



Comment on “Association between the urinary sodium-to-potassium ratio and apparent treatment-resistant hypertension in Japanese patients with non-dialysis dependent chronic kidney disease: the Fukuoka Kidney disease Registry study”

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We read with great interest the article by Matsukuma et al. [1], published in *Hypertension Research*, titled “Association between the urinary sodium-to-potassium ratio and apparent treatment-resistant hypertension in Japanese patients with non-dialysis dependent chronic kidney disease: the Fukuoka Kidney disease Registry study”. This study leverages the Fukuoka Kidney disease Registry (FKR) dataset to investigate the association between the urinary sodium-to-potassium (U-Na/K) ratio and apparent treatment-resistant hypertension (aTRH) in 4102 Japanese patients with non-dialysis-dependent chronic kidney disease (CKD) [1]. The findings highlight the U-Na/K ratio as a significant predictor of aTRH, offering additional predictive value beyond conventional risk factors. The use of a large, multicenter cohort and robust statistical methods, including net reclassification improvement (NRI), strengthens the study’s contribution to CKD management in Asian populations. However, several methodological and interpretative aspects warrant further discussion.

First, the cross-sectional design of the study limits its ability to establish causality between the U-Na/K ratio and aTRH [2]. While the association is statistically significant, longitudinal studies are needed to confirm whether high U-Na/K ratios directly contribute to the development or persistence of aTRH. Additionally, the reliance on a single spot

urine sample for U-Na/K ratio measurement introduces potential variability, as the Japanese Society of Hypertension recommends averaging multiple measurements over several days for greater reliability [3].

Second, the study’s findings may be influenced by unmeasured confounders, such as medication adherence and the white coat effect, which were not addressed due to data limitations [4]. These factors are particularly relevant in CKD patients, where antihypertensive medication regimens are complex, and non-adherence is common [5]. Incorporating ambulatory blood pressure monitoring or adherence data could enhance the study’s precision in defining aTRH.

Third, while the study highlights the relevance of the U-Na/K ratio in the context of high sodium and low potassium intake typical of Asian diets, it does not explore the impact of dietary interventions aimed at optimizing this ratio [6]. Given the emphasis on dietary management in CKD, data on the feasibility or effectiveness of sodium reduction and potassium supplementation programs could provide practical guidance for clinicians.

Finally, the generalizability of the findings may be limited by the study’s focus on a Japanese CKD cohort. Dietary patterns, healthcare practices, and CKD management strategies vary globally, potentially affecting the applicability of the U-Na/K ratio as a biomarker in other populations [7]. Comparative studies across diverse ethnic and regional groups are needed to validate these findings.

In conclusion, Matsukuma et al.’s study provides valuable insights into the role of the U-Na/K ratio in identifying aTRH in Japanese CKD patients. The findings underscore the need for targeted dietary and therapeutic strategies to manage hypertension in this population. Future research should adopt longitudinal designs, account for additional confounders such as adherence, and explore the global

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applicability of the U-Na/K ratio to enhance its clinical utility.

Compliance with ethical standards

Conflict of interest The authors declare no competing interests.

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References

1. Matsukuma Y, Tanaka S, Nakayama M, Kitamura H, Tsuruya K, Kitazono T, et al. Association between the urinary sodium-to-potassium ratio and apparent treatment-resistant hypertension in Japanese patients with non-dialysis dependent chronic kidney disease: the Fukuoka Kidney disease Registry study. *Hypertens Res.* 2025;48:2163–72.
2. Vandenbroucke JP, von Elm E, Altman DG, Gøtzsche PC, Mulrow CD, Pocock SJ, et al. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. *Ann Intern Med.* 2007;147:W163–194.
3. Hisamatsu T, Kogure M, Tabara Y, Hozawa A, Sakima A, Tsuchihashi T, et al. Practical use and target value of urine sodium-to-potassium ratio in assessment of hypertension risk for Japanese: consensus statement by the Japanese Society of Hypertension Working Group on Urine Sodium-to-Potassium Ratio. *Hypertens Res.* 2024;47:3288–302.
4. Carey RM, Calhoun DA, Bakris GL, Brook RD, Daugherty SL, Dennison-Himmelfarb CR, et al. Resistant hypertension: detection, evaluation, and management: a scientific statement from the american heart association. *Hypertension.* 2018;72:e53–e90.
5. Burnier M, Egan BM. Adherence in hypertension. *Circ Res.* 2019;124:1124–40.
6. Aburto NJ, Hanson S, Gutierrez H, Hooper L, Elliott P, Cappuccino FP. Effect of increased potassium intake on cardiovascular risk factors and disease: systematic review and meta-analyses. *BMJ.* 2013;346:f1378.
7. Iwahori T, Miura K, Ueshima H, Tanaka-Mizuno S, Chan Q, Arima H, et al. Urinary sodium-to-potassium ratio and intake of sodium and potassium among men and women from multiethnic general populations: the INTERSALT Study. *Hypertens Res.* 2019;42:1590–98.