

Increasing patient hydration through technology

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Achieving optimal hydration is crucial particularly for patients with nephrolithiasis. Research suggests that intake should approach 2.5–3.5 litres per day to allow for the daily excretion of 2–3 litres of dilute urine [1]. Unfortunately, patient compliance is known to be quite poor and only around 50% of patients are compliant with this recommendation after just six months [2].

Simple strategies for increased hydration

The first step is straightforward: encourage patients to carry a reusable water bottle and aim for at least 2.5 litres daily. The water bottle acts as a cue to action and to change behaviour, being a constant reminder to drink [3]. McCauley et al. showed that patients feel more confident about managing their hydration with a water bottle [3] in comparison to dietary and pharmacological changes. Additionally, gradual habit changes, like incorporating flavoured water may be helpful. This aligns with research on treating childhood constipation, where juice was more effective than plain water. Highlighting the benefits of increased fluid intake, such as improved energy, weight management, and reduced constipation, can further motivate patients.



Water Tracker: WaterMinder

Hydration apps

Patients are receptive to using smart technology to improve hydration. There was a strong interest in apps or devices to support compliance with hydration in nephrolithiasis patients [4]. Hydration apps offer broadly similar features including:

- Goal setting based on fluid intake (based on the user's weight and sex)

- Tracking of water intake (some apps include types of drink and various container sizes)
- Reminder notifications.

Almost all of the hydration apps offer a free trial or are advert-supported. At the time of writing Drink Water Reminder Pro app and BeWet app offer the best value for outright purchase with no advertising,

Table 1: Summary of hydration apps.

App name and publisher	Platform	Cost	Features
Drink Water Reminder Pro	iOS / Google Play	Free with ads £1.99–2.09 to remove ads	Water tracking, reminders, challenges, analytics
BeWet (Beforest Apps)	Google Play	Free with ads £1.99 to remove ads	Water tracking, target settings, drink types, reminders
My Water (My Water Drink Tracker Oy)	iOS / Google Play	Free with ads, £1.29 / month £9.99 / year	Water tracking, drink types, weight tracking, reminders, analytics
Plant Nanny - Water Tracker (Sparkful)	iOS / Google Play	Free trial, £7.99 / month £69.99 / year	Water tracking, drink reminders, adjustment to exercise, virtual animated plant interface
Water Tracker: WaterMinder (Funn Media)	iOS / Google Play	Free with ads £3.99 monthly £8.49 / year £28.49	Water tracking, reminders, hydration analytics, variety of units, tracking based on weight
Hydro Coach (Codium App Ideas)	iOS / Google Play	Free with ads £2.99 / month £19.99 / year £39.99	Water tracking, reminders, analytics, social function with friends

DIGITAL REVIEW

but all of the six apps listed in Table 1 have good reviews in online stores and in published urological literature.

Smart water bottles

Smart water bottles like Hhydrate Spark (£64–£90 depending on model) track fluid intake and sync with a smartphone for reminders. A study involving patients with kidney stones and low urine output (<1.5 litres) showed a significant increase in daily urine volume when using the Hhydrate Spark compared to standard dietary recommendations [5]. Patients in the smart water bottle group had less difficulty remembering to drink fluids which was the main baseline factor limiting fluid intake. Although smart water bottles have been clinically proven to be useful [4,5] they have potential concerns including cost, battery life, the need to be recharged as well as potential data privacy problems. Studies are also yet to determine if these increases in hydration are sustained beyond 12 weeks.

Conclusion

The most successful and simplest strategy for patients to successfully increase their hydration is to carry a water container [6]. Smart water bottles and hydration

apps can be valuable tools for those who struggle to remember to drink throughout the day. However, more research is needed to understand and optimise these technologies to produce long-term changes in patient drinking habits and prevent the recurrence of conditions like kidney stones.

References

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2. Khambati A, Matulewicz RS, Perry KT, Nadler RB. Factors associated with compliance to increased fluid intake and urine volume following dietary counseling in first-time kidney stone patients. *J Endourol* 2017;**31**(6):605–10.
3. McCauley LR, Dyer AJ, Stern K, et al. Factors influencing fluid intake behavior among kidney stone formers. *The Journal of Urology* 2012;**187**(4):1282–6.
4. Streeper NM, Fairbourn JD, Marks J, et al. Feasibility of Mini sipIT behavioral intervention to increase urine volume in patients with kidney stones. *Urology* 2023;**179**:39–43.
5. Stout TE, Lingeman JE, Krambeck AE, et al. A randomized trial evaluating the use of a smart water bottle to increase fluid intake in stone formers. *Journal of Renal Nutrition* 2022;**32**(4):389–95.
6. Tarplin S, Monga M, Stern KL, et al. Predictors of reporting success with increased fluid intake among kidney stone patients. *Urology* 2016;**88**:49–56.

Apps

<https://apps.apple.com/gb/app/drink-water-reminder-pro>

<https://play.google.com/store/apps/details?id=com.tarahonich.bewet&hl=en>

<https://mywaterapp.me>

<https://sparkful.app/plant-nanny>

<https://waterminder.com>

<https://hydrocoach.com>

Smart water bottle

<https://hidratespark.com>

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