| **Study** | **Participants** | **Exposure** | **Intake Status Ascertainment** | **Results** |
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| Joosten, 2014152  Location: Netherlands  Setting: Community  Design: Prospective Cohort study  Study Name: The Prevention of Renal and Vascular End-stage Disease (PREVEND) study  . | Study of: Adults N: 2363  % Male: by sodium quartiles q1 48.7 q2 48.7 q3 48.7 q4 48.7 Mean Age/Range/Age at Baseline: by sodium quartiles q1 mean 50 (SD 13) q2 mean 49 (SD 13) q3 mean 48 (SD 12) q4 mean 47 (SD 11) Race: NR Systolic BP: by sodium quartiles q1 mean 129 (SD 22) q2 mean 128 (SD 20) q3 mean 128 (SD 20) q4 mean 129 (SD 20) Diastolic BP: by sodium quartiles q1 mean 74 (SD 10) q2 mean 74 (SD 10) q3 mean 74 (SD 10) q4 mean 74 (SD 9) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by sodium quartiles q1 mean 25 (SD 3.7) q2 mean 25.5 (SD 3.7) q3 mean 26.1 (SD 4.1) q4 mean 27.5 (SD 4.8) % with Hypertension: by sodium quartiles q1 32.8 q2 30.4 q3 31.4 q4 30.7 % with history of CVD: NR % with Type 2 diabetes: by sodium quartiles q1 2.2 q2 2.5 q3 2.9 q4 4.7 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included Dutch participants between ages 28 to 75 and those who agreed to participate in questionnaire survey and urine sample collection. Exclusion: Excluded pregnant women and those with type I diabetes. | Exposure Type: Sex-specific quartiles of sodium excretion Exposure Unit: mmol/24h  Duration: NR Exposure to Follow Up Time: a median of 10.5 years  Dose format: range Q1, Dose: male <95 female <122 Q2, Dose: male 95-121 female 122-154 Q3, Dose: male 122-151 female 155-190 Q4, Dose: male >151 female >190 continuous, Dose: per 1-g/d increase | Sodium measure: two 24-hr urine analysis with out reported quality control measure Best sodium measure recorded: During baseline examination, participants collected two 24-hour urines for 2 consecutive days. Mortality Outcomes-Method of Ascertainment: Central Bureau of Statistics CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: national registry of hospital discharge diagnoses | Coronary Heart Disease Events (CHD was defined as myocardial infarction (ICD-code 410), acute and subacute ischemic heart disease (ICD-code 411) and coronary artery bypass grafting or percutaneous transluminal coronary angioplasty.) (mmol/24h/Outcome): Median 10.5 years (Q1-Q3: 9.9-10.8 years; 71491 person years) FU Q1 cases: 76, total: NR, person-years: 5524, continuous cases: 290, total: NR, person-years: 21669, Q2 cases: 70, total: NR, person-years: 5336, Q3 cases: 74, total: NR, person-years: 5472, Q4 cases: 70, total: NR, person-years: 5337 Adjustment: Age, body mass index, smoking status, sex, alcohol intake, parental history of coronary heart disease, type 2 diabetes, total to high-density lipoprotein cholesterol ratio, and urinary potassium, magnesium, and creatinine excretion For each 1-g/d increase, the associations between sodium excretion and risk of CHD were significant only among subjects with hypertension. No statistically significant association was observed. |
| O'Donnell, 2014124  Location: 17 low-, middle-, and high-income countries  Setting: Community  Design: Prospective Cohort study  Study Name: The Prospective Urban and Rural Epidemiology (PURE) study  . | Study of: Adults N: 101945  % Male: 42.5 Mean Age/Range/Age at Baseline: mean 51.01 (SD 9.72) years Race: 48.4 Asian Systolic BP: mean 131.7 (SD 22.30) Diastolic BP: mean 82.24 (SD 15.65) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 41.5 % with history of CVD: 8.3 % with Type 2 diabetes: 9.1 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Study selected a number of countries representing different economic levels, and selected urban and rural communities based on predetermined guidelines. Households and individuals were selected to fulfill maximum representativeness. Selected individuals aged between 35-70. Exclusion: Excluded those who refused to participate. | Exposure Type: Estimated Potassium Excretion (Kawasaki equation) Exposure Unit: g/day  Exposure Type: Estimated Sodium Excretion (Kawasaki equation) Exposure Unit: g/day  Duration: NR Exposure to Follow Up Time: mean 3.7 years  Dose format: range G1, Dose: <3 G2, Dose: 3-5.99 G3, Dose: >=6 Q1, Dose: <1.50 Q2, Dose: 1.50-1.99 Q3, Dose: 2.00-2.49 Q4, Dose: 2.50-3.00 Q5, Dose: >3.00 | Sodium measure: Partial or spot urine with validated prediction equation Best sodium measure recorded: collected one morning fasting midstream urine sample (Kawasaki formula) Sodium, Method of Validation: A validation study using the Kawasaki formula with actual 24-hour urine collection in 1,083 people from 11 countries showed an intraclass correlation coefficient of 0.71 (95% confidence interval (CI), 0.65 to 0.76). Potassium measure: Partial or spot urine with validated prediction equation\_1 Best potassium measure recorded: collected one morning fasting midstream urine sample (Kawasaki formula) Potassium, Method of Validation: A validation study using the Kawasaki formula with actual 24-hour urine collection in 1,083 people from 11 countries showed an intraclass correlation coefficient of 0.71 (95% confidence interval (CI), 0.65 to 0.76). Mortality Outcomes-Method of Ascertainment: Standardized case-report forms (adjudicated by trained physicians using standardized definitions, Contact family members, Captured best available information from reliable sources CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Interview with participant or proxy, Standardized case-report forms (adjudicated by trained physicians using standardized definitions), Captured best available information from reliable sources | All-cause mortality and Major Cardiovascular Event (g/day/Outcome): Mean 3.7 y FU G1 cases: NR, total: 10810, G2 cases: NR, total: 67794, G3 cases: NR, total: 23341 Adjustment: All analyses adjusted for age, sex, education, ethnicity (Asian versus non-Asian), alcohol intake, diabetes mellitus, body mass index, a history of cardiovascular events and current smoking, using logistic regression with generalized estimating equation models. The association between estimated sodium excretion and the composite outcome was strongest among participants with hypertension, with an increased risk at an estimated sodium excretion of 6.00 g or more per day.  All-cause mortality and Major Cardiovascular Event (g/day/Outcome): Mean 3.7 y FU Q1 cases: NR, total: 14262, Q2 cases: NR, total: 31466, Q3 cases: NR, total: 30956, Q4 cases: NR, total: 17171, Q5 cases: NR, total: 8032 Adjustment: All analyses adjusted for age, sex, education, ethnicity (Asian versus non-Asian), alcohol intake, diabetes mellitus, body mass index, a history of cardiovascular events and current smoking, using logistic regression with generalized estimating equation models. No significant association between potassium intake and risk of death and major CVD events among those with hypertension. |
| Ohta, 2013153  Location: Japan  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults N: 133  % Male: 39.85 Mean Age/Range/Age at Baseline: mean (SD) 59.7 (8.6) Race: NR Systolic BP: mean (SD) 143 (12) Diastolic BP: mean (SD) 85 (8) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: People with hypertension who visited the National Kyushu Medical Center, and underwent more than five successful 24 h home urine collections during the follow-up period were included. Exclusion: NR | Exposure Type: Urinary sodium excretion Exposure Unit: g/day  Duration: NR Exposure to Follow Up Time: 126 (10.5 y)  Change in eGFR (Calculated using the Modification of Diet in Renal Disease formula) Dose format: NR continuous, Dose: per 1 g/day  EGFR (Calculated using the Modification of Diet in Renal Disease formula) Dose format: range high urinary salt excretion, Dose: >8g/day low urinary salt excretion, Dose: <8g/day | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: more than five, first between 1998 and 2000, last between 2008 and 2010 CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: CKD was considered to be present if the patient had either a decreased estimated GFR (eGFR) (o60 ml min 1 per 1.73m2) or persistent proteinuria | Change in eGFR (Calculated using the Modification of Diet in Renal Disease formula) (g/day/Outcome): Average 10.5 years FU continuous cases: NR, total: 133 Adjustment: Change in serum uric acid, body weight at the first visit, eGFR at the first visit Significant negative association between average sodium excretion and change in eGFR  EGFR (Calculated using the Modification of Diet in Renal Disease formula) (g/day/Outcome): Average 10.5 years FU high urinary salt excretion cases: NR, total: 85, low urinary salt excretion cases: NR, total: 48 Adjustment: NR Significant association between those with an average salt excretion <8g/day and slower decline in renal function. |
| Seth, 2014154; Anderson, 2003155  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Women’s Health Initiative Observational Study (WHI-OS)  . | Study of: Adults N: 90137  % Male: 0 Mean Age/Range/Age at Baseline: mean 63.6 (SD 7.4) years Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included 93676 postmenopausal women aged 50 to 79 years. Exclusion: Excluded women with history of stroke, with missing information on history of stroke, and those with no information on dietary potassium at baseline. Excluded women with <465 calories intake or with >3931 calories intake, whose potassium intake ranged 0.07--1790 mg or ranged 1507 -- 31129 mg. | Exposure Type: Dietary Potassium Intake Exposure Unit: mg/d  Duration: NR Exposure to Follow Up Time: average 11 years  Dose format: range Q1, Dose: <1925.5 Q2, Dose: >=1925.5-2519.4 Q3, Dose: >=2519.4-3193.6 Q4, Dose: >=3193.6 | Potassium measure: Food Frequency Questionnaires Best potassium measure recorded: Two food frequency questionnaires (FFQ) at study enrollment and year 3 follow-up Potassium, Method of Validation: Used a sub sample to evaluate FFQ measurement properties Mortality Outcomes-Method of Ascertainment: Hospital records, Death certificate, Autopsy reports CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Medical files, self reported | All-cause mortality (Stroke was defined as rapid onset of neurological deficit lasting >24 hours and without evidence of other causes.) (mg/d/Outcome): Average 11 years FU Q1 cases: NR, total: NR, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Age, race, hypertension status, smoking status, physical activity, history of diabetes mellitus, history of atrial fibrillation, history of myocardial infarction, hormone use, alcohol intake, aspirin use, high cholesterol and body mass index Among women with hypertension, higher potassium intake was associated with lower all-cause mortality, but there was no association with any stroke outcome.  Stroke (All) (Stroke was defined as rapid onset of neurological deficit lasting >24 hours and without evidence of other causes.) (mg/d/Outcome): Average 11 years FU Q1 cases: NR, total: NR, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Age, race, hypertension status, smoking status, physical activity, history of diabetes mellitus, history of atrial fibrillation, history of myocardial infarction, hormone use, alcohol intake, aspirin use, high cholesterol and body mass index Among women with hypertension, higher potassium intake was associated with lower all-cause mortality, but there was no association with any stroke outcome. |
| Whelton, 199890; Appel, 200191; Espeland, 199992; Banson, 199793; Appel, 1995 94; Kostis, 199895; Whelton, 199796  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Trial of nonpharmacological interventions in the elderly (TONE)  . | Study of: Adults N: 681 for all endpo N: 681  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: NR Mean Age/Range/Age at Baseline: mean 66.5 (SD 4.6) Race: African American: 24% Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 60-80, SBP<145, DBP <85 while on anti-hypertensive medication, stable health, independence in daily living, capacity to alter diet and physical activity in accordance with the intervention Exclusion: History of a stroke or heart attack within the last 6 months, current angina pectoris, CHF, insulin dependent diabetes, serious physical or mental illness, unexplained weight loss of more than 4.5 kg during the past year, BMI <21 (both sexes), BMI>33 (men), BMI>37(women), hyperglycemia, anemia. | Exposure Type: Urinary sodium excretion Exposure Unit: mmol/d  Duration: NR Exposure to Follow Up Time: NR  Dose format: mean change in urinary sodium excretion Q1, Dose: plus 41 Q2, Dose: plus 3 Q3, Dose: minus 22 Q4, Dose: minus 51 Q5, Dose: minus 93 | Sodium measure: Single 24-hour urinary analysis without reported quality control measure, 24-hour diet recall Best sodium measure recorded: 2 times during enrollment, then at 9, and 18 months, and at the final follow up Sodium, Method of Validation: 24-hour "diet recall" Sodium Status Arm 2: Net reduction of -39.8 mmol/day Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times during enrollment, then at 9, and 18 months, and at the final follow up  How was blood pressure measured? BP measured while patients were in the seated position using Hawksley random-zero sphygmomanometers. SBP defined as the pressure at which the first Kortkoff sound was heard, DBP when the 5th sound could no longer be heard. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Interview with participant or proxy, medical records | Incidence of primary study endpoint, defined as: a (Primary end point defined as an average SBP >= 150 mm Hg, an average DBP >= 90 mm Hg, the resumption of BP medication, or a CVD event during followup (mean, 27.8 months)) (mmol/d/Outcome): Mean 27.8 months FU Q1 cases: NR, total: NR, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR, Q5 cases: NR, total: NR Adjustment: NR No association between baseline dietary sodium intake or excretion and the risk of a primary study endpoint. The risk of a primary study endpoint increased with increased reduction in urinary sodium excretion. |