



Opinion

Dietary Therapy for CKD: Salt Intake Reduction

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Abstract

Salt restriction continues to be suggested in current clinical practice guidelines. While it is useful for the management of hypertension, restriction may be too severe and hazardous for chronic kidney disease (CKD) patients, particularly older patients. Habitual salt intake is different in individuals and influenced by socio-economic conditions, CKD stage, primary renal disease, and co-morbid conditions. Currently, team-based care is recommended with adjustments for individuals. Kaizen, i.e., to begin with one small step, is the best strategy to improve the quality of life of CKD patients. Managing salt intake plays an important role in maintaining adequate nutritional status.

Keywords: salt restriction; salt reduction; Kaizen; nutrition; elderly

1. Introduction

Conquer Kidney Disease—Pride and Poise was the theme of the 68th Annual Meeting of the Japanese Society of Nephrology (JSN), which was held on 20–22 June 2025, in Yokohama. The Congress president, Prof. Masaomi Nangaku, stated, “Science is global. Implementation is local.” The prevalence of CKD and dialysis patients is high in Japan. In 2008, the Specific Health Check program (Tokutei-Kenshin) was launched to identify cases of metabolic syndrome, which includes lifestyle-related diseases such as hypertension, diabetes mellitus, hyperlipidemia, and CKD. The target population is aged 40 to 74 years old. Early detection and slowing the progression of CKD are important steps. Dietary management and lifestyle modification are the first-line management. I was asked to speak at the symposium titled “Dietary Therapy for CKD Patients: What is the desirable dietary management?” This review discusses current topics in salt restriction.

Okinawa is located in the southern-most part of Japan and has been noted as having a high incidence of end-stage renal disease (ESRD) [1]. Reasons for regional differences in ESRD incidence are not yet clear; however, salt intake in Okinawa has been found to be lower than in other parts of Japan. According to the annual survey of the Japanese Society for Dialysis Therapy (JSDT), the prevalence of dialysis patients decreased from 2786.5 per million population (pmp) in 2021 to 2781 (2022) and 2762 (2023). The mean age at start of dialysis was 71.6 years (70.9 in men, 73.1 in women) in 2023. Incidence of ESRD is actually the acceptance rate for renal replacement therapy (RRT). Currently, the number of patients choosing conservative kidney management (not RRT) is also increasing in Japan [2].

2. Clinical Practice Guideline (CPG)

In the JSN guidelines, salt restriction to less than 6 g/day is recommended because this will reduce blood pressure and urinary protein parameters in patients with CKD [3].



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The guidelines also add the following: “However, its effects on progression to end-stage kidney disease (ESKD), all-cause mortality, and cardio vascular disease (CVD) events are unknown. There is no strong evidence on the effect of salt restriction on CKD progression.”

The KDIGO Clinical Practice Guideline suggests a sodium intake of <2 g of sodium per day (or <90 mmol of sodium per day, or <5 g of sodium chloride per day) in people with CKD [4]. A lifestyle with a healthy and diverse diet is mandatory for CKD management. In the outpatient clinic, regular risk factor reassessment, such as physical activity, smoking status, and weight, is necessary every 3 to 6 months. From the perspective of clinical practice, dietary sodium restriction is usually not appropriate for patients with sodium-wasting nephropathy.

3. Adherence to Salt Restriction

The traditional Japanese dietary pattern, “Washoku,” is considered to involve a high salt intake. Salt intake is high in northeast Japan and low in southwest Japan, which may be related to the influence of environmental factors, such as local climate [5]. Too strict salt restriction may deteriorate nutritional balance and lead to malnutrition and cachexia. There are several appetizing foods with salty ingredients such as instant noodles, fast foods, processed foods, sauces, and condiments. Eating a flavorful diet is the key to living for elderly people [6].

Randomized clinical trials on protein restriction, such as the Northern Italian Cooperative Study [7] and Modification of Diet in Renal Disease Study [8], have not shown definitive conclusions on CKD progression, mainly because of non-compliance to protein restriction. Salt restriction, to less than 6 g/day, has been recommended as a useful modality to control hypertension, but there is no strong evidence on the outcomes of CKD. However, several observational studies showed better survival with a salt intake of more than 6 g/day. Salt restriction of less than 6 g/day is too low compared to the salt intake of the general Japanese population. The average salt intake was 10.7 g/day (men) and 9.1 g/day (women) in 2023. Since 2014, it seems to have plateaued [9].

Adherence to KDIGO2012 recommendations for CKD management is reported to be low, as in a typical practice setting, with substantial variation by country, the opportunity to see a dietician is quite low [10].

4. Evidence Against Salt Restriction

There are several observations and opinions concerning salt restriction.

* General Population and CKD patients not dependent on dialysis: The Prospective Urban Rural Epidemiology (PURE) study showed that both high and low levels of sodium excretion (estimated by 24 h urine collection) are associated with an increased risk of death and cardiovascular disease outcomes, and increasing the urinary potassium excretion counterbalances the adverse effect of high sodium excretion [11]. This study does not support the current CPG recommendations for the general population to restrict salt intake [12].

The relationship between sodium excretion and risk of major cardiovascular events was examined among patients with CKD enrolled in the Chronic Renal Insufficiency Cohort (CRIC) Study [13]. The risk for major cardiovascular events remains almost constant below 150 mmol Na excretion/24 h. Among patients with CKD, higher urinary sodium excretion was associated with increased risk of CVD. The results of the study also raised questions regarding the necessity of restriction of protein and salt intake [14]. There are many useful drugs for CKD management, such as RAS-i, SGLT-2i, ns-MRA, and GLP1-RA.

The risk of developing CKD is higher in people with hypertension who consume less than 2.08 g/day (5.28 g salt) or over 4.03 g/day sodium (10.2 g salt) [15]. In South

Korea, the average sodium (salt) intake is 4.18 (10.6) g/day for men and 3.48 (8.8) g/day for women, which is slightly lower than that of the Japanese population.

* Hemodialysis (HD) Patients: Many HD patients are required to restrict dietary intake, including restricting sodium intake. However, the average salt intake was 9 g/day among HD patients based on the food frequency questionnaire in the Japan Dialysis Outcomes and Practice Patterns Study (JDOPPS) [16]. By using the Japanese Society for Dialysis Therapy (JSDT) database, the relationship between estimated salt intake and 1-year all-cause mortality rate was examined ($n = 88,155$) [17]. In this study, HD patients who had undergone HD for at least 2 years at baseline were selected to exclude the urinary sodium loss. The low-salt-intake (<6 g/day) group demonstrated the highest all-cause mortality and cardiovascular deaths. The lowest risk for all-cause mortality and cardiovascular death was observed among patients with an estimated salt intake of 9 g/day.

5. Current Practice of Salt Intake Reduction in Japan

The Frontier of Renal Outcome Modifications in Japan (FROM-J): FROM-J was designed to encourage CKD patients to consult a physician, enhance cooperation between nephrologists and general practices, and prevent the progression of kidney disease. A cluster-randomized trial showed that intervention by a dietician was effective at inhibiting the progression of stage 3 CKD [18,19]. Dietary management, particularly salt and protein restriction, is fundamental for the proper care of CKD patients. We prospectively observed the effects of intervention from dietitians and supportive care in CKD patients in addition to the usual care recommended by JSN [20]. Tips for salt reduction and Japanese kidney-friendly recipes are also provided [21].

The Japan Specific Health Check (J-SHC) study group examined risk factor profiles based on eGFR and proteinuria among the general population [22]. Results show that fast eating is the sole predisposing factor among eating habits for new-onset diabetes [23]. The findings indicated that CKD and risk factors for CVD are quite common among middle-aged Japanese people. CKD classification based on eGFR and proteinuria may be useful for predicting CVD, mortality rate, and ESRD in the Japanese population. The data has been shared with the Chronic Kidney Disease Epidemiology Collaboration, Chronic Kidney Disease Prognosis Consortium (CKD PC) [24].

6. Other Methods for Salt Intake Reduction

* Potassium-Enriched Salt Substitutes: High sodium intake and low potassium intake are both well-established risk factors for hypertension. A recent review summarized that there are substantial benefits from the much wider use of potassium-enriched salt with a composition of 75% sodium chloride and 25% potassium chloride [25]. The effects of salt substitutes were examined on the incidence of recurrent stroke and mortality among patients with stroke [26]. Salt substitution was safe and reduced the risks of stroke recurrence and death. However, it is not yet clear whether this is also applicable to advanced CKD.

* Time-Restricted Eating: Time-restricted eating (TRE) is a dietary intervention that limits food consumption to a specific time window each day. TRE is quite effective in preventing obesity in animal models [27]. When to eat and when to sleep are important parts of one's lifestyle. Further research on chrono-nutrition is needed [28].

* Kaizen: The key way of salt restriction is to start with one small step and continue (Kaizen) [29]. Kaizen (change for the better) is a tool for clinical practice. It allows quantitative assessment of daily practice and functions to bridge the evidence–practice gap. It is recommended for patients and their spouses to reinforce a positive attitude and encourage sustained adherence to low-salt diets [30].

* Dr Robin A.J. Eady was a world-renowned UK dermatologist and also the first patient to undergo chronic HD. He started dialysis in Seattle, USA, in 1963. In 1987, he received a cadaver renal transplant [31]. We invited him as a special speaker at the 2013 JSDT meeting in Fukuoka. The title of the lecture was “The experience of the 50 years of renal replacement therapy (25 years of hemodialysis and 25 years of cadaver transplant recipients)”. The conclusion of his lecture was summarized in the last slide. He questioned the value of sodium restriction compared to eating a balanced diet. He stated, “At the beginning, patient or graft survival was a major goal and symbol of successful treatment. But for the patient, what really matters is the quality of his life, assuming he can survive.” He died in August 2017 at the age of 76.

7. Conclusions

Salt restriction has been an important part of dietary management in CKD patients, particularly in those with hypertension. However, restriction may be too severe and hazardous for CKD patients. Habitual salt intake is different in individuals, influenced by socio-economic conditions, CKD stage, primary renal disease, and co-morbid conditions.

Currently, team-based care is recommended. Regular and timely checks are desirable to reduce daily salt intake. Kaizen, to begin with one small step, is the best strategy for changing the quality of life of CKD patients. Managing salt intake is an important aspect of maintaining adequate nutritional status, particularly among the elderly.

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