cellular and molecular mechanisms of diuretic plants: an overview. Current pharmaceutical design. 23(8), Pages 1247-52. Doi: 10.2174/1381612822666161014114437.

2 Hegde A, 2020. Diuretics in Acute Kidney Injury. Indian J Crit Care Med. 24(3), Pages 98–99. doi: 10.5005/jp-journals-10071-23406.

3 Junior AG, Prando TBL, Leme TDSV, et al, 2012. Mechanisms underlying the diuretic effects of Tropaeolum majus L. extracts and its main component isoquercitrin. J Ethnopharmacol. 141(1), Pages 501-509. Doi: 10.1016/j.jep.2012.03.018.

4 Kreydiyyeh SI, Usta J, 2002. Diuretic effect and mechanism of action of parsley. J Ethnopharmacol. 79(3), Pages 353-357. Doi:10.1016/S0378-8741(01)00408-1.

5 Kumar M, Trivedi V, Shukla AK, 2018. Effect of polymers on the physicochemical and drug release properties of transdermal

patches of atenolol. Int J Appl Pharmaceutics. 10(4), Pages 68-73. Doi:10.22159/ijap.2018v10i4.24916.

6 Mahajan MD, 2013. Overview of diuretic strategies in edematous states. The Medicine Forum. 14(7), Pages 1-4.

7 Grams ME, Estrella MM, Coresh J, 2011. The National Heart, Lung, and Blood Institute Acute Respiratory Distress Syndrome Network. Fluid balance, diuretic use, and mortality in acute kidney injury. Clin J Am Soc Nephrol. 6(5), Pages 966-973. Doi:10.2215/CJN.08781010 PMC.

8 Sharma M, Dev SK, Shukla AK, et al, 2018. Microspheres as a suitable drug carrier in sustained release drug delivery: an overview. Asian J Pharm Pharmacol. 4(2), Pages 102-108. Doi:10.31024/ajpp.2018.4.2.2 IJBCP.

9 Shukla AK, Tiwari A, Yadav VK, et al, 2025. Preliminary phytochemical, isolation, characterization, antioxidant, and antimicrobial activity assessments of Achyranthes aspera L. Biosci Biotechnol Res Asia. 22(1), Pages 401-410. Doi: http://dx.doi.org/10.13005/bbra/3371.

10 Shukla AK, Kanaujia KA, Yadav VK, et al, 2024. Expert systems in preformulation and formulation development with special reference to SeDeM system: an innovative, problem solving, intelligent and optimization algorithm tool. Curr Indian Sci. (2), Pages 1-12. Doi:10.2174/012210299X338978241015155050.

11 Shukla AK, Kumar M, Bishnoi RS, 2018. Applications of tamarind seed polysaccharide-based copolymers in controlled drug delivery: an overview. Asian J Pharm Pharmacol. 4(1), Pages 23–30. Doi: https://doi.org/10.31024/ajpp.2018.4.1.5.

12 Shukla AK, Bishnoi RS, Kumar M, et al, 2020. Bioavailability enhancement and dissolution rate of poor water-soluble drug by solid dispersion technique. Indian J Novel Drug Deliv. 12(4), Pages 201–207.

13 Shukla AK, Singh SK, Mishra SP, et al, 2022. Development and characterization of natural polymer based nifedipine sustained release matrix tablet. J Pharm Negat Results. 13(Suppl 8), Pages 3663–3668. Doi: 10.47750/pnr.2022.13.S08.454.

14 Shukla AK, Yadav VK, Kumar P, et al, 2025. Use of natural gum in poorly water-soluble drug solid dispersion and solubility enhancement. Res J Pharm Technol. 18(8), Pages 3995–4000. Doi: 10.52711/0974-360X.2025.00574.

15 Dubey RS, Naidu MA, Shukla AK, 2022. Application of bioactive molecules in the treatment and management of type-1 diabetic disease: an overview. Sci Temper. 13(2), Pages 264–280. Doi: 10.58414/SCIENTIFICTEMPER.2022.13.2.40.

16 Dubey RS, Verma NK, Shukla AK, 2021. Diabetes mellitus: a report on antidiabetic medicinal plants and their potent bioactive molecules. J Med Pharm Allied Sci. 10(3), Pages 2949–2960. Doi: 10.22270/jmpas.V10I3.1414.

17 Shukla AK, Bishnoi RS, Kumar M, 2019. Development of natural and modified gum based sustained-release film-coated tablets containing poorly water-soluble drug. Asian J Pharm Clin Res.12(3), Pages 266–271. Doi: 10.22159/ajpcr.2019.v12i3.30296.

18 Shukla AK, Bishnoi RS, Kumar M, 2019. Development of natural gum based sustained release tablets of propranolol hydrochloride. Res J Pharm Technol. 12(7), Pages 3295–3300. Doi: 10.5958/0974-360X.2019.00546.8.

19 Shukla AK, Bishnoi RS, Kumar M, 2019. Isolation and characterization of natural and modified seed gum. Asian J Pharm Pharmacol. 5(2), Pages 409–418. DOI: 10.22270/jmpas.v9i2.920.

20 Tiwari V, Sharma M, Yadav VK, et al, 2024. Solubility enhancement and estimation of paracetamol and domperidone by hydrotropic agents. Biochem Cell Arch. 24(2), Pages 2783-93. Doi: 10.51470/bca.2024.24.2.0000.