| **Study** | **Participants** | **Intervention(s)** | **Intake Status Ascertainment** | **Findings - Outcomes and Comparison** |
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| Alli, 19921  Location: Italy  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 77  Intervention 1: % Male: 34.6 Mean Age/Range/Age at Baseline: mean 44.3 (SD 10.2) Race: NR Systolic BP: 150.8 Diastolic BP: 97 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % 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: 50 Mean Age/Range/Age at Baseline: mean 51.7 (SD 11) Race: NR Systolic BP: 148.3 Diastolic BP: 97.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.8 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Mild hypertension not previously known, not taking antihypertensive treatment or medications which interfered with BP; and they were not overweight (BMI< 30). Exclusion: Evidence of cardiovascular complications or secondary hypertension (as per pathological history, physical examination, and lab tests). | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Dietary instructions with the goal of lowering sodium intake Form of Administration: Dietary Modification: low-sodium diet Dose: NR Na/K ratio: 2.7 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: 2.8 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: At 1, 3, 6, 9 and 12 months. Sodium, Method of Validation: Completeness or urine collection was assessed on the basis of 24h creatinine excretion., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 177 mEq Best potassium measure recorded: At 1, 3, 6, 9 and 12 months. Potassium, Method of Validation: Completeness or urine collection was assessed on the basis of 24h creatinine excretion. Potassium Status Intervention 1: 67.2 mEq  How was blood pressure measured? BP taken in the supine position after 5 minutes at rest. SBP and DBP recorded at Korotkoff phases I and V. Three BP measurements were recorded at 1-minute intervals and the lowest value was used. | Subgroup: Mild HTN Diastolic BP-supine Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD 4.00 (95% CI: 1.02 - 6.98) Systolic BP-supine Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD 3.80 (95% CI: -2.70 - 10.30) |
| Ambrosioni, 19822  Location: Italy  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: NR days  Study Years: NR | Study of: Both adults and children N: 25  Participants: % Male: 55 Mean Age/Range/Age at Baseline: 23+/-6 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  Inclusion: young people with elevated BP Exclusion: NR | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Low sodium diet to achieve intake of 3-5g sodium chloride/d Form of Administration: Dietary Modification: Not described Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: 6-10g sodium chloride/d Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: NR Exposure to Follow Up Time: NR | Sodium measure: Partial urines without validation Best sodium measure recorded: 6 consecutive overnight urines Sodium, Method of Validation: NR Sodium Status Intervention 1: NR Potassium Status Intervention 1: NR  How was blood pressure measured? automatic device, Dinamap 845; casual readings were recorded after 1 minute and baseline recordings were obtained after 10 minutes. Measurements were performed at 1-minute intervals, seated | Diastolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -1.80 (95% CI: -6.63 - 3.03) Systolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -5.00 (95% CI: -10.66 - 0.66) |
| Applegate, 19923  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 47  Intervention 1: % Male: 43 Mean Age/Range/Age at Baseline: mean 65 (SD 3.8) Race: white: 57% Systolic BP: 143 Diastolic BP: 86 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 89 Kg % 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: 46 Mean Age/Range/Age at Baseline: mean 64 (SD 4.5) Race: white: 65% Systolic BP: 145 Diastolic BP: 88 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 81 Kg % 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 60-85, mild diastolic hypertension, modestly overweight (115% of ideal body weight), a Folstein Mini-Mental State score > 22 out of 30, adequate physical health, adequate vision, willingness to participate. Exclusion: MI within the past year, prior diagnosis of angina pectoris or congestive heart failure, stroke within the last year, other serious CVD, or diabetes . Other serious chronic illnesses; a random serum glucose concentration>= 12.2 mmol/L, a serum creatinine level of > 150 umol/L, and a serum cholesterol level of more than 6.85 mmol/L; serious physical handicaps; disorders that might affect the implementation of dietary interventions; or use of medications that could impact BP. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Intervention focused on calorie and sodium reduction with increases in moderate levels of physical activity Form of Administration: Dietary Modification: Individual and group sessions Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure, diet recall Best sodium measure recorded: 0, 2, 3, and 6 months. Sodium Status Intervention 1: 142.5 mmol/d  How was blood pressure measured? After a 5-minute rest at each clinic visit, BP was measured in triplicate in the seated position by trained staff using random zero sphygmomanometers. | Subgroup: Mild HTN, modestly overweight Diastolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -4.90 (95% CI: NC - NC) Systolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -4.20 (95% CI: NC - NC) |
| Arroll, 19954  Location: Australia  Setting: Community  Design: Randomized Factorial Design individual  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 87  Participants: % Male: 52 Mean Age/Range/Age at Baseline: mean 55 Race: NR Systolic BP: 144.6 Diastolic BP: 89.4 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: Essential hypertension with a SBP > 115 mm Hg or a DBP > 70 mm Hg (on medication); ages 20 - 69 years inclusive; a sedentary lifestyle and under the care of a primary care physician Exclusion: Symptomatic coronary heart disease, immobility that restricted walking; current DBP >105 mm Hg or a SBP greater > 180 mm Hg; regularly performing regular moderate physical activity. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: NR Form of Administration: Dietary Modification: Education and instruction on reducing salt in diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Exercise + salt restriction Description: NR Form of Administration: Other: Education and instruction on reducing salt in diet + physical activity Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times 3 months apart Sodium Status Intervention 1: median 107 mmol/24h Sodium Status Intervention 2: median 105.5 mmol/24h  How was blood pressure measured? BP measured using a Hawksley random zero sphygmomanometers. Three consecutive measurements taken and an average of the last two readings was used. | Subgroup: Treated hypertensive Diastolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -4.50 (95% CI: -8.24 - -0.76) Systolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -2.80 (95% CI: -9.04 - 3.44) |
| Australian National Health and Medical Research Council Dietary Salt Study Management Committee, 19895  Location: Australia  Setting: Community  Design: Randomized, parallel  Number of Sites: 2  Study Years: unclear | Study of: Adults N: 108  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 149.1 Diastolic BP: 91.4 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: 93 Mean Age/Range/Age at Baseline: 58.4 Race: NR Systolic BP: 152.8 Diastolic BP: 95.4 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: DBP at four run-in visits between 90 and 100 mm Hg, with no single measure above 110 mm Hg or below 85 mm Hg, and gave written informed consent. Exclusion: Being treated for hypertension, a secondary cause of hypertension, hypertension complications, evidence of other cardiovascular disease | Intervention Type(s):  Intervention 1: Other: Low sodium Description: NR Form of Administration: Other: placebo Dose: Diet containing less than 80 mmol sodium/day + 8 placebo pills daily Na/K ratio: 1.4 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Normal Sodium Description: 153 mmol/day Form of Administration: Sodium supplement Dose: Diet containing less than 80 mmol sodium/day + 8 slow-release sodium chloride [10 mmol] pills daily) Na/K ratio: 2.4 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times, every 2 weeks Sodium Status Intervention 1: 90 mmol/day Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 3 times, every 2 weeks Potassium Status Intervention 1: 71 mmol/day  How was blood pressure measured? Seated BP measurements were made after 5 min rest using a sphygmomanometry with oscillometric detection. A large cuff was applied to the left arm and four measurements were taken with intervals of 1 min. The first value was discarded and the mean of the other three measures were used. | Subgroup: Mild HTN Diastolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -2.80 (95% CI: -4.46 - -1.14) Systolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -5.50 (95% CI: -8.41 - -2.59) |
| Barcelo, 19936  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 57  Participants: % Male: 43.8 Mean Age/Range/Age at Baseline: mean 44 (SD 11) 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: 0 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Documented active calcium nephrolithiasis concomitant with an isolated hypocitraturic abnormality | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: Potassium tablets + advised to increased ingestion of fluids (2 to 3 1. a day) and reduced sodium intake Form of Administration: Oral potassium supplement Dose: 20 mEq. (4 tablets) potassium citrate 3 times a day right after meals. Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Placebo + advised to increased ingestion of fluids (2 to 3 1. a day) and reduced sodium intake Form of Administration: Placebo Dose: placebo tablets as potassium citrate groups and at the same dosage and schedule. Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 36 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Taken at baseline, at 3 months, 6 months, then every 6 months for the remainder of the 3 years Sodium, Method of Validation: Single 24-hour urine analysis with validation Best potassium measure recorded: Taken at baseline, at 3 months, 6 months, then every 6 months for the remainder of the 3 years Potassium Status Intervention 1: 3.36 mmol/day | Subgroup: Nethrolithiasis+hypocitraturia Decrease quality of life Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator RR 0.48 (95% CI: 0.05 - 5.03) Stone formation rate (number per patient year) Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -1.16 - -0.84) |
| Barros, 20157  Location: South America (Argentina, Brazil, Chile, and Colombia)  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 2012 | Study of: Adults N: 38  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 142.95 Diastolic BP: 86.79 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.38 % 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: 34.3 Mean Age/Range/Age at Baseline: mean 55.5 SD (7.4) Race: NR Systolic BP: 143.44 Diastolic BP: 91.19 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 31 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Hypertensive individuals between ages 20 and 65 years. Patients lived in the metropolitan region of Goiânia, Brazil, on stable doses of antihypertensive drugs for at least 30 days, with uncontrolled hypertension (BP \_ 140 x 90 mmHg) in their last visit. Exclusion: Acute or subacute (up to 3 months before the beginning) and unstable chronic diseases. Those having their meals prepared with a salt different from that provided in the study more than once a week. | Intervention Type(s):  Intervention 1: Other: Light salt Description: Instructed to consume only the provided salt throughout this study. Instructed to reduce sodium-rich food consumption throughout the study period. Form of Administration: Salt substitute Dose: 28 small plastic bags containing the daily amount of salt. Light salt composition (per gram) was as follows: 130 mg of sodium, 346 mg of potassium and 44 mcg of iodine Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Instructed to consume only the provided salt throughout this study. Instructed to reduce sodium-rich food consumption throughout the study period. Form of Administration: Usual diet Dose: 28 small plastic bags containing the daily amount of salt. Regular salt contained (per gram) 390 mg of sodium and 25 mcg of iodine. Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times 1 month apart Sodium Status Intervention 1: 127.11 mEq/day Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times 1 month apart Potassium Status Intervention 1: 48.05 mEq/day  How was blood pressure measured? Casual BP taken by the same researcher, at least three times and at 1-minute intervals, until the differences between the measurements were lower than 4 mmHg. The mean of the mean of the last two values was considered, obtained by using a semi-automatic digital device. | Subgroup: HTN on antihypertensives Diastolic BP-NS Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -6.80 (95% CI: -14.11 - 0.51) Systolic BP-NS Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -10.08 (95% CI: -22.23 - 2.07) Decreased quality of life Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) |
| Beard, 19828  Location: Australia  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 113  Intervention 1: % Male: 60 Mean Age/Range/Age at Baseline: Mean 48.4 Race: white: 100% Systolic BP: 142.3 Diastolic BP: 131.0 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 79.98 Kg % 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: 53 Mean Age/Range/Age at Baseline: mean 49.6 Race: white: 100% Systolic BP: 138.9 Diastolic BP: 86.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 77.81 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Individuals aged 25-69 years, receiving antihypertensive medication and who had a premedication DBP between 95 and 109 mm Hg and SBP under 200 mm Hg Exclusion: Women who were pregnant or taking an oral contraceptive. Men and women with severe intercurrent illness, serum creatinine >0-20 mmol/l, or history of antihypertensive medication for less than 3 months | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: No-added-sodium diet Form of Administration: Dietary Modification: No-added-sodium diet. Shopping guides, small group discussions, recipe exchanges, nutritional counseling Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual salt intake Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure, Patients answered a final questionnaire on lifestyle and health; the diet group reported compliance and future intentions. Best sodium measure recorded: 5 times, at baseline, 2, 4, 6, and 11 weeks. Sodium Status Intervention 1: 37.0 mmol/24h Potassium measure: Single 24-hour urine analysis without validation, Patients answered a final questionnaire on lifestyle and health; the diet group reported compliance and future intentions. Best potassium measure recorded: 5 times, at baseline, 2, 4, 6, and 11 weeks. Potassium Status Intervention 1: 79.9 mmol/24h  How was blood pressure measured? Casual sitting BP (average of two readings) was measured to the closest 2 mm Hg with the Hawksley random-zero machine, using a 13 cm x 35 cm bag and the 5th-phase DBP. These readings were taken by one of two nurses whose results had shown good agreement and internal consistency in practice sessions. | Subgroup: HTN on antihypertensives Diastolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -1.30 (95% CI: -5.04 - 2.44) Systolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -1.80 (95% CI: -8.63 - 5.03) Average drug consumption (number of pills per day) relative to baseline Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -0.50 (95% CI: NC - NC) Failed to stop or reduce medication Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator RR 3.75 (95% CI: 1.94 - 7.27) |
| Becerra-Tomas, 20159  Location: Spain  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14 days  Study Years: 2013-2014 | Study of: Adults N: 24  Participants: % Male: 43 Mean Age/Range/Age at Baseline: 48 Race: NR Systolic BP: 136 Diastolic BP: 85 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.31 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 18 to 65 ; BMI; SBP ranging 20-159 mm Hg, or DBP between 80 -99 mm Hg; and daily consumption of bread. Exclusion: Severe hypertension; antihypertensive medication, diabetes or another endocrine disease, significant renal or hepatic disease; alcohol, drug, or tobacco abuse; pregnancy or plans to be pregnant, weight loss >5 kg in the previous 3 months; a vegetarian diet or other dietary restrictions related to disease control; previous atherosclerotic disease or target organ damage; use of dietary supplements, mineral or vitamin complexes, or sterols. The presence of any medical conditions that may affect participation in the study. | Intervention Type(s):  Intervention 1: Other: (LSB) low-sodium wheat bread enriched in potassium Description: NR Form of Administration: Dietary Modification: NR Dose: Bread with 0.4 g of potassium citrate Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: (LSB\_+\_G) low-sodium wheat bread rich in potassium, GABA, and ACEI peptides Description: NR Form of Administration: Dietary Modification: NR Dose: Bread with low-sodium chloride (1 g/100 g) wheat bread enriched with 0.4 g of potassium citrate and containing 22.8 mg/100 g of GABA Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: (CB) conventional wheat bread Description: NR Form of Administration: Dietary Modification: NR Dose: Bread with 1.4 g/100 g of sodium chloride Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: baseline, before and after each intervention period Sodium, Method of Validation: Intervention compliance determined by recording the bread consumed by each participant, 3 day diet records, Single 24-hour urine analysis with validation Sodium Status Intervention 1: NR Sodium Status Intervention 2: NR Best potassium measure recorded: baseline, before and after each intervention period Potassium, Method of Validation: Intervention compliance determined by recording the bread consumed by each participant, 3 day diet records Potassium Status Intervention 1: NR Potassium Status Intervention 2: NR  How was blood pressure measured? Measurements were taken between 8:00 a.m. and 10:00 a.m. SBP and DBP were measured in both arms while patients were using a validated oscillometer. Measurements were taken in triplicate with between 1-minute intervals. The first measurement was thrown out and the average of the other 2 was recorded. The arm with the highest value was used in the study. | Subgroup: Hypertensives Diastolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -1.49 (95% CI: -3.86 - 0.88) Comparison: Intervention 1 vs Intervention 2 MD -1.04 (95% CI: -3.21 - 1.13) Comparison: Intervention 2 vs Comparator MD -0.45 (95% CI: -2.71 - 1.81) Systolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -1.01 (95% CI: -4.39 - 2.37) Comparison: Intervention 1 vs Intervention 2 MD -0.58 (95% CI: -3.76 - 2.60) Comparison: Intervention 2 vs Comparator MD -0.43 (95% CI: -3.96 - 3.10) |
| Beckmann, 199510  Location: Norway  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: unclear | Study of: Adults N: 64  Participants: % Male: 100 Mean Age/Range/Age at Baseline: Range: 40-56 Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.7 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Otherwise healthy middle aged men with never-treated hypertension | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: The goal was a daily intake of sodium chloride of approximately 100 mmol. Form of Administration: Dietary Modification: Subjects instructed on a diet to reduce sodium. For the first 2 weeks they were provided with free food to help with diet compliance Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: BP Control group Description: No dietary advice was given Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: 12 months | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: Taken once for control groups at baseline. Taken at baseline and 12 months for intervention group Sodium Status Intervention 1: 123 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: Taken at baseline, weeks 1,2,3 months, 6 months, 12 months Potassium Status Intervention 1: 90 mmol/24 h  How was blood pressure measured? BP measurements were taken on the right arm using an oscillometric device. In the study sample, this semiautomatic BP monitor measured SBP and DBP on average 3.5 and 2.0 mm Hg lower than a mercury sphygmomanometer, but without examiner bias. BP recordings were made after 9 and 10 min in the supine position, and also after 9 and 10 min of standing. The mean of the two blood pressure recordings at 9 and 10 min was used for analysis. | Subgroup: HTN MBP-supine Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -8.00 (95% CI: -11.16 - -4.84) |
| Berry, 201011  Location: UK  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: >=35 days  Study Years: 2004-2005 | Study of: Adults N: 48  Participants: % Male: 52.1 Mean Age/Range/Age at Baseline: Men: mean 45.5 (SD 10.6); Women: mean 44.8 (SD 8.2) Race: Men: White 70%; Women: White 52% Systolic BP: Men: 139.4; Women: 136 Diastolic BP: Men: 88; Women 89.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Men: 27.7; Women: 29.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Seated DBP . 80 and , 100 mmHg on two occasions Exclusion: Clinical history of MI, diabetes mellitus, renal disease, diabetes mellitus, gastrointestinal disease, pancreatitis, cholestatic liver disease or cancer; current use of systemic corticosteroids, androgens, phenytoin, erythromycin, thyroid hormones, lipid lowering, BP-lowering or anticoagulant medication; cigarette smoking; history of substance abuse or alcoholism or alcohol intake exceeding a moderate intake. Pregnancy or having had a baby in the last year; allergy or intolerance to intervention foods; unwillingness to refrain from the use of dietary supplements; weight loss. 3 kg in the last 2 months; BMI< 20 and > 35 kg/m2; and BP and other risk factors that make them eligible for drug treatment of raised BP according to the British Hypertension Society guidelines | Intervention Type(s):  Intervention 1: Other: Increased Fruits and Vegetables Description: An extra 20 or 40 mmol Kþ/d from fruit and vegetables Form of Administration: Dietary Modification: Extra fruit and vegetable Dose: NR Na/K ratio: 1.9 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 40 mmol potassium citrate capsules/d Na/K ratio: 1.5 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Participants asked not to change their usual diet Form of Administration: Placebo Dose: NR Na/K ratio: 2.3 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium Status Intervention 1: 116 mmol/d Sodium Status Intervention 2: 113 mmol/d Potassium measure: Single 24-hour urine analysis without validation, Food diaries without reported validation Best potassium measure recorded: 2 times, in week 3 of the run-in period and week 5-6 of the treatment period. Potassium Status Intervention 1: 75 mmol/d Potassium Status Intervention 2: 87 mmol/d  How was blood pressure measured? Measured over 24 h using an A&D TM-2430 device. BP was measured at 30 min intervals during the day and hourly during the night, and the patients maintained a record of the activities of the recording period. | Subgroup: Hypertensives DBP clinical Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD 1.00 (95% CI: -1.20 - 3.20) Comparison: Intervention 1 vs Comparator MD 0.30 (95% CI: -1.90 - 2.50) Comparison: Intervention 2 vs Comparator MD -0.30 (95% CI: -2.20 - 1.60) SBP clinical Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD 1.90 (95% CI: -1.60 - 5.40) Comparison: Intervention 1 vs Comparator MD 0.70 (95% CI: -2.80 - 4.20) Comparison: Intervention 2 vs Comparator MD -1.50 (95% CI: -4.30 - 1.30) |
| Braschi, 200812  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 114  Intervention 1: % Male: 19.2% Mean Age/Range/Age at Baseline: mean 36.9 (SEM 2.8) Race: Caucasian 76.9%; Middle-Eastern 7.7%; East Asian 7.7%; Afro-Caribbean 7.7% Systolic BP: 114.67 Diastolic BP: 70.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 43.3 Mean Age/Range/Age at Baseline: mean 36.2 (SEM 2.6) Race: Caucasian 86.7%; Middle-Eastern 6.7%; East Asian 6/7%; Systolic BP: 111.88 Diastolic BP: 69.49 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.5 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 41.2 Mean Age/Range/Age at Baseline: mean 33.8 (SEM 2.2) Race: Caucasian 67.6%; Middle Eastern 14.7%; East Asian 14.7%; Afro-Caribbean 2.9% Systolic BP: 107.84 Diastolic BP: 66.33 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 22.55 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 22 - 65 years, BMI between 19 and 35 kg/m2 , an alcohol consumption of <= 21 units/week (women), <= 28 units/week (men), SBP <= 160 and DBP<= 105 mmHg at screening Exclusion: CVD (including cardiac arrhythmia), diabetes, renal diseases, metabolic acidosis and digestive problems. Those taking anti-hypertensive drugs, cyclosporin, heparin, digoxin, anticholinergics and non-steroidal anti-inflammatory drugs. Patients who, during the study period changed either their usual diet or lifestyle and those undergoing changes in psychical condition (stress, depression, tiredness) were excluded and those with poor compliance. | Intervention Type(s):  Intervention 1: Other: KCL supplement Description: NR Form of Administration: Oral potassium supplement Dose: two capsules, 3 times per day with 5 mmol potassium Na/K ratio: 1.55 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: K-cit supplement Description: NR Form of Administration: Oral potassium supplement Dose: two capsules, 3 times per day with 5 mmol potassium Na/K ratio: 1.66 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: placebo Na/K ratio: 1.93 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times 6 weeks apart Sodium Status Intervention 1: 122.92 mmol/d Sodium Status Intervention 2: 153.48 mmol/d Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times 6 weeks apart Potassium Status Intervention 1: 89.58 mmol/d Potassium Status Intervention 2: 98.17 mmol/d  How was blood pressure measured? BP was measured around the same time of the day by the same observer using the same instruments throughout the study. Participants were asked to maintain the same habits before each appointment. BP was assessed in the seated position in the left arm after a 10 min rest using a clinically validated semi-automated oscillometric sphygmomanometer. Three readings were taken at 2 min intervals and the values for SBP were then averaged, the reading that had the greatest difference from the mean was discarded together with the corresponding DBP and pulse measurement, and the average of the two remaining readings used for analysis. | Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 2 vs Comparator MD -4.26 (95% CI: -6.31 - -2.21) Comparison: Intervention 1 vs Comparator MD -4.30 (95% CI: -6.39 - -2.20) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 2 vs Comparator MD -6.69 (95% CI: -8.85 - -4.43) Comparison: Intervention 1 vs Comparator MD -5.24 (95% CI: -7.43 - -3.06) |
| Bulpitt, 198513  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 33  Intervention 1: % Male: 43 Mean Age/Range/Age at Baseline: 56.1 Race: NR Systolic BP: Untreated: 199 Diastolic BP: Untreated: 122 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: 47 Mean Age/Range/Age at Baseline: mean 54.2 (SE 1.9) Race: NR Systolic BP: Untreated: 190 Diastolic BP: Untreated: 133 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: Hypertensive, using a potassium losing diuretic Exclusion: Using a potassium-sparing diuretic, plasma urea had ever been greater than 9.9 mmol/1 or plasma potassium > 5 mmol/1. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 8 Slow K tablets daily (64 mmol of slow release potassium) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet and drug treatment Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NA | Sodium Status Intervention 1: 149 Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1, Food diaries without reported validation Best potassium measure recorded: 2 times, 3 months apart Potassium Status Intervention 1: 95  How was blood pressure measured? Measured 2 times, 3 months apart. BP was measured standing and lying by attending physicians and by the research team using the London School of Hygiene (LSH) sphygmomanometer (10) and measuring systolic, diastolic (IVth) and diastolic (Vth) after 3 minutes standing and 5 minutes lying. | Subgroup: Hypertensive on K-losing diuretics Diastolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD 4.80 (95% CI: -3.11 - 12.71) Reduced quality of life (indigestion) Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 0.74 (95% CI: 0.05 - 10.79) Systolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD 2.30 (95% CI: -15.16 - 19.76) Significant changes in blood cholesterol Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) Significant changes in blood glucose Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) |
| Bulpitt, 198414  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 65  Intervention 1: % Male: 34.4 Mean Age/Range/Age at Baseline: Mean 54.5 Race: NR Systolic BP: 158 Diastolic BP: 103 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 77.1 Kg % 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: 54.5% Mean Age/Range/Age at Baseline: 54.6 Race: NR Systolic BP: 169 Diastolic BP: 100 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 80.1 kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: All patients were attending the Hammersmith Hospital Hypertension Clinic agents and had been treated on a long term basis with a variety of agents. The inclusion criterion was unsatisfactory BP control defined as a standing DBP > 95 mm Hg on two successive occasions despite drug treatment | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Dietary advice for a 1 g Na (44 mmol) daily diet. A salt substitute, KCL, was also given. Form of Administration: Dietary Modification: Dietary advice, salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 48 hour urine analysis; Questionnaire on diet Best sodium measure recorded: 2 times, at baseline and at 3 months Sodium Status Intervention 1: 204 mmol/48-h  How was blood pressure measured? Measurements were taken both lying and standing by the attending physician and by the research team using the London School of Hygiene (LSH) sphygmomanometer and measuring SBP, DBP to the Korotkoff's 4th and 5th phase after five minutes lying and three minutes standing | Subgroup: HTN on antihypertensives Decreased quality of life Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD 0.07 (95% CI: NC - NC) Diastolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -2.10 (95% CI: -7.82 - 3.62) Systolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -6.10 (95% CI: -17.47 - 5.27) Percent of people with major decrease in drug therapy Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 3.01 (95% CI: 0.13 - 72.03) |
| Calabrese, 198515  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The Massachusetts Blood Pressure Study, Part 3  Number of Sites: multiple  Study Years: 1979 | Study of: Children N: 102  Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 99.6 Diastolic BP: 57.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Males: 34 kg; Females: 29.8 kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 99.4 Diastolic BP: 57.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Male: 36.3 kg; Female 33.6 kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 99.3 Diastolic BP: 57.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Male: 34.3 kg; Female: 32.5 kg % with Hypertension: NR % 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: NR 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: Children in fourth grade, children's' parents consent | Intervention Type:  Arm 1: Other: Low sodium water Description: NR Form of Administration: Dietary Modification: Low sodium water Dose: Low sodium water contained 10 mg/L Na Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Arm 2: Other: Low sodium water with added sodium Description: NR Form of Administration: Dietary Modification: Low sodium water with added sodium Dose: Low sodium water + added sodium such that it contained 110 mg/L Na Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Arm 3: Other: High sodium water Description: NR Form of Administration: Dietary Modification: High sodium water Dose: High sodium water contained 110 mg/ L Na Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: 2 day food records; Partial or spot urine with validated prediction equation Best sodium measure recorded: Collected at 0,1,2,3 months Sodium, Method of Validation: To measure compliance parents completed a questionnaire at two-week intervals, reporting how their child adhered to the bottled water regimen during that period. Sodium Status Arm 1: Males: 127.2 mEq; Females 128.6 mEq Sodium Status Arm 2: Males 127.6 mEq; Females 135.8 mEq Sodium Status Arm 3: Males 123.2 mEq; Females 109.0 mEq Potassium measure: Partial or spot urine without validated prediction equation, 2 day food records Best potassium measure recorded: Collected at 0,1,2,3 months Potassium, Method of Validation: To measure compliance parents completed a questionnaire at two-week intervals, reporting how their child adhered to the bottled water regimen during that period. Potassium Status Arm 1: Males 36.8 mEq; Females 32.2 mEq Potassium Status Arm 2: Males 42.4 mEq; Females 36 mEq Potassium Status Arm 3: Males 33.6 mEq; Females 34.9 mEq  How was blood pressure measured? Patients sitting casually and BP on the left arm was taken at each station by a nurse using a mercury sphygmomanometer. The pressure was raised approximately 30 mm Hg higher than the point at which the pulse disappeared and then released at a rate of 2 to 3 mm Hg/ sec. SBP was taken at the point where two consecutive Korotkoff sounds were audible and DBP at the disappearance of sound. | Subgroup: Girls Diastolic BP-sitting Follow-Up Time: 3 months Comparison: Arm 1 vs Arm 4 MD -5.45 (95% CI: -10.53 - -0.37) Systolic BP-sitting Follow-Up Time: 3 months Comparison: Arm 1 vs Arm 4 MD -1.50 (95% CI: -5.61 - 2.61)  Subgroup: Boys Diastolic BP-sitting Follow-Up Time: 3 months Comparison: Arm 1 vs Arm 4 MD 1.45 (95% CI: -3.05 - 5.95) Systolic BP-sitting Follow-Up Time: 3 months Comparison: Arm 1 vs Arm 4 MD 0.35 (95% CI: -3.30 - 4.00) |
| Cappuccio, 200616  Location: Ghana  Setting: Community  Design: Cluster RCT Parallel  Number of Sites: multiple  Study Years: 2001-2002 | Study of: Adults N: 1013  Intervention 1: % Male: 38 Mean Age/Range/Age at Baseline: mean 54 (SD 11) Race: NR Systolic BP: 129 Diastolic BP: 77 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 21 % with Hypertension: 154 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 38 Mean Age/Range/Age at Baseline: mean 55 (SD 11) Race: NR Systolic BP: 127 Diastolic BP: 76 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 21 % with Hypertension: 28 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Health education programme at the village level Form of Administration: Dietary Modification: Village education program to reduce sodium intake Dose: NR Na/K ratio: 2.2 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: 1.9 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times, 3 months apart Sodium Status Intervention 1: 91.8 mm/24 h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 3 times, 3 months apart Potassium Status Intervention 1: 48.2 mm/24 h  How was blood pressure measured? BP was measured by a fieldworker | Diastolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD 2.70 (95% CI: 0.73 - 4.67) Systolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -0.50 (95% CI: -4.22 - 3.22) |
| Chang, 200617; Tsai, 199618  Location: Taiwan  Setting: Veteran retirement home  Design: Cluster RCT Parallel  Number of Sites: multiple  Study Years: 1995-1999 | Study of: Adults N: 1981  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: Kitchen 2: mean 75.6 (SD 7.7);mean 74.8 (SD 7.0) Race: NR Systolic BP: 131.3 Diastolic BP: 71.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.3 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 100 Mean Age/Range/Age at Baseline: Kitchen 1: mean 74.8 (SD 7.3); Kitchen 4: 74.7 (SD 6.7); Kitchen 5: 74.6 (SD 6.1) Race: NR Systolic BP: 130.7 Diastolic BP: 71.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23 % with Hypertension: 40.4 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR Exclusion: High serum creatinine concentrations, sharing kitchens | Intervention Type(s):  Intervention 1: Other: Kitchen used potassium salt Description: NR Form of Administration: Salt substitute Dose: potassium-enriched salt was composed of 49% sodium chloride, 49% potassium chloride, and 2% other additives, Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Kitchen used regular salt Description: NR Form of Administration: Regular Salt Dose: regular salt was composed of 99.6% sodium chloride and 0.4% other additives Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 31 month Exposure to Follow Up Time: NR | Sodium Status Intervention 1: 1.22 sodium-creatinine ratio Potassium measure: Food Diaries discuss, Potassium Status Intervention 1: 0.48 potassium-creatinine Mortality Outcomes-Method of Ascertainment: Death certificate CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Death certificate reports | CHD mortality Follow-Up Time: 31 months Comparison: Intervention 1 vs Comparator RR 1.41 (95% CI: 0.64 - 3.07) CVD mortality (hypertension, ischemic heart disease, cerebrovascular disease, heart failure, diabetes) Follow-Up Time: 31 months Comparison: Intervention 1 vs Comparator RR 1.55 (95% CI: 1.00 - 2.40) Total number of deaths Follow-Up Time: 31 months Comparison: Intervention 1 vs Comparator RR 1.03 (95% CI: 0.88 - 1.20) |
| Charlton, 200819  Location: South Africa  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: 2004-2005 | Study of: Adults N: 92  Intervention 1: % Male: 17.5% Mean Age/Range/Age at Baseline: mean 61.8 (SD 6.6) Race: Black: 100% Systolic BP: 133.9 Diastolic BP: 79.8 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 32.9 % 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: 15% Mean Age/Range/Age at Baseline: mean 60.4 (SD 7.4) Race: Black: 100% Systolic BP: 135.4 Diastolic BP: 82.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 35.3 % 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 50–75 years, with medication-treated mild-to-moderate hypertension Exclusion: On two or more diuretics; on furosemide for cardiac failure; cerebral infarction or haemorrhage; renal impairment, consuming three or more alcoholic drinks a day; type 1 diabetes mellitus; impaired cognitive function; incontinence; and BMI >45kg/m2, severely uncontrolled hypertension. | Intervention Type(s):  Intervention 1: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Intervention foods were designed to provide 41% less sodium, 826 % more potassium, 388 % more calcium and 368 % more Magnesium Form of Administration: Dietary Modification: Patients provided food with lower salt, higher potassium content Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Patients were given food without the sodium composition unchanged Form of Administration: Other: Given food with regular sodium content Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times, 4 weeks apart Sodium, Method of Validation: Completeness of 24 h urine collection was assessed as with sex specific urinary creatinine values., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 154.3 mmol/24h Best potassium measure recorded: 3 times, 4 weeks apart Potassium, Method of Validation: Completeness of 24 h urine collection was assessed as with sex specific urinary creatinine values. Potassium Status Intervention 1: 71.7 mmol/24h  How was blood pressure measured? Resting office BP measured following American Heart Association Recommendations using a validated automated method with pre-set inflation (Omron M4-I BP monitor). BP was measured three times on each occasion and the mean of the second and third measurements was used for analyses. | Subgroup: Mild to moderate hypertension 24h Ambulatory DBP Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -2.49 (95% CI: -5.16 - 0.17) 24h Ambulatory SBP Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -4.53 (95% CI: -9.05 - -0.01) Stroke Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator RR 0.34 (95% CI: 0.01 - 8.14) |
| China Salt Substitute Study Collaborative, 200720; Hu, 200921  Location: China  Setting: Community  Design: Randomized, parallel  Number of Sites: 39  Study Years: 2004-2005 | Study of: Adults N: 608  Intervention 1: % Male: 48 Mean Age/Range/Age at Baseline: mean 59 (SD 10) Race: NR Systolic BP: 159 Diastolic BP: 93 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 42 Mean Age/Range/Age at Baseline: mean 61 (SD 9.7) Race: NR Systolic BP: 159 Diastolic BP: 93 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: High risk of future vascular disease based on a physicians diagnosis of any of : coronary, cerebral or peripheral vascular disease, diabetes and aged 55 years or older or a SBP > 160 mmHg. Estimated daily sodium intake > 260 mmol/day. Exclusion: Established clear indication for, or contra-indication to, using the study salt substitute (e.g. potassium-sparing medication or significant renal impairment). Since members might be cooking for families, potential contra-indicators of family members were considered for exclusion. Blood test result considered by the responsible doctor to be possibly abnormal. | Intervention Type(s):  Intervention 1: Use of potassium product as salt (sodium) substitute to reduce sodium intake Description: NR Form of Administration: Salt substitute Dose: Salt substitute was 65% sodium chloride, 25% potassium chloride and 10% magnesium sulphate Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Regular salt Description: NR Form of Administration: Regular Salt Dose: normal salt, 100% sodium chloride Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: Partial or spot urine with validated prediction equation Best sodium measure recorded: Measured at registration, randomization, and 6 and 12-month visits. Concentrations were measured using either the ion selective electrode method or atomic absorption spectrophotometry. Sodium Status Intervention 1: Difference of 8.0 mmol between the salt substitute and regular salt group (p>0.05) Potassium measure: Partial or spot urine with validated prediction equation\_1 Best potassium measure recorded: Measured at registration, randomization, and 6 and 12-month visits. Concentrations were measured using either the ion selective electrode method or atomic absorption spectrophotometry. Potassium Status Intervention 1: Difference of 7.2 mmol between the salt substitute and regular salt group (p<0.05)  How was blood pressure measured? BP was measured using an Omron HEM-770A automatic sphygmomanometer. It was recorded in the right arm with participants seated at rest for at least 5 min beforehand. The average of two measurements made at least two minutes apart was used. | CVD events (non-specified) Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator RR 0.63 (95% CI: 0.21 - 1.91) Deaths Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator RR 1.01 (95% CI: 0.26 - 4.01) Diastolic BP-sitting Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -2.80 - -0.80) Hyperkalemia Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) Systolic BP-sitting Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -5.40 (95% CI: -8.50 - -2.30) |
| Cobiac, 199222  Location: Australia  Setting: Community  Design:  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 114  Intervention 1: % Male: 69.2 Mean Age/Range/Age at Baseline: 67 (SEM +- 1) Race: NR Systolic BP: 132 Diastolic BP: 77 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 1: NR % Male: 64 Mean Age/Range/Age at Baseline: 67 (SEM +- 1) Race: NR Systolic BP: 135 Diastolic BP: 78 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 64 Mean Age/Range/Age at Baseline: 66 (SEM +-1) Race: NR Systolic BP: 133 Diastolic BP: 78 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 2: NR % Male: 66.7 Mean Age/Range/Age at Baseline: 67 (SEM 1) Race: NR Systolic BP: 130 Diastolic BP: 75 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR Exclusion: Taking blood pressure medication, history of renal or liver disease, unstable heart, hypercholesterolaemia, DBP>105, BMI>30, smoked 20 or more cigarettes per day, drank 40g of alcohol per day, exercised erratically, institutionalized, had no control over food preparation. | Intervention Type(s): Intervention 1: Other: Low-Sodium Intake - Sunflower Oil Description: 'Low' sodium intake. Subjects are on a low sodium diet. This group is given placebo to keep them at low sodium intake Form of Administration: Placebo Dose: 8 Placebo tablets per day consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Other: Normal-Sodium Intake - Sunflower Oil Description: 'Normal' sodium intake. Subjects are on a low sodium diet. This group is given supplements to raise their sodium to normal levels. Form of Administration: Sodium supplement Dose: 4800 mg/d sodium consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Low Sodium Intake - Fish Oil Description: 'Low' sodium intake. Subjects are on a low sodium diet. This group is given placebo to keep them at low sodium intake Form of Administration: Other: placebo Dose: placebo consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 2: Other: Normal Sodium Intake - Fish Oil Description: 'Normal' sodium intake. Subjects are on a low sodium diet. This group is given supplements to raise their sodium to normal levels. Form of Administration: Sodium supplement Dose: 4800 mg/d sodium consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NA | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times 2 weeks apart Sodium, Method of Validation: Regular feedback of the results of urinary sodium analysis, counting unused tablets and capsules. Sodium Status Intervention 1: 79 mmol/day Sodium Status Comparator 1: 152 mmol/day Sodium Status Intervention 2: 70 mmol/day Sodium Status Comparator 2: 145 mmol/day  How was blood pressure measured? Every 2 weeks, same time of date with an automated sphygmomanometer (Dinamap model 845XT) after individuals had been sitting quietly for 5 min or more. It was requested that subjects had an empty bladder and to avoid eating and exercise for 2 H prior. SBP, DBP determined through 5 readings at 1 min intervals (first was discarded). | Diastolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator 1 MD 0.80 (95% CI: -1.16 - 2.76) Systolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator 1 MD -1.70 (95% CI: -5.87 - 2.47) |
| de Brito-Ashurst, 201323  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: 2008-2009 | Study of: NR N: 56  Intervention 1: % Male: 56 Mean Age/Range/Age at Baseline: mean 55.7 (SD 15.1) Race: Bangladesh: 100% Systolic BP: 149.3 Diastolic BP: 85 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: 17 % with Kidney disease: 100 % with history of Kidney stones: NR  Comparator: % Male: 61 Mean Age/Range/Age at Baseline: mean 60.7 (SD 12) Race: Bangladesh: 100% Systolic BP: 156 Diastolic BP: 85 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.1 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: 14 % with Kidney disease: 100 % with history of Kidney stones: NR  Inclusion: Estimated glomerular filtration rate (eGFR) <60 mL/min and mean SBP >130/80 mm Hg on at least 2clinic visits or taking antihypertensive medication. Exclusion: Patients on dialysis, those with a BMI <20 or >35 kg/m2, urinary incontinence, or cognitive impairment. Mental problems impairing their ability to participate were excluded | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Tailored low-salt diet, educational, community sessions Form of Administration: Dietary Modification: Tailored low-salt diet, educational, community sessions Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Low sodium general dietary advice sheet sent by post with the physician’s letter Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times 6 months apart Sodium Status Intervention 1: 138 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times 6 months apart  How was blood pressure measured? BP was taken using TM-2430-13 devices. Daytime measures were taken at 30 min intervals, night-time measures every 60 min. BP collected 2 times 1 time at baseline then at 6 months post intervention | Subgroup: Chronic kidney disease (CKD), eGFR< 60 mL/min, Asian 24h Ambulatory DBP-night time Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -4.00 (95% CI: -9.00 - -1.00) 24h Ambulatory SBP-daytime Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -9.00 (95% CI: -13.00 - -5.00) Deaths Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) |
| Dodson, 198924  Location: US  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 34  Intervention 1: % Male: 71 Mean Age/Range/Age at Baseline: mean 61.9 (SD 7.5) Race: NR Systolic BP: 179 Diastolic BP: 98 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 100 % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 65 Mean Age/Range/Age at Baseline: mean 61.1 (SD 6.3) Race: NR Systolic BP: 174 Diastolic BP: 100 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 100 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Patients with type II diabetes with no past or current history of treatment with insulin. Three consecutive hypertensive BP readings (defined by the SBP > 160 mm Hg or DBP >95 mm Hg) in an established diabetic. Exclusion: Evidence of diabetic or hypertensive nephropathy, pregnancy, and cardiac failure. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Moderate sodium restriction Form of Administration: Dietary Modification: Patients advised not to add salt at the table or in cooking and the avoidance of heavily salted foods Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Patients instructed to continue with their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: During run in period then at 1, 2, 3 months Sodium Status Intervention 1: 136.8 mmol/24h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: During run in period then at 1, 2, 3 months Potassium Status Intervention 1: 63.9 mmol/24h  How was blood pressure measured? BP was taken in the supine and erect positions (after 5 and two minutes' rest, respectively) with a Hawksley random zero sphygmomanometer. All readings were taken by a separate "blind" observer, DBP was recorded at Korotkoff phase V. When the mid-arm circumference was less than 33 cm A standard width cuff (14 cm) was used ; for larger circumferences a 19 cm cuff was used. | Subgroup: Mild HTN, Diabetes Diastolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -2.80 (95% CI: -8.48 - 2.88) Systolic BP-supine Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -7.10 (95% CI: -19.11 - 4.91) |
| Dubbert, 199525  Location: US  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 122  Participants: % Male: NR Mean Age/Range/Age at Baseline: mean 62 (SD 8.8) Race: black: 54% Systolic BP: 142.3 Diastolic BP: 85.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.1 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: VA enrollees; diagnosis of essential hypertension, a stable DBP such that patients were not expected to need a change in medications for 3 months and urine Na excretion 1> 100 millimoles (mmol)/24 hours Exclusion: Patients requiring immediate dietary intervention for diabetes or other conditions. Patients judged by their primary care provider to be unlikely to benefit from the dietary intervention because of current alcohol abuse, psychosis, or organic brain disease | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Goal is to achieve a 87 mmol/day reduced sodium diet Form of Administration: Dietary Modification: A single session of individualized instruction for 87 mmol/day reduced sodium diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: NR Description: Goal is to achieve a 87 mmol/day reduced sodium diet Form of Administration: Dietary Modification: A single session of individualized instruction for a 87 mmol/day reduced sodium diet + a means of estimating urine electrolyte excretion at home Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: NR Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure, 24-hour diet recall Best sodium measure recorded: 2 times 3 months apart Sodium, Method of Validation: 24-hour "diet recall" Sodium Status Intervention 1: Change of - 55 mmol/24h: blacks, change of -25 mmol/24h whites [estimated - raw data not available] Sodium Status Intervention 2: Change of - 40 mmol/24h: blacks, change of -85 mmol/24h whites [estimated - raw data not available] Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 2 times 3 months apart  How was blood pressure measured? Sitting BP was measured | Diastolic BP-sitting Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -0.30 (95% CI: NC - NC) Comparison: Intervention 2 vs Comparator MD -0.70 (95% CI: NC - NC) Systolic BP-sitting Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -0.40 (95% CI: NC - NC) Comparison: Intervention 2 vs Comparator MD -2.40 (95% CI: NC - NC) |
| Ellison, 198926  Location: US  Setting: Community  Design:  Number of Sites: 2  Study Years: NR | Study of: NR N: 309  Intervention 1: % Male: 49.2 Mean Age/Range/Age at Baseline: mean 152.2 (SD 0.9) (males); mean 14.9 (SD 0.6) (females) Race: white: 80% (males); white (74%) (females) Systolic BP: 111.9 (males); 105.8 (females) Diastolic BP: 65.8 (males); 66.1 (females) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 141.2 Lb (males); 123.7 Lb (females) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 56.6 Mean Age/Range/Age at Baseline: mean 15.1 (SD 0.9) (Males); mean 14.9 (SD 0.6) (Females) Race: white: 78% (males); white: 75% (females) Systolic BP: 109.3 (males); 101.7 (females) Diastolic BP: 62 (males); 61.7 (females) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 142.7 Lb (males); 124.7 Lb (Females) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Students at participating highschools taking basic science courses | Intervention Type(s):  Intervention 1: NR Description: Change of food purchasing at boarding school to help lower salt intake Form of Administration: Dietary Modification: Food purchasing practices were modified and prepared with less salt Dose: NR Na/K ratio: 1.5 (males); 1.5 (females) Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: 1.9 (males); 1.9 (females) Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Composition of salt substitute with intervention/exposure adherence measure, 24-hour diet recall Best sodium measure recorded: 12 times, 1 time per week for the first 6 weeks, during 2 weeks in the winter and 4 weeks during spring Sodium, Method of Validation: Composition of potassium supplement with intervention/exposure adherence measure, 24-hour "diet recall" Sodium Status Intervention 1: 127.2 mEq (males); 83.8 mEq (females) Best potassium measure recorded: 12 times, 1 time per week for the first 6 weeks, during 2 weeks in the winter and 4 weeks during spring Potassium Status Intervention 1: 89.9 mEq (males); 63.5 mEq (females)  How was blood pressure measured? At the beginning of each school year, students were instructed on how to use of automatic devices BP measurements. Devices consisted of a Dinamap vital signs monitor (model 845 or 845-A) connected to an Apple II computer. On each occasion, three measurements of SBP and DBP were taken and recorded on a floppy disk.For each set of 3 BP recordings, the average of the second and third was taken | Subgroup: Male Diastolic BP Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD -1.19 (95% CI: -2.6 - .2) Systolic BP Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD -.94 (95% CI: -2.7 - .8)  Subgroup: Female Diastolic BP Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD -2.54 (95% CI: -4 - -1.1) Systolic BP Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD -2.55 (95% CI: -4.3 - -.8) |
| Flack, 200227  Location: US  Setting: Community  Design: Randomized Cross-over individual  Study Name: Study of Sodium and Potassium (SNaP)  Number of Sites: 2  Crossover: Length of washout period: 56 days  Study Years: unclear | Study of: Adults N: 112  Intervention 1: % Male: 37.5 Mean Age/Range/Age at Baseline: mean 40.3 (SD 8.2) Race: NR Systolic BP: 105.4 Diastolic BP: 69.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.2 % with Hypertension: NR % 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: NR 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: Native born US African-American , normal to high-normal BP. Sodium excretion of 140 mmol in pooled urine collections during screening after 6 weeks of dietary sodium intervention, and 70% adherence to study capsules (as assessed by pill count) during the dietary intervention phase. Exclusion: uncontrolled hypertension at their first eligibility visit, fasting serum glucose >=7.7 mmol/L, taking BP or cardiovascular medication either currently or within the past year, on medications for mental illness , taking more than 4 alcoholic drinks per day , consuming more than 7 restaurant meals per week, actively dieting or trying to lose weight, planning to travel extensively or move from the area, refusal to sign an informed consent form, refusing venipuncture, refusal to take study capsules, refusing to comply with overnight urine collections, otherwise refusing to comply with study protocol, and exhibiting higher than 140 mmol urinary sodium excretion after dietary sodium intervention in the 3 consecutive pooled overnight 8-hour urine collections | Intervention Type:  Intervention 1: Placebo Description: NR Form of Administration: Placebo Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Use of salt pills to increase sodium intake Description: The aim of the intervention was for patients to comply with a sodium intake of 75-80 Form of Administration: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Partial or spot urine with validated prediction equation, 3 consecutive pooled overnight 8-hour urine collections; 3 day food diet Best sodium measure recorded: collected 5 times over the study period Sodium Status Intervention 1: mean difference reported, reference group is placebo  How was blood pressure measured? BP measurement was done using a random zero sphygmomanometer with the bell of the stethoscope. After quietly sitting for 5 minutes with feet flat on the floor and legs uncrossed, the participant’s right arm was used to measure two sitting BP readings (with a 30-second interval between readings). | 24h ambulatory diastolic BP Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -0.74 (95% CI: -1.72 - 0.24) 24h ambulatory systolic BP Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -1.20 (95% CI: -2.33 - -0.07) |
| Franzoni, 200528  Location: Italy  Setting:  Design:  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 104  Intervention 1: % Male: 59.6% Mean Age/Range/Age at Baseline: mean 51 (SD 11) Race: NR Systolic BP: 154.4 Diastolic BP: 95 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.3 % 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: 65.3% Mean Age/Range/Age at Baseline: mean 53 (SD 12) Race: NR Systolic BP: 153.8 Diastolic BP: 96.4 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: established or newly diagnosed mild - moderate essential hypertension, Exclusion: Patients with SBP > 200 mmHg and suspected or defined secondary hypertension, coronary artery disease, valvular or primary myocardial heart disease, diabetes, dyslipidemia and arrhythmias | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 30 mmol/day per os of potassium aspartate supplementation Na/K ratio: 2.4 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Instructed to maintain a constant dietary sodium and potassium intake of throughout the study Form of Administration: Usual diet Dose: NR Na/K ratio: 3.2 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium Status Intervention 1: 196.2 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times 1 month apart Potassium Status Intervention 1: 81.6 mmol/24 h  How was blood pressure measured? Office BP and 24-h ambulatory BP were measured at baseline and after the 4 week intervention. Office BP was taken twice in the sitting position by a physician with a mercury sphygmomanometer. A 24-h ambulatory BP monitoring was performed using a SpaceLabs 90207 monitor. Measurements in the non-dominant arm were taken at 30-min intervals during the 24-h period and hourly means were calculated. Day time BP was defined as the mean value from 9:00 AM to 11:00 PM and the night time BP as the mean value from 11:30 PM to 6:00 AM. | Subgroup: Mild to moderate HTN Diastolic BP-24H AMB Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -6.60 (95% CI: -8.16 - -5.04) Systolic BP-24H AMB Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -5.70 (95% CI: -8.38 - -3.02) |
| Geleijnse, 199429  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: 1990-1992 | Study of: Adults N: 100  Intervention 1: % Male: 53 Mean Age/Range/Age at Baseline: mean 65.7 (SD 4.6) Race: NR Systolic BP: 158 Diastolic BP: 89.8 Magnesium: 5.4 mmol/24h Calcium: NR Other Minerals: NR Mean BMI: 27.1 % 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: 49% Mean Age/Range/Age at Baseline: 67.1 (4.5) Race: NR Systolic BP: 157.5 Diastolic BP: 90.8 Magnesium: 5.2 mmol/24h Calcium: NR Other Minerals: NR Mean BMI: 27.2 % 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 55-75 with SBP between 140 and 200 mm Hg or DBP between 85 and 110 mm Hg without antihypertensive treatment. Exclusion: History of MI, angina pectoris, diabetes mellitus, or impaired renal function (serum creatinine concentration > 200 ,umol/1) or on a salt restricted diet based on medical advice. | Intervention Type(s):  Intervention 1: NR Description: NR Form of Administration: Dietary Modification: Salt substitute for cooking + food made with salt substitute Dose: mineral salt (sodium: potassium: magnesium 8:6:1) to be used for cooking, and food prepared with mineral salt (d bread, cheese, luncheon meats, canned and instant soups, and smoked sausage) Na/K ratio: 1.3 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Regular salt group Description: NR Form of Administration: Regular Salt Dose: regular salt (sodium: potassium: magnesium 8:6:1) to be used for cooking, and food prepared with regular salt (bread, cheese, luncheon meats, canned and instant soups, and smoked sausage) Na/K ratio: 2.1 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 4 times 8 weeks apart Sodium Status Intervention 1: 116 mmol/24 h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 4 times 8 weeks apart Potassium Status Intervention 1: 97 mmol/24 h  How was blood pressure measured? BP was taken on the right arm by two investigators using an automatic device (Dinamap model 8100) and a 51 cm by 15 cm cuff while the patient was seated. After at least five minutes' rest four measurements were taken, the mean of last three were measurements was used. | Subgroup: Mild-moderate HTN Diastolic BP-sitting Follow-Up Time: 24 weeks Comparison: Intervention 1 vs Comparator MD -4.10 (95% CI: -4.57 - -3.63) Follow-Up Time:49 weeks Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -4.50 - 2.50) Systolic BP-sitting Follow-Up Time: 24 weeks Comparison: Intervention 1 vs Comparator MD -5.10 (95% CI: -5.84 - -4.36) Follow-Up Time:49 weeks Comparison: Intervention 1 vs Comparator MD 0.80 (95% CI: -4.50 - 6.00) |
| Gilleran, 199630  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 40  Intervention 1: % Male: 60% Mean Age/Range/Age at Baseline: 62.5 Race: NR Systolic BP: 163.2 Diastolic BP: 91.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.1 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 60% Mean Age/Range/Age at Baseline: mean 59.2 (SD 10.8) Race: NR Systolic BP: 169.6 Diastolic BP: 91.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 59.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 100 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Three consecutive hypertensive BP readings in with established diabetes including patients already taking one antihypertensive medication (provided that the medication had been discontinued for at least 1 month prior to the trial) Exclusion: Treatment with insulin, unstable or poor diabetic control, evidence of diabetic or hypertensive nephropathy (persistent proteinuria on Albustix, or raised serum creatinine concentration: 130 /xmol/1), pregnancy, cardiac failure, or a patient already consuming a low sodium diet | Intervention Type(s):  Intervention 1: NR Description: NR Form of Administration: Salt substitute Dose: salt substitute (Seltin) containing 50% sodium chloride, 40% potassium chloride, 10% magnesium sulphate Na/K ratio: 2.3 Magnesium: 4.2 Urinary excretion (24 h estimation) Calcium: NR Other Minerals: NR  Comparator: Other: Table salt Description: NR Form of Administration: Regular Salt Dose: Ordinary table salt Na/K ratio: 2.3 Magnesium: 3.7 Calcium: NR Other Minerals: NR  Duration: 9 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 0,1,2,3,6,9 months Sodium, Method of Validation: Checks of remaining allotted monthly supplies of Seltin or whole salt, Single 24-hour urine analysis with validation Sodium Status Intervention 1: 166.6 Urinary excretion (24 h estimation) Best potassium measure recorded: 0,1,2,3,6,9 months Potassium, Method of Validation: Checks of remaining allotted monthly supplies of Seltin or whole salt Potassium Status Intervention 1: 77.3 Urinary excretion (24 h estimation)  How was blood pressure measured? BP was measured in the supine and erect positions (after 5 min and 2 min rest respectively) with a Hawksley random zero sphygmomanometer. All readings were taken by a blinded observer, DBP was recorded at Korotkoff phase V. A standard width cuff (14 cm) was used with the midarm circumference was less than 33 cm, but for larger circumferences, a 19 cm cuff was used | Subgroup: Hypertensive Type II diabetics Diastolic BP-supine Follow-Up Time: 9 months Comparison: Intervention 1 vs Comparator MD 1.70 (95% CI: -5.77 - 9.17) Comparison: Intervention 1 vs Comparator MD -1.70 (95% CI: -9.17 - 5.77) Stroke Follow-Up Time: 9 months Comparison: Intervention 1 vs Comparator RR 0.33 (95% CI: 0.01 - 7.72) Comparison: Intervention 1 vs Comparator RR 3.00 (95% CI: 0.13 - 69.52) Systolic BP-supine Follow-Up Time: 9 months Comparison: Intervention 1 vs Comparator MD 21.50 (95% CI: 3.62 - 39.38) Comparison: Intervention 1 vs Comparator MD -21.50 (95% CI: -39.38 - -3.62) |
| Gillum, 198131; Prineas, 198032  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The Minneapolis Children's Blood Pressure Study  Number of Sites: multiple  Study Years: 1978 | Study of: Children N: 80  Intervention 1: % Male: 88 (Attenders) Mean Age/Range/Age at Baseline: mean 7.8 (SD 0.7) (Attenders) Race: NR Systolic BP: 110 (Attenders) Diastolic BP: 65 (Attenders) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.4 kg (Attenders) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 92 Mean Age/Range/Age at Baseline: 8 Race: NR Systolic BP: 115 Diastolic BP: 69 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.8 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Families providing consent, whose children had BP over the 95th percentile for age and sex | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Achieve sodium intake of 70 mEq sodium /day Form of Administration: Dietary Modification: Family Education Program Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, Composition of salt substitute with intervention/exposure adherence measure Best sodium measure recorded: Controls: At baseline and 1 year follow up, overnight urine was used. Cases: 4 times biweekly, then bimonthly for the rest of the 1 year study period. 24 hour urine collection used Sodium Status Intervention 1: 87 mmol/24h (Attenders)  How was blood pressure measured? SBP was measured in the right arm after 5 minutes rest with a random-zero mercury sphygmomanometer. One of four cuff bladder sizes was chosen based on arm circumference. The mean of 2 successive readings of SBP, fourth phase DBP, and fifth phase diastolic DBP were used | Subgroup: Children Diastolic BP-NS Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD 3.90 (95% CI: -5.10 - 12.90) Systolic BP-NS Follow-Up Time: 1 year Comparison: Intervention 1 vs Comparator MD 2.50 (95% CI: -1.19 - 6.19) |
| Graham, 201433  Location: UK  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14-28 days  Study Years: 2009-2010 | Study of: Adults N: 40  Participants: % Male: 80 Mean Age/Range/Age at Baseline: mean 54.8 (S.E.M 1.1) Race: NR Systolic BP: 140.6 Diastolic BP: 86.4 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: Ages 40–70 years; a 10-year cardiovascular disease risk >10% Exclusion: Fasting plasma glucose >= 7.0 mmol l^-1, serum potassium outside of 3.5–5.0 mmol I^-1, impaired renal function with estimated glomerular filtration rate <60 ml min 1 per 1.73 m^2, history of cardiovascular or cerebrovascular disease, a treated BP >140/90 mm Hg, women on oestrogen replacement therapy or oral contraceptives pill and pregnant or lactating women. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 64 mmol potassium chloride Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure, 4 day food diary Best sodium measure recorded: collected during washout period Sodium Status Intervention 1: 145.6 mmol/24h Potassium measure: Single 24-hour urine analysis without validation, 4 day food diary Best potassium measure recorded: collected during washout period Potassium Status Intervention 1: 103.9 mmol/24h  How was blood pressure measured? BP was measured in triplicate after 30 min of supine rest using an Omron M5-I automatic blood pressure monitor. The average of the second and third readings was calculated and used to represent the blood pressure at that visit. The BP taken at the second and forth visits were used in the statistical analysis as end-of-treatment blood pressure. | Subgroup: Hypertensives Diastolic bp Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -2.40 (95% CI: -5.70 - 0.90) Systolic bp Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -5.30 (95% CI: -9.30 - -1.30) |
| Grimm, 199034; Grimm, 198835  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: Minnesota Mount Sinai Hypertension Trial (MSHT)  Number of Sites: multiple  Study Years: 1984-1985 | Study of: Adults N: 287  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: mean 57.8 (SD 6.2) Race: NR Systolic BP: 124.7 Diastolic BP: 79.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.6 % 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: 100 Mean Age/Range/Age at Baseline: mean 57.5 (SD 6.5) Race: NR Systolic BP: 126.4 Diastolic BP: 80.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.4 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Males, aged 45-68, documentation of long term drug treatment for hypertension in Minneapolis. Currently taking one or two antihypertensive drugs with DBP<95 mm Hg on the first 2 clinic visits, and <90 mm Hg average for both visits. Exclusion: Treatment of hypertension for < 3.5 years, use of cardiovascular drugs, electrocardiographic evidence or clinical evidence of CVD, body weight >15% of the ideal weight, diet incompatible with lowering sodium intake, history of renal disease, documented poor compliance with antihypertensive treatments. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: Placebo pills + low sodium diet with a goal of < 80 mmol sodium per day Form of Administration: Oral potassium supplement Dose: 96 mmol microcrystalline potassium chloride - 12 capsules, per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Potassium pills + low sodium diet with a goal of < 80 mmol sodium per day Form of Administration: Placebo Dose: 12 placebo capsules per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 24 months Exposure to Follow Up Time: NR | Potassium measure: Partial or spot urine without validated prediction equation, Food diaries without reported validation Potassium Status Intervention 1: 40 mmol/8h | Subgroup: Hypertensive men Decreased quality of life (diarrhea) Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator RR 0.91 (95% CI: 0.69 - 1.21) Decreased quality of life (stomach pains) Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator RR 0.80 (95% CI: 0.55 - 1.17) Diastolic BP-NS Follow-Up Time: 28 months Comparison: Intervention 1 vs Comparator MD -0.60 (95% CI: NC - NC) Nausea Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator RR 1.16 (95% CI: 0.69 - 1.94) Percent resuming antihypertensives Follow-Up Time: 28 months Comparison: Intervention 1 vs Comparator RR 0.98 (95% CI: 0.79 - 1.21) Systolic BP-NS Follow-Up Time: 28 months Comparison: Intervention 1 vs Comparator MD -1.90 (95% CI: NC - NC) |
| Gu, 200136  Location: China  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Potassium and Protein Supplementation Study (PAPSS)  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 150  Intervention 1: % Male: 37.3 Mean Age/Range/Age at Baseline: 56.9 (SD 7.4) Race: NR Systolic BP: 136.9 Diastolic BP: 81.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 66.9 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 42.7 Mean Age/Range/Age at Baseline: 55 (SD 7.6) Race: NR Systolic BP: 134 Diastolic BP: 83 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.3 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 45-64. SBP 13-159 mmHg, DBP<95 mmHg OR SBP<160 mmHg AND DBP < 160 mmHg. Able to take potassium supplements in accordance with protocol Exclusion: blood pressure medication in the last 2 months, history of CVD, diabetes at any time, non-skin malignancy in the last 5 years, COPD, psychiatric disease, other life threatening illnesses. serum creatinine >=1.7 mg/dl or K+>=5.0 mmol/l at screening, alcohol use of >=21 drinks/week or >=40 g/day. Pregnancy, plans to move out of study area, or non-cooperation. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 3 0.5 g potassium chloride pills taken 3 times a day. Or 60 mmol potassium per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Other: Placebo Dose: 3 placebo pills taken 3 times a day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium Status Intervention 1: 185.7 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 3 at screening, Once at 6 weeks, then at 12 weeks Potassium, Method of Validation: Pill count Potassium Status Intervention 1: 54.2 mmol/24 h  How was blood pressure measured? Trained staff using Hawksley random zero sphygmomanometers. Taken on the right arm with appropriately sized cuffs after quietly sitting for 5 min. BP recorded three times at each screening, then at follow up visits at 6 and 12 weeks. | Subgroup: High normal Diastolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -0.10 (95% CI: -2.14 - 1.94) Systolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -3.70 (95% CI: -7.01 - -0.39) |
| He, 201537; He, 201538  Location: China  Setting: Community  Design: Cluster RCT Parallel  Number of Sites: multiple  Study Years: 2013 | Study of: Both adults and children N: 832  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 120.1 Diastolic BP: 76.5 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  Comparator: % Male: Children: 48. Adults: 48.5 Mean Age/Range/Age at Baseline: Children: mean 10.1 (SD 0.5). Adult: mean 43.8 (SD 12.2) Race: NR Systolic BP: 118.2 Diastolic BP: 75.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Children: 16.9. Adults: 24.9 % with Hypertension: Adults: 13.6 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Primary schools in urban Changzhi Exclusion: Schools in rural areas | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Salt education. Aim was to reduce salt intake by a minimum of 20%. Form of Administration: Dietary Modification: Salt education Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: No salt education Form of Administration: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3.5 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation, Families put all household salt in a Tupperware container, at the beginning of the trial and it was weighed during follow up. Best sodium measure recorded: 2 times 3.5 months apart Sodium Status Intervention 1: Children: 112.2 mmol/24h; Adults: 178.5 mmol/24h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 2 times 3.5 months apart Potassium Status Intervention 1: Children: 25.3 mmol/24h; Adults: 38.1 mmol/24h  How was blood pressure measured? BP Measured using a validated automatic blood pressure monitor (Omron HEM-7301-IT, Amsterdam) with an appropriately sized cuff. After 10 minutes rest in a quiet room, BP was taken 3 times in seated position with the arm at heart level. Average of the last 2 measurement were taken. BP was taken at baseline and at the end of study (3.5 months) | Subgroup: Children Diastolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -3.44 - 1.44) Systolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -0.60 (95% CI: -2.83 - 1.63)  Subgroup: Adults Diastolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -0.50 (95% CI: -2.30 - 1.30) Systolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -1.60 (95% CI: -3.83 - 0.63) |
| He, 201039  Location: UK  Setting: Community  Design: Randomized Cross-over individual  Number of Sites:  Crossover: Length of washout period: NR days  Study Years: NR | Study of: Adults N: 42  Participants: % Male: NR Mean Age/Range/Age at Baseline: 51+/-10 Race: NR Systolic BP: 145+/-11 Diastolic BP: 91+/-7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.7+/-4.8 % with Hypertension: 100 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: NR  Inclusion: ages 18 to 75 years, with sitting systolic BP of 140 to 170 mm Hg or diastolic BP of 90 to 105 mm Hg, with no previous treatment for raised BP Exclusion: impaired renal function with plasma creatinine 150 mol/L, any secondary cause of hypertension, chronic diarrhea, history of ulcer disease, baseline plasma potassium 5.0 mmol/L, previous stroke, ischemic heart disease, heart failure, diabetes mellitus, malignancy, liver disease, pregnantcy, breastfeeding, use of oral contraceptives | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: Potassium chloride 10 pills/d to achieve 64mmol/d Form of Administration: Oral potassium supplement Dose: 122 mmol/d +/-38 mmol Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Use of potassium supplement to increase potassium levels Description: Potassium bicarbonate 10 pills/d to achieve 64 mmol Form of Administration: Oral potassium supplement Dose: 122 mmol/d +/-38 mmol Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Placebo potassium pills, 10/d with usual diet Form of Administration: Placebo Dose: 122 mmol/d +/-38 mmol Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 weeks Exposure to Follow Up Time: 0 months | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: two consecutive days Sodium, Method of Validation: creatinine, Composition of potassium supplement with intervention/exposure adherence measure Sodium Status Intervention 1: 134 mmol/d (+/-49) Sodium Status Intervention 2: 129 mmol +/-45 mmol Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 2 consecutive days Potassium Status Intervention 1: 122 mmol +/-25 Potassium Status Intervention 2: 125 mmol +/-27 mmol  How was blood pressure measured? validated automatic digital BP monitor (Omron HEM-705CP) in sitting position after 5 to 10 minute rest and in the same arm throughout the study; three readings at 1- to 2-minute intervals; the mean of last 2 readings was used. Twenty-four–hour ambulatory blood pressure monitoring was performed using SpaceLabs 90207 devices | Subgroup: Hypertensives 24 hr diastolic BP Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD 1.00 (95% CI: -1.72 - 4.22) Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -3.58 - 2.06) 24 hr systolic BP Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD 0.00 (95% CI: -3.19 - 3.77) Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -5.89 - 0.41) Left ventricular mass (g) Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD -9.00 (95% CI: -23.20 - 7.80) Comparison: Intervention 1 vs Comparator MD -8.00 (95% CI: -22.58 - 9.25) |
| Hofman, 198340  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 1980 | Study of: Children N: 476  Intervention 1: % Male: 52 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 87 Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 3.466 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 51 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 87.7 Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 3.421 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Infants delivered at home or in an outpatient clinic. | Intervention Type(s):  Intervention 1: Other: Low Sodium Description: NR Form of Administration: Dietary Modification: Low sodium formula for infants Dose: Mothers low sodium formula to feed infants. It was similar to that of human milk, and it was three times lower than the normal-sodium milk (6.3 v 19.2 mmole/L). Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Normal Sodium Description: NR Form of Administration: Usual diet Dose: Mothers given normal-sodium formula to feed infants. It contained an amount of sodium that was regular for Dutch formula milks during the study period Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6.25 months Exposure to Follow Up Time: NR | Sodium measure: Chemical analysis of diet with intervention/exposure adherence measure, Casual urine Best sodium measure recorded: weeks 5,13,21 Sodium Status Intervention 1: 11.1 mmoles/L  How was blood pressure measured? BP measured in weeks 1, 5, 9, 13, 17, 21, and 25. measurements were taken with a Doppler ultrasound device" connected to a random-zero sphygmomanometer by a trained observer. The average of three readings at each occasion was used in the analyses | Subgroup: Newborn infants Deaths Follow-Up Time: 25 weeks Comparison: Intervention 1 vs Comparator RR 0.94 (95% CI: 0.06 - 14.99) Severe disease (NS) Follow-Up Time: 25 weeks Comparison: Intervention 1 vs Comparator RR 0.63 (95% CI: 0.11 - 3.73) Systolic BP-supine Follow-Up Time: 25 weeks Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -4.10 - 0.10) |
| Howe, 199441  Location: Australia  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 28  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 146 Diastolic BP: 83 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  Comparator 1: NR % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 143 Diastolic BP: 80 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  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 145 Diastolic BP: 81 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  Comparator 2: NR % Male: 55.3 Mean Age/Range/Age at Baseline: mean 55 (SD 1) Race: NR Systolic BP: 145 Diastolic BP: 81 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Patients with uncomplicated essential hypertension being treated by ACE inhibitor monotherapy Exclusion: History of unstable heart, liver or renal disease or a DBP greater than 105 mmHg. Consuming more than 20 cigarettes or 40 g alcohol per day, exercised erratically, were institutionalized; had no control over the preparation of their food. | Intervention Type(s): Intervention 1: Other: low sodium with fish oil Description: Sodium intake of 70 mmol/day Form of Administration: Other: placebo Dose: eight placebo tablets per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Other: normal sodium with fish oil Description: Sodium intake of 150 mmol/day Form of Administration: Sodium supplement Dose: eight slow sodium tablets per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: low sodium with olive oil Description: Sodium intake of 70 mmol/day Form of Administration: Other: placebo Dose: eight placebo tablets per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 2: Other: normal sodium with olive oil Description: Sodium intake of 150 mmol/day Form of Administration: Sodium supplement Dose: eight slow sodium tablets per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 2 times 1.5 months apart Sodium, Method of Validation: Pill counts, feedback on excretion levels, checking creatinine values., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 78 mmol/24h Sodium Status Comparator 1: 150 mmol/24h Sodium Status Intervention 2: 75 mmol/24h Sodium Status Comparator 2: 150 mmol/24h Best potassium measure recorded: 2 times 1.5 months apart Potassium, Method of Validation: Pill counts, feedback on excretion levels, checking creatinine values.  How was blood pressure measured? BP was measured with a Dinamap portable automated sphygmomanometer with a cuff of appropriate size on the right arm. BP values used for analysis were obtained by averaging repeated readings taken at one minute intervals after throwing out an initial reading. | Subgroup: HTN on antihypertensives Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 2 vs Comparator 2 MD -2.10 (95% CI: -5.70 - 1.50) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 2 vs Comparator 2 MD -5.00 (95% CI: -10.96 - 0.96) |
| Hwang, 201442  Location: Korea  Setting: Community  Design: Randomized, parallel  Number of Sites: 7  Study Years: 2012-2013 | Study of: Adults N: 256  Participants: % Male: 49.8 Mean Age/Range/Age at Baseline: Mean 49.5 (SD 13.3) Race: NR Systolic BP: 130.9 Diastolic BP: 79.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 67.8 kgs % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Aged 19–75, the use of antihypertensive meds or a diagnosis of hypertension. Modification of Diet in Renal Disease study eGFR>=30 ml/min per 1.73 m2, random urine albumin-to-creatinine ratio >=30 mg/g creatinine more than two times with a >=1-week interval in the last 6 months. Exclusion: Patients with uncontrolled hypertension (BP.160/110 mmHg), pregnant women, and patients with serum potassium >5.5 mEq/L. Malignancy, a diagnosis of CVD (cerebral infarction, hemorrhagic infarction, acute MI or unstable angina, coronary angioplasty, or coronary artery bypass surgery) in the last 6 months, contraindication for angiotensin II receptor blockers (ARBs), and diabetes mellitus, continuous users of steroids or other immunosuppressive agents. | Intervention Type(s):  Intervention 1: Other: Intensive education Description: Intensive education group. The target amount of daily sodium intake was >100 mEq/d, A >=25% reduction of salt intake was also recommended Form of Administration: Other: Intensive education Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Conventional Education Description: Conventional education, a A >=25% reduction of salt intake was recommended. Form of Administration: Other: Conventional education Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times, 0, 2 and 4 months Sodium, Method of Validation: The adequacy of 24H urine samples with correction was evaluated by calculating the predicted daily creatinine excretion Sodium Status Intervention 1: 122.2 mEq/d  How was blood pressure measured? No description | Subgroup: Hypertensive on antihypertensive,All Diastolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -1.20 (95% CI: -3.69 - 1.29) Hypotension Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator RR NC (95% CI: NC - NC) Systolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -1.40 (95% CI: -5.00 - 2.20) |
| Hypertension Prevention Trial Research Group, 199043; Borhani, 198944; Brown, 198945; Forster, 199046; Jeffery, 199047 Jeffery, 198948; Meinert, 198949; Prud'homme, 198950; Schmid, 199151; Shah, 199052  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The hypertension Prevention Trial  Number of Sites: 9  Study Years: 1981-1984 | Study of: Adults N: 587  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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 1: NR % Male: 65.3 Mean Age/Range/Age at Baseline: mean 38.6 Race: white 82.2% Systolic BP: 124.3 Diastolic BP: 82.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 2.7 (kg/cm2 \* 100) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 25-29, 76<DBP<99 mm Hh at the first baseline visit, 78<DBP<89 at the second baseline visit. Exclusion: Taking antihypertensive medication, evidence of cardiovascular disease, BMI of 0.0035 kg/cm2 or more, had dietary requirements incompatible with the dietary counseling regimens, consumed 21 or more alcoholic beverages a week, or were perceived as unable to comply with the data collection schedule or counseling regimens. | Intervention Type(s): Intervention 1: Other: Sodium restriction - Dietary Counseling Description: Urine sodium excretion <= 70 mmol/d Form of Administration: Dietary Modification: Counseling to reduce salt intake in diet Dose: NR Na/K ratio: 2.75 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Other: Usual Diet Dose: None Na/K ratio: BL: 3.33 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Sodium restriction and potassium increase - Dietary Counselling Description: Urine sodium excretion <=70 mmol/d; urine potassium excretion 100 mmol/d Form of Administration: Dietary Modification: Counseling to reduce salt intake in diet and increase K+ intake Dose: NR Na/K ratio: 2.57 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 1: Other: Sodium restriction - Dietary Counseling Description: Urine sodium excretion <= 70 mmol/d Form of Administration: Dietary Modification: Counseling to reduce salt intake in diet Dose: NR Na/K ratio: 2.75 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 36 months Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure, Food diaries with reported validation Best sodium measure recorded: 0, 3, 6, 12, 18, 24, 30, 26 months. Sodium, Method of Validation: 24-hour "diet recall" Sodium Status Intervention 1: 38.6 mmol/8h Sodium Status Comparator 1: 43.4 mmol/8h Sodium Status Intervention 2: 36.3 mmol/8h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 0, 3, 6, 12,18,24,30,26 months.  Potassium Status Intervention 1: 14 mmol/8h Potassium Status Comparator 1: 13.0 mmol/8h Potassium Status Intervention 2: 14.1 mmol/8h  How was blood pressure measured? BP measured at 0, 3, 6, 12,18,24,30,26 months. Measurements were taken with a random zero sphygmomanometer and standard procedures. All measurements (first and fifth Korotkoff sounds) are the average of two readings on the right arm with the participant seated. The initial measurement was taken approximately 5 minutes after the participant was seated, and the second measurement was taken about 30 seconds after the first. | Subgroup: Low BMI (BL 27) Diastolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator 1 MD 0.20 (95% CI: -1.19 - 1.59) Comparison: Intervention 2 vs Intervention 1 MD -0.90 (95% CI: -2.29 - 0.49) Diastolic blood pressure >=90 mm Hg or systolic blood pressure >=140 mm Hg or treatment for hypertension Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator 1 RR 1.36 (95% CI: 0.99 - 1.88) Comparison: Intervention 2 vs Intervention 1 RR 1.13 (95% CI: 0.78 - 1.64) Systolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator 1 MD 0.10 (95% CI: -1.84 - 2.04) Comparison: Intervention 2 vs Intervention 1 MD -1.30 (95% CI: -3.24 - 0.64) |
| Hypertension Prevention Collaborative Research Group, 199753; Hebert, 199554; Cook, 200555; Kumanyika 200556; Cook, 200757; Lasser, 199558; Appel, 199559; Hunt, 199860; Hollis, 199561; Cook, 201662  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Trials of Hypertension Prevention (TOHP)  Number of Sites: 9  Study Years: 1990-1992 (2013 follow-up) | Study of: Adults N: 2382  Intervention 1: % Male: 64.8 Mean Age/Range/Age at Baseline: mean 44.2 (SD 6.1) Race: white 81.1% Systolic BP: 127.7 Diastolic BP: 86.1 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  Comparator: % Male: 68.3 Mean Age/Range/Age at Baseline: mean 43.2 (SD 6.1) Race: white 79.5% Systolic BP: 127.3 Diastolic BP: 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: healthy, moderately overweight, 30- to 54-year-old adults (men and women) with a high-normal DBP Exclusion: -Evidence of current hypertension -History of: cardiovascular disease, Diabetes mellitus, malignancy other than nonmelanoma skin cancer during the past 5 y, any other serious life-threatening illness that requires regular medical treatment -Men with BMI < 26.1 or > 37.4; Women with a BMI < 24.4 or > 37.4 kg/m -Current use of prescription medications that affect blood pressure, as well as nonprescription diuretics -Men with Serum creatinine level > 1.7 mg/dL for men or Women with Serum creatinine level > 1.5 mg/dL. Casual serum glucose 2 200 mg/dL, as determined locally -Current alcohol intake > 21 drinks/wk -For women, current pregnancy or intent to become pregnant during the study -Other: such as planned residence distant from the clinical center or inability to cooperate | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: 1800 mg (80 mEq) sodium or less per day, Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 36 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation, 24-hour diet recall Best sodium measure recorded: 7 times, 6 months apart Sodium Status Intervention 1: 135.2 mmol/d Potassium Status Intervention 1: NR | Subgroup: TOHP-2 CVD disease (myocardial infarction, stroke, revascularisation, or death due to cardiovascular causes) Follow-Up Time: 10 years Comparison: Intervention 1 vs Comparator RR 1.13 (95% CI: 0.83 - 1.54) Total mortality Follow-Up Time: Comparison: Intervention 1 vs Comparator RR 1.12 (95% CI: 0.84 - 1.49) Follow-Up Time:10 years Comparison: Intervention 1 vs Comparator RR 1.12 (95% CI: 0.66 - 1.91)  Subgroup: Overweight-obese, high-normal BP Cumulative incidence of HTN Follow-Up Time: 48 months Comparison: Intervention 1 vs Comparator RR 1.17 (95% CI: 1.01 - 1.34) Deaths Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator RR 0.66 (95% CI: 0.11 - 3.96) Diastolic BP-sitting Follow-Up Time: >=36 months Comparison: Intervention 1 vs Comparator MD -0.50 (95% CI: -1.29 - 0.29) Systolic BP-sitting Follow-Up Time: >=36 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -2.03 - 0.03) |
| Jula, 199263  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: unclear | Study of: Adults N: 36  Intervention 1: % Male: 42.1 Mean Age/Range/Age at Baseline: mean 44.7 (SD 5.6) Race: NR Systolic BP: 151.9 Diastolic BP: 98.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.1 % 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: 47 Mean Age/Range/Age at Baseline: mean 42.5 (SD 3.8) Race: NR Systolic BP: 143.9 Diastolic BP: 96.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.7 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Mild to moderate essential hypertension Exclusion: cardiomyopathy or significant valvular disease, oral contraceptives or any other regular drug treatment. Being treated for hypertension earlier (within the last year). | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: To reduce daily sodium intake to less than 70 mmol Form of Administration: Dietary Modification: non-pharmacological treatment programme Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times, 3 months apart Sodium, Method of Validation: Single 24-hour urine analysis with validation Sodium Status Intervention 1: 79 mmol 24/h Potassium measure: Food diaries without reported validation Best potassium measure recorded: 3 times, 3 months apart Potassium Status Intervention 1: 88 mmol 24/h  How was blood pressure measured? Blood pressure was measured using a mercury sphygmomanometer by a single trained nurse. Subjects were in the supine position, and the average of two measurements taken at approximately 2-min intervals was used to calculate peripheral resistance and end-systolic wall stress. Out-patient clinic BP measurements were done by a single trained technician using a Hawksley random zero sphygmomanometer. Subjects were in the sitting position, always in the morning and in the same quiet room throughout the study. The mean value of two measurements taken with a 2-min interval was calculated. | Subgroup: Mild-mod hypertension Diastolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -4.20 (95% CI: -8.16 - -0.24) Systolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -3.30 (95% CI: -10.55 - 3.95) |
| Kitaoka, 201364  Location: Japan  Setting: Community  Design:  Number of Sites: 1  Study Years: 2003-2011 | Study of: Adults N: 71  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: mean 66.2 (5.4) Race: NR Systolic BP: 150.6 Diastolic BP: 92.8 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.6 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 5.3 % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 100 Mean Age/Range/Age at Baseline: mean 64.1 (7.6) Race: NR Systolic BP: 146.9 Diastolic BP: 89.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.8 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 7.7 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Free-living men, aged 40–75 years, who lived in Kyoto city or neighboring towns. SBP 130 mm Hg and <180 mm Hg or DBP 85 mm Hg and <110 mm Hg. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Lecture and a cooking instructions conducted by registered dietitians. Form of Administration: Dietary Modification: lecture and a cooking instructions conducted by registered dietitians. Dose: NR Na/K ratio: mean Na:K ratio = 1.9 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: mean Na:K ratio = 2.9 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 5 months Exposure to Follow Up Time: NR | Sodium measure: Food diaries with reported validation, Partial or spot urine with validated prediction equation Best sodium measure recorded: Two times, at baseline and after 5 months. Kawasaki’s formula. Sodium Status Intervention 1: 10.6 g/day Potassium measure: Partial or spot urine with validated prediction equation\_1, Food diaries without reported validation Best potassium measure recorded: Two times, at baseline and after 5 months. Kawasaki’s formula Potassium Status Intervention 1: 3807 mg/day  How was blood pressure measured? BP was measured by trained physicians using a mercury sphygmomanometer. Participants were asked to sit calmly for 5–10 minutes before being measured. These BP values were taken twice and the mean value was calculated for each subject. | Subgroup: Hypertensive Diastolic BP-sitting Follow-Up Time: 5 months Comparison: Intervention 1 vs Comparator MD 2.00 (95% CI: -9.26 - 13.26) Systolic BP-sitting Follow-Up Time: 5 months Comparison: Intervention 1 vs Comparator MD -4.50 (95% CI: -24.66 - 15.66) |
| Knuist, 199865  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 1992-1994 | Study of: Adults N: 361  Intervention 1: % Male: 0 Mean Age/Range/Age at Baseline: mean 27.6 (SD 4.2) Race: NR Systolic BP: NR Diastolic BP: 74.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 70.4 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 0 Mean Age/Range/Age at Baseline: mean 27.5 (SD 4.8) Race: NR Systolic BP: NR Diastolic BP: 75 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 69.7 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Dutch-speaking nulliparous women, with a DBP pressure < 90 mmHg at their first prenatal visit, taking place before 20 weeks of gestation Exclusion: Women planning to move to another city, conditions associated with an increased risk of pregnancy induced hypertension (for example: diabetes, twins, pre-existing hypertension or renal disease). | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Decrease salt intake, < 50 mmol sodium Form of Administration: Dietary Modification: Low salt diet, Written dietary instructions were given by the midwives Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: Until delivery Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 12 times during pregnancy Sodium, Method of Validation: Creatinine was measured to compare completeness of the 24-hour urine sampling Sodium Status Intervention 1: 84 mmol/24h  How was blood pressure measured? BP was measured with the subject in the sitting position, using the same arm with a portable oscillometric sphygmomanometer. Two consecutive readings of at a minimum of four hours apart were required to assign the highest diastolic blood pressure, | Diastolic BP-sitting Follow-Up Time: 35 days Comparison: Intervention 1 vs Comparator MD 0.00 (95% CI: -2.29 - 2.29) |
| Kojuri, 200766  Location: NR  Setting: Community  Design:  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 80  Intervention 1: % Male: 50 Mean Age/Range/Age at Baseline: mean 48.7 (SD 11.1) Race: NR Systolic BP: 147.1 Diastolic BP: 136.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 69.47 Kg % 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: 50 Mean Age/Range/Age at Baseline: mean 46.05 (SD 13.173) Race: NR Systolic BP: 141.2 Diastolic BP: 133.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 70.85 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: mild to moderate hypertension and not taking any antihypertensive drugs | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: NR Form of Administration: Dietary Modification: DASH Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, 6 weeks apart Sodium Status Intervention 1: 110 meq/dl  How was blood pressure measured? 24 hour holter monitoring of blood pressure was measured with a Davinsa device from 8 AM to 8 AM next day. | Subgroup: Mild to moderate hypertension 24h Ambulatory DBP-daytime Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -9.20 (95% CI: -11.55 - -6.85) 24h Ambulatory DBP-night time Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -7.00 (95% CI: -9.03 - -4.97) 24h Ambulatory SBP-daytime Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -17.00 (95% CI: -20.71 - -13.29) 24h Ambulatory SBP-night time Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -12.43 (95% CI: -15.44 - -9.42) |
| Kwakernaak, 201467  Location: Netherlands  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 0 days  Study Years: NR | Study of: Adults N: 45  Intervention 1: % Male: 84 Mean Age/Range/Age at Baseline: 65+/-9 Race: 100% white Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 32+/-5 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: 100 % with Kidney disease: 100 % with history of Kidney stones: NR  Comparator: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Type 2 diabetes, albuminuria (defined as albuminuria >30 mg per day or urinary albumin concentration >20 mg/L or urinary albumin:creatinine ratio >2·5 mg/mmol for men and >3·5 mg/mmol for women) at time of screening and after completion of run-in; age 18 years or older; creatinine clearance of 30 mL/min or higher with a less than 6 mL/min decrease in the previous year Exclusion: systolic blood pressure of 180 mm Hg or higher; diastolic blood pressure of 110 mm Hg or higher; overt nephrotic syndrome at baseline; second primary renal disease in addition to diabetic nephropathy; type 1 diabetes; renovascular hypertension; a cardiovascular or cerebrovascular event within 3 months before inclusion; serum potassium of 6·0 mmol/L or higher; transplantation or immunosuppressive treatment; contraindication for the use of lisinopril or hydrochlorothiazide; pregnancy or lactation; noncompliance twithmedication; and inability to provide informed consent | Intervention Type:  Intervention 1: Usual Diet Description: Regular sodium diet Form of Administration: Usual diet Dose: 224 mmol/d (+/- 73) sodium; 74 mmol/d potassium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: To achieve 50mmol sodium intake/d Form of Administration: Dietary Modification: 2 diet counseling sessions Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 periods of 6 weeks each Exposure to Follow Up Time: 0 months | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: once (in the middle and at the end of each intervention period) Sodium, Method of Validation: creatinine clearance, Single 24-hour urine analysis with validation Sodium Status Intervention 1: 224 mmol/d (+/- 73) Best potassium measure recorded: once (in the middle and at the end of each intervention period) Potassium, Method of Validation: NR Potassium Status Intervention 1: 74 mmol/d  How was blood pressure measured? measured at 1-min intervals for 15 minutes with a semiautomatic device (Dinamap, GE Medical Systems, Milwaukee, WI, USA) in a semisupine position; used the mean of the second-to-last four readings | Diastolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -12.00 (95% CI: -15.20 - -7.80) Systolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -5.30 (95% CI: -9.10 - -1.50) |
| Langford, 199168  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Study Name: The Trial of Antihypertensive Interventions and Management (TAIM)  Number of Sites: 3  Study Years: 1985-1987 | Study of: Adults N: 169  Intervention 1: % Male: 62.1 Mean Age/Range/Age at Baseline: mean 48.2 Race: white: 66.7 Systolic BP: 141.9 Diastolic BP: 93.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 89.6 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 64.4 Mean Age/Range/Age at Baseline: mean 47.7 Race: white: 69% Systolic BP: 142.8 Diastolic BP: 93.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 88.6 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 3: % Male: 55.7 Mean Age/Range/Age at Baseline: mean 50.5 Race: white: 70.9% Systolic BP: 144.9 Diastolic BP: 94.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 87.4 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 4: % Male: 55.1 Mean Age/Range/Age at Baseline: mean 48.9 Race: white: 66.3% Systolic BP: 143.1 Diastolic BP: 93.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 86.1 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 5: % Male: 65.6 Mean Age/Range/Age at Baseline: mean 51 Race: white: 64.4 Systolic BP: 146.3 Diastolic BP: 94 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 90.2 Kg % 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: 40 Mean Age/Range/Age at Baseline: mean 47.4 Race: white: 67.8% Systolic BP: 144.5 Diastolic BP: 93.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 85.6 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: At preliminary screening, a DBP <= 100 mm Hg or less for participants currently taking antihypertensive medication or a DBP 90-104 mm Hg for those on no treatment. Patients had to be between 110% and 160% of their ideal weight by recall. Exclusion: History or evidence of MI, stroke or bronchial asthma, a creatinine level >= 180 /umol/l, diabetes requiring insulin therapy, allergy to thiazides or Beta-blockers, actual or contemplated pregnancy, or likelihood of difficulty in complying with the interventions | Intervention Type(s):  Intervention 1: Other: Usual Diet - Chlorthalidone Description: Participants asked not to change their usual diet Form of Administration: Other: usual diet Dose: chlorthalidone 25 mg Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Usual Diet - Atenolol Description: Participants asked not to change their usual diet Form of Administration: Other: usual diet Dose: atenolol 50 mg Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Low Na/high K - Placebo Description: Average sodium target of 87 mmol/day, potassium 103 mmol/day Form of Administration: Dietary Modification: NR Dose: placebo + Low Na/high K diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 4: Other: Low Na/high K - Chlorthalidone Description: Average sodium target of 87 mmol/day, potassium 103 mmol/day Form of Administration: Dietary Modification: NR Dose: Chlorthalidone 25 mg + Low Na/high K diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 5: Other: Low Na/high K - Atenolol Description: Average sodium target of 87 mmol/day, potassium 103 mmol/day Form of Administration: Dietary Modification: NR Dose: Atenolol 50 mg + Low Na/high K diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Usual Diet - Placebo Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, 3-day food records Best sodium measure recorded: two times 6 months apart Sodium, Method of Validation: Single 24-hour urine analysis with validation Sodium Status Intervention 1: 144.05 mmol/day Sodium Status Intervention 2: 132.44 mmol/day Sodium Status Intervention 3: 95.06 mmol/day Sodium Status Intervention 4: 111.18 mmol/day Sodium Status Intervention 5: 117.41 mmol/day Potassium measure: Food diaries without reported validation Best potassium measure recorded: two times 6 months apart Potassium Status Intervention 1: 67.48 mmol/day Potassium Status Intervention 2: 54.25 mmol/day Potassium Status Intervention 3: 67.83 mmol/day Potassium Status Intervention 4: 72.08 mmol/day Potassium Status Intervention 5: 67.87 mmol/day  How was blood pressure measured? BP was taken following American Heart Association guidelines by trained staff with a random zero mercury sphygmomanometer. Blood pressures were measured after the participant had been seated quietly for at least 5 minutes. The mean of two readings of the fifth phase diastolic blood pressure was used in all analyses. | Subgroup: Mild HTN Diastolic BP Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD 0.05 (95% CI: -2.81 - 2.91) Systolic BP Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD 1.68 (95% CI: -3.14 - 6.50) Percent with DBP <90 mmHg Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator RR 0.90 (95% CI: 0.73 - 1.11) |
| Li, 201669  Location: China  Setting: Community  Design: Cluster RCT Parallel  Number of Sites: multiple  Study Years: 2011-2012 | Study of: Adults N: 2566  Intervention 1: % Male: 50 Mean Age/Range/Age at Baseline: mean 55 (SD 14) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 50 Mean Age/Range/Age at Baseline: mean 55 (SD 14) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR | Intervention Type(s):  Intervention 1: Other: Village level sodium reduction program Description: Community-based health education, making reduced-sodium, added-potassium salt substitute available at village shops Form of Administration: Dietary Modification: community-based health education + reduced sodium salt Dose: NR Na/K ratio: 5.2 Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Continued their usual practices Form of Administration: Usual diet Dose: NR Na/K ratio: 6.1 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 18 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: One time (end of intervention) Sodium, Method of Validation: Samples rejected if participant reported missing the first morning void, missing more than one void, a collection period less than 22 hours or longer than 26 hours, or spilling more than 10% of the total volume. Urine samples contaminated with feces, where volume was too low or high were excluded. 24-hour creatinine excretion was also used to validate, Single 24-hour urine analysis with validation Sodium Status Intervention 1: 237 mmol/day Best potassium measure recorded: One time (end of intervention) Potassium, Method of Validation: Samples rejected if participant reported missing the first morning void, missing more than one void, a collection period less than 22 hours or longer than 26 hours, or spilling more than 10% of the total volume. Urine samples contaminated with feces, where volume was too low or high were excluded. 24-hour creatinine excretion was also used to validate Potassium Status Intervention 1: 53 mmol/day  How was blood pressure measured? BP was measured in duplicate, after participant had rested for 5 min. An automated electronic phygmomanometer was used with measurements made at least two minutes apart. | Diastolic BP-sitting Follow-Up Time: 18 months Comparison: Intervention 1 vs Comparator MD -0.70 (95% CI: -2.20 - 0.80) Percent with hypertension Follow-Up Time: 18 months Comparison: Intervention 1 vs Comparator RR 1.04 (95% CI: 0.97 - 1.11) Systolic BP-sitting Follow-Up Time: 18 months Comparison: Intervention 1 vs Comparator MD -1.10 (95% CI: -3.30 - 1.10) |
| Little, 200470  Location: UK  Setting: Community  Design: Randomized Factorial Design individual  Number of Sites: 6  Study Years: 1991-2001 | Study of: Adults N: 296  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 154 Diastolic BP: 94 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  Comparator: % Male: 56 Mean Age/Range/Age at Baseline: mean 55 (SD 10) Race: NR Systolic BP: 152 Diastolic BP: 92 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: patients over the age of 17 not taking hypertensive drugs with a SBP > 160 mm Hg or DBP > 90 mm Hg on a single reading. Exclusion: Established hypertension, renal impairment, regular nonsteroidal anti-inflammatory drugs; patients who were very ill or who would have trouble changing diet (e.g., severe chronic illness, anorexia, bulimia, pregnancy, breast feeding); and patients with SBP > 200 mm Hg or DBP > 120 mm Hg. | Intervention Type(s):  Intervention 1: Other: low sodium salt Description: Pot of low sodium salt (LoSalt; Klinge Foods, East Kilbride) was given to enrollees. They were asked to use it in cooking and on food instead of normal salt. Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: NR Description: NR Form of Administration: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: No low sodium salt Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, Food diaries with reported validation Best sodium measure recorded: baseline, 4 weeks, and 6 months Sodium, Method of Validation: Single 24-hour urine analysis with validation, Food diaries with reported validation Sodium Status Intervention 1: NR Best potassium measure recorded: baseline, 4 weeks, and 6 months Potassium Status Intervention 1: NR  How was blood pressure measured? At the clinic, BP measured three times after the patient had been seated for five minutes. A Omron HEM-705CP blood pressure monitor was used. Home measurements were taken by patients, who had been trained by the nurse. | Diastolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD 1.60 (95% CI: -2.10 - 5.30) Systolic BP-sitting Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD 1.42 (95% CI: -11.20 - 14.00) |
| Mascioli, 199171  Location: US  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14 days  Study Years: NR | Study of: Adults N: 48  Intervention 1: % Male: 79 Mean Age/Range/Age at Baseline: mean 52 Race: white: 98% Systolic BP: 131 Diastolic BP: 84 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.6 % with Hypertension: NR % 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: NR 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: Ages 30-59 years with seated DBP of 80-89 mm Hg on entry. No treatment/diagnosis of hypertension currently or in the past, SBP < 150 mm Hg, and no serious or life-threatening illnesses. | Intervention Type:  Intervention 1: Placebo Description: NR Form of Administration: Placebo Dose: Placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Use of salt pills to increase sodium intake Description: NR Form of Administration: Sodium supplement Dose: 96 meq sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 months Exposure to Follow Up Time: NR | Sodium measure: Overnight urine sample Best sodium measure recorded: At weeks 4 and 10. Divided into aliquots and measured with an ion-selective electrode. Sodium, Method of Validation: Pill counts Sodium Status Intervention 1: Group 1: 34.1 meq/8 h; Group 2: 27.7 meq/8 h  How was blood pressure measured? BP was measured with patients in a seated position and on the right arm. Two blood pressures were taken at each visit after subjects rested for 5-minutes. This was done with a random-zero sphygmomanometer (Hawskley) and then the mean was taken averaged. | Subgroup: All Diastolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -2.30 (95% CI: -3.86 - -0.74) Systolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -3.60 (95% CI: -5.33 - -1.87) |
| Matthesen, 201272  Location: Denmark  Setting:  Design: Randomized Cross-over individual  Number of Sites:  Crossover: Length of washout period: 14 days  Study Years: unclear | Study of: NR N: 21  Participants: % Male: 43 Mean Age/Range/Age at Baseline: mean 26 (range: 18-40) Race: 100 Systolic BP: 116 Diastolic BP: 71 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 18-40 years; BMI 18.5- 30 kg/m 2 Exclusion: Arterial hypertension; history of or clinical signs of disease in the heart, lungs, liver, brain or endocrine organs; current medical treatment; malignancies; substance or alcohol abuse; smoking; pregnancy; breast-feeding; no contraceptive treatment for fertile aged women ; clinically significant abnormalities in the blood screening with respect to haemoglobin, white cell count, platelet count, sodium, potassium, creatinine, alanine and aspartate aminotransferase, albumin, cholesterol and glucose. Clinically significant abnormal screening of the urine with respect to albumin and glucose; abnormal electrocardiogram; intercurrent diseases; blood donation less than one month before the trial; unwillingness to participate in the trial; issues with establishing IV access or urine collection. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: Participants were given a standardized diet Form of Administration: Oral potassium supplement Dose: 50 mmol potassium twice daily Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Participants were given a standardized diet Form of Administration: Placebo Dose: Placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice separated by 28 days Sodium Status Intervention 1: 199 mmol/24 h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice separated by 28 days Potassium Status Intervention 1: 168 mmol/24 h  How was blood pressure measured? Ambulatory blood pressure taken using Kiwex TM-2430. In the day, pulse and blood pressure were measured every 15 min. During the night, pulse and blood pressure were measured in 30 min intervals | Subgroup: Normotensive 24 h ambulatory- diastolic Follow-Up Time: 28 days Comparison: Intervention 1 vs Comparator MD 1.00 (95% CI: -1.80 - 3.80) 24 h ambulatory- systolic Follow-Up Time: 28 days Comparison: Intervention 1 vs Comparator MD 0.00 (95% CI: -3.42 - 3.42) Aldosterone Follow-Up Time: 28 days Comparison: Intervention 1 vs Comparator MD 60.00 (95% CI: -100.65 - 220.65) |
| Meland, 200973  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 1999-2002 | Study of: Adults N: 46  Intervention 1: % Male: 74 Mean Age/Range/Age at Baseline: mean 55 Race: NR Systolic BP: 155 Diastolic BP: 92 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29 % 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: 74 Mean Age/Range/Age at Baseline: mean 57 Race: NR Systolic BP: 157 Diastolic BP: 93 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Taking antihypertensive medications, aged 20- 75 years with DBP>90 mmHg and/or SBP>160 mmHg two occasions during a run-in period. Exclusion: Possible drug-induced hypertension, receiving drugs for cardiovascular disease with hypotensive effects, DBP increase to a level of 115 mmHg or SBP 210 mmHg before or during the study. | Intervention Type(s):  Intervention 1: Use of salt pills to increase sodium intake Description: Dietary advice outlining a moderate salt reduced diet + salt tablets. Goal was a regular sodium intake diet Form of Administration: Sodium supplement Dose: five capsules of 10 mmol sodium per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Dietary advice outlining a moderate salt reduced diet + placebo. The goal of this arm was a sodium restricted diet Form of Administration: Placebo Dose: five capsules SiO2 per day (placebo) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NA | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: At baseline (inclusion) and the final visit Sodium, Method of Validation: Capsule counts, Single 24-hour urine analysis with validation Sodium Status Intervention 1: Change of -28 mmol/24h (raw numbers not reported) Best potassium measure recorded: At baseline (inclusion) and the final visit Potassium, Method of Validation: Capsule counts Potassium Status Intervention 1: Change of +3 mmol/24h (raw numbers not reported)  How was blood pressure measured? BP was measured with a mercury manometer on the right arm in a sitting position after resting for at least two minutes. Three recordings were taken at two-minute intervals, and the average of the last two readings was used for analyses. Appropriate sized cuffs were used and the same cuff was used on each visit. BP readings were done before run-in, at inclusion, and after four and eight weeks. | Subgroup: HTN on antihypertensives Diastolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -5.00 (95% CI: -7.00 - -1.00) Systolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -5.00 (95% CI: -11.00 - 0.00) |
| Meuleman, 201674  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites: 4  Study Years: 2011-2014 | Study of: Adults N: 151  Intervention 1: % Male: 79 Mean Age/Range/Age at Baseline: mean 55.6 (SD 11.7) Race: NR Systolic BP: 142 Diastolic BP: 87 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.7 % with Hypertension: NR % with history of CVD: 36 % with Type 2 diabetes: 30 % with Kidney disease: 100 % with history of Kidney stones: NR  Comparator: % Male: 85 Mean Age/Range/Age at Baseline: mean 54.7 (SD 16) Race: NR Systolic BP: 137 Diastolic BP: 83 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.7 % with Hypertension: NR % with history of CVD: 39 % with Type 2 diabetes: 21 % with Kidney disease: 100 % with history of Kidney stones: NR  Inclusion: moderately decreased kidney function, Dutch speaking, >=18 years old, Being treated by an internist, Protein excretion measurements . 0.2 g/L or 0.3 g/24 h, 2 recent sodium excretion measurements > 120 mmol/24 h, BP >135/85 mm Hg or controlled BP with the use of anti-hypertensive medication, among which at least 1 RAAS blockade. Exclusion: BP >180/100 mm Hg or < 125/75 mm Hg, received a kidney transplant less than 1 y ago, diagnosed with type 1 diabetes, had acute kidney failure, accelerated kidney function decrease (> 6 mL/min/1.73 m2 in previous year). Had a cardiovascular event (ie, MI or cerebrovascular event) < 6 mo ago. diagnoses of malignancy within 5 years (other than basal cell or squamous cell carcinoma of skin), participating in other clinical trial that included medication | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Usual care + counselling, education, motivational interviews to reduce sodium in diet Form of Administration: Dietary Modification: counselling, education, motivational interviews to reduce sodium in diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Regular care Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: once a week in the first 6 weeks then every 2 or 3 weeks Sodium Status Intervention 1: 157 mmol/24h  How was blood pressure measured? Office BP was measured Microlife WatchBP Home after 5 minutes of rest, the average of 3 measurements was used. Ambulatory BP was measured with validated Spacelabs 90207 and 90217 devices. Monitors were programmed for 24 hours with 15-minute day intervals and 30-minute night intervals. | Subgroup: CKD, hypertensive 24h Ambulatory DBP Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -4.22 - 0.22) 24h Ambulatory SBP Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -5.33 - 1.33) |
| Miller, 201675  Location: US  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: 2012-2013 | Study of: Adults N: 123  Intervention 1: % Male: 34 Mean Age/Range/Age at Baseline: mean 58.8 (SD 8.7) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 34.9 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 34 % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 25 Mean Age/Range/Age at Baseline: mean 58.5 (SD 10.4) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 34.1 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 21 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Electronic medical record diagnosis of hypertension; age >=21 years; self-reported African American race; average SBP of 120–140 mmHg or DBP of 80–90 mmHg at the two most recent clinic visits, stable doses of antihypertensive medications for at least 2 months prior to randomization Exclusion: Self-report of a cardiovascular event in last 6 months; a chronic disease that might interfere with trial participation (e.g., CKD defined as an estimated glomerular filtration rate o60 mL/minute); unwillingness or inability to adopt a DASH-like diet; consumption of >14 alcoholic drinks a week; poorly controlled diabetes (hemoglobin A1c 49%); or use of insulin. Individuals using potassium supplements could enroll if they were willing to stop supplements 1 month prior to randomization and refrain throughout the study. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Received coach-directed dietary advice and assistance with weekly ($30/week) online ordering/purchasing of high-potassium foods delivered by a community supermarket to a local library Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Received a printed DASH diet brochure and a debit account with equivalent value to that of the intervention group. Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium, Method of Validation: 24-hour "diet recall" Potassium measure: Spot fasting urine taken. But primary comparisons report pre–post intervention effects using creatinine-normalized measures as an indicator of adherence to the dietary intervention Best potassium measure recorded: Taken 2 time s at baseline and 8 weeks Potassium Status Intervention 1: 54 mmol/g creatinine  How was blood pressure measured? Measured 5 times: two times during screening visits, once at randomization, then at 3 and 8 weeks follow up. BP taken using an OMRON 907-XL automated BP machine programmed with a 5-minute delay followed by three measurements separated by 30 seconds. Certified trained staff performed and recorded all three measures averaged them at each visit. The average BP of the Screening Visits 1 and 2 established baseline BP, and the average BPs measured at Weeks 3 and 8 were used to determine intervention effects. | Subgroup: African American, HTN Diastolic BP-NS (machine) Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD 1.30 (95% CI: -1.30 - 3.90) Systolic BP-NS (machine) Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD 1.50 (95% CI: -2.57 - 5.57) |
| Miller, 198776  Location: US  Setting: Community  Design:  Number of Sites: multiple  Study Years: unclear | Study of: Both adults and children N: 76  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: mean 42 (SD 8.4) Race: white: 100% Systolic BP: 113.2 Diastolic BP: 73.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 76.1 kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: mean 11.6 (SD 3.8) Race: white: 100% Systolic BP: 100.9 Diastolic BP: 59.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 37.1 kg % with Hypertension: NR % 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: NR Race: NR Systolic BP: 100.8 Diastolic BP: 60.0 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 37.1 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Normotensive, school-aged, identical twins and their parents who were already in the twin panel in the Department of Medical Genetics, Indian University School of Medicine | Intervention Type:  Intervention 1: Other: Adults - Potassium supplement Description: Participants asked not to change their usual diet Form of Administration: Oral potassium supplement Dose: Average supplementation was 53.7 mEq/day for women, 66 mEq/day for men. Na/K ratio: 2.2 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Potassium supplementation - children Description: K+ supplement to increase potassium intake Form of Administration: Other: liquid potassium supplement Dose: Average supplementation was 45 mEq/day for boys, 36.2 mEq/day for girls. Na/K ratio: 2.4 Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Other: Placebo - children Description: NR Form of Administration: Other: Placebo Dose: Placebo Na/K ratio: 3.2 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Five times during over a month during a baseline period. Then parents collected 24-hour urine samples every two weeks, twins collected the samples every week. Sodium, Method of Validation: Measurement of creatinine excretion (if it was ± 20% of the mean creatinine content of all complete baseline collections for that individual, it was considered complete)., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 165 mEq/d Sodium Status Intervention 2: 108.8 mEq/d Best potassium measure recorded: Five times during over a month during a baseline period. Then parents collected 24-hour urine samples every two weeks, twins collected the samples every week. Potassium, Method of Validation: Measurement of creatinine excretion (if it was ± 20% of the mean creatinine content of all complete baseline collections for that individual, it was considered complete). Potassium Status Intervention 1: 81.6 mEq/d Potassium Status Intervention 2: 48.6 mEq/d  How was blood pressure measured? Three BP measurements were taken with a Hawksley random zero blood pressure device while the subjects were in a seated position. The research assistant was certified in blood pressure measurement. The mean of the last two of three blood pressure measurements was used for analysis. | Subgroup: All children Diastolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD 0.10 (95% CI: -5.01 - 5.21) Systolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD -0.50 (95% CI: -5.88 - 4.88) |
| Miller, 198877  Location: US  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: unclear | Study of: Children N: 298  Participants: % Male: 43 Mean Age/Range/Age at Baseline: boys: mean 10.6 (SEM 0.4); girls: mean 9.7 (SEM 0.5) Race: white: 100% Systolic BP: boys 95.3; girls 91 Diastolic BP: boys 54.5; girls 54 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: boys: 38 kg; girls 32.5 kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Normotensive school-age identical twin pairs recruited from an existing twin panel | Intervention Type(s):  Intervention 1: Use of salt pills to increase sodium intake Description: Low sodium diet + salt pill to achieve normal sodium intake Form of Administration: Sodium supplement Dose: Na chloride supplement Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Maintain an average Na excretion <=60 mmol/d Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Nontwins collected urine samples every other week; twins collected urine samples weekly for a period, over 12 weeks Sodium, Method of Validation: Creatinine excretion in urine samples analyzed to determine if it was representative, Single 24-hour urine analysis with validation Sodium Status Intervention 1: 72.1/mmol/day Best potassium measure recorded: Nontwins collected urine samples every other week; twins collected urine samples weekly for a period, over 12 weeks Potassium, Method of Validation: Creatinine excretion in urine samples analyzed to determine if it was representative Potassium Status Intervention 1: 36.7 mmol/day  How was blood pressure measured? Three seated BP measurements were obtained using a Hawksley Random Zero blood pressure device by a research assistant with a certification in blood pressure measurement. The mean of the last two of three blood pressure readings at each visit was used. | Diastolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -0.20 (95% CI: -1.61 - 1.21) Systolic BP-sitting Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD 0.30 (95% CI: -0.91 - 1.51) |
| Morgan, 198778  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 20  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 143 Diastolic BP: 83 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  Comparator: % Male: 100 Mean Age/Range/Age at Baseline: Mean 60.5 Race: NR Systolic BP: 143 Diastolic BP: 81 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: No clinical evidence of peripheral vascular or cardiac disease, no evidence of left ventricular hypertrophy on electrocardiogram. No detected cause for their hypertension. Well controlled blood pressure | Intervention Type(s):  Intervention 1: Other: 'Reduced Sodium diet' Description: NR Form of Administration: Dietary Modification: no further information given Dose: between 50 and 75 mmol/d consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: NR Dose: between 50 and 75 mmol/d consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: Week 0,1,4,13,26 Sodium Status Intervention 1: 75 mmol/day  How was blood pressure measured? supine systolic and diastolic blood pressure (mdg) measured at start, 'before drug stopped, week 1 and month 6. | Subgroup: Hypertensive (DBP>100) Diastolic-supine Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -8.00 (95% CI: -15.07 - -0.93) Systolic-supine Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator MD -23.00 (95% CI: -39.86 - -6.14) |
| Morgan, 197879; Morgan, 198080  Location: Germany  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: 1973 | Study of: Adults N: 77  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 160 Diastolic BP: 97 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  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 162 Diastolic BP: 98 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  Intervention 3: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 163 Diastolic BP: 98 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: NR Race: NR Systolic BP: 165 Diastolic BP: 97 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: DBP > 90 mm Hg on admission to hospital or at a visit to an outpatient department Exclusion: Malignant disease, severe psychiatric disturbances, severe physical incapacity or a disease likely to be fatal in the next 2 years. Patients with serum-creatinine levels > 0-18 mmol/1, those with abnormal liver-function tests, and those in cardiac failure or on diuretics | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: To reduce sodium intake to 70-100 mmol/day Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Treated with chlorothiazide (500 mg twice d) with the addition of ’Aldomet’ if control was inadequate. If control was still not achieved then other drugs were added. Description: NR Form of Administration: Other: chlorothiazide Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Patients treated with propranolol (up to 480 mg/day) and a diuretic, other drugs were considered if control was inadequate Description: NR Form of Administration: Other: propranolol Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 24 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 5 times, 6 months apart Sodium Status Intervention 1: 157 mmol/day Sodium Status Intervention 2: 191 mmol/day Sodium Status Intervention 3: 189 mmol/day  How was blood pressure measured? BP taken in duplicate with a Bonn amplified sphygmomanometer (by a trained user) after the patients had been in the supine position for ten minutes. The DBP was taken at the 4th phase of the Korotkoff sounds. The BP was again recorded in duplicate after the patient had been standing quietly for five minutes. If the BP differed from previous readings the patient was seen again at the clinic one month later. The procedure was then repeated, and the patient was then included in the study. The mean of the 4 DBPs was taken as the pressure at entry into the study | Subgroup: HTN males CVD mortality (cerebrovascular accidents, myocardial infarction, congested cardiac failure) Follow-Up Time: 200-2000 days Comparison: Intervention 1 vs Comparator RR 0.83 (95% CI: 0.12 - 5.62) DBP <90 mmHg Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator RR 2.00 (95% CI: 0.77 - 5.20) Diastolic BP-supine Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator MD -7.00 (95% CI: -11.16 - -2.84) Systolic BP-supine Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -10.15 - 8.15) Treatment for heart failure Follow-Up Time: 24 months Comparison: Intervention 1 vs Comparator RR 1.50 (95% CI: 0.27 - 8.36) Total number of deaths Follow-Up Time: 200-2000 days Comparison: Intervention 1 vs Comparator RR 1.04 (95% CI: 0.30 - 3.58) |
| Morgan, 198181  Location: Australia  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 24  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: Males: mean 41 (SD 4); Females: mean 36 (SD 4) Race: NR Systolic BP: NR Diastolic BP: Males: 101; Females 97 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  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: Males: mean 42 (SD 4); Females: 46 (SD 4) Race: NR Systolic BP: NR Diastolic BP: Males: 123; Females 118 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  Intervention 3: % Male: NR Mean Age/Range/Age at Baseline: Males: mean 42 (SD 4); Females: mean 41 (SD 4) Race: NR Systolic BP: NR Diastolic BP: Males: 121; Females: 117 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  Comparator: % Male: 50 Mean Age/Range/Age at Baseline: Males: mean 38 (SD 3); Females: mean 39 (SD 4) Race: NR Systolic BP: NR Diastolic BP: Males: 99; Females 98 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 28-50 | Intervention Type(s):  Intervention 1: Other: DBP low - NA restrict Description: Detailed instructions how to reduce salt intake to 70 mmol a day Form of Administration: Dietary Modification: restricted sodium Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: DBP high - thiazide Description: No diet intervention, patients given were given chlorothiazide (500 mg a day). Form of Administration: Other: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: High DBP Na restrict Description: Detailed instructions how to reduce salt intake to 70 mmol a day Form of Administration: Dietary Modification: Restricted sodium Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: DBP low - control Description: No dietary advice Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: weekly during first stage (up to 1 month), then every 2 weeks during second stage (8 weeks) Sodium Status Intervention 1: Males: 78 mmol/24h; Females: 58 mmol/24h Sodium Status Intervention 2: Males: 181 mmol/24h; Females 138 mmol/24h Sodium Status Intervention 3: Males: 85 mmol/24h; Females: 64 mmol/24h  How was blood pressure measured? The same observer measured the patient's BP duplicate at each session with a mercury sphygmomanometer after they had been lying down for 10 minutes and standing for 5 minutes. Korotkoff phase I and IV sounds were used. | Subgroup: Male, DBP<105 mmHg Diastolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -7.00 (95% CI: -14.92 - 0.92)  Subgroup: Female, DBP<105 mmHg Diastolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -10.92 - 4.92) |
| Morikawa, 201182  Location: Japan  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: unclear | Study of: Adults N: 41  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: mean 48.3 (SD 8.7) Race: NR Systolic BP: 149.8 Diastolic BP: 96.9 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.9 % 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: 100 Mean Age/Range/Age at Baseline: mean 47.1 (SD 8.5) Race: NR Systolic BP: 149.4 Diastolic BP: 96.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.9 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Employees of a railroad company. Waist circumference < 85 cm. SBP higher than 130 mmHg and/or DBP higher than 85 mmHg. Not currently in treatment for hypertension. | Intervention Type(s):  Intervention 1: Other: Self-monitoring of daily salt excretion by an electronic salt sensor and personalized advice via sent via cellular phone Description: Group counseling on lifestyle modification from public health nurses and registered dietitians + Intervention Self-monitoring of daily salt excretion by an electronic salt sensor and personalized advice via sent via cellular phone. Aim was to reduce salt intake Form of Administration: Other: Email/Text message alerts Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Group counseling on lifestyle modification from public health nurses and registered dietitians Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Partial or spot urine with validated prediction equation, Food questionnaire without reported validation Best sodium measure recorded: Estimated NaCl24 = 5.76 (NaCln \_ Vn)^0.53 Taken 2 times, in week 1 and week 4 Sodium Status Intervention 1: Daily salt excretion 10.7 (g) Potassium Status Intervention 1: NR  How was blood pressure measured? BP was measured two times with a fully automated sphygmomanometer HEM-762; the average of the values was used for the evaluation. BP taken at baseline and after 4 weeks | Subgroup: Hypertensive Diastolic BP-NS Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -4.60 (95% CI: -8.21 - -0.99) Systolic BP-NS Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -3.20 (95% CI: -8.15 - 1.75) |
| Mu, 200983  Location: China  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Both adults and children N: 325  Intervention 1: % Male: 54.5% Mean Age/Range/Age at Baseline: mean 20.3 (SD 3.1) Race: NR Systolic BP: 123.8 Diastolic BP: 75 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 52.7 Mean Age/Range/Age at Baseline: mean 20.6 (SD 3.1) Race: NR Systolic BP: 121.5 Diastolic BP: 75.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.4 % 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: 53 Mean Age/Range/Age at Baseline: mean 21.4 (SD 3.0) Race: NR Systolic BP: 124.3 Diastolic BP: 77 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.8 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: BP \_90th percentile by age and sex. No contraindication to the supplementation of potassium and calcium, such as the use of a potassium sparing drugs or significant renal impairment. Exclusion: Abnormal blood tests confirmed by a physician. | Intervention Type(s):  Intervention 1: Other: Potassium-Calcium salt Description: Roughly 10 mmol of potassium and 10 mmol of calcium extra per day through (added to salt Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Salt restricted group Description: Through health behavior education, the aim was 50–100mmol sodium per person per day at the end of 2 years Form of Administration: Dietary Modification: Health behavior education Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 24 months Exposure to Follow Up Time: NR | Sodium measure: partial urine - equation not mentioned, 3 day food consumption questionnaire Best sodium measure recorded: 5 times separated by 6 months Sodium Status Intervention 1: 70 mmol/8h Sodium Status Intervention 2: 45 mmol/8h Potassium measure: Partial or spot urine without validated prediction equation Best potassium measure recorded: 5 times separated by 6 months Potassium Status Intervention 1: 8 mmol/8h Potassium Status Intervention 2: 5 mmol/8h  How was blood pressure measured? BP measurements were taken with patients in a sitting position after at least a 5-min rest in quiet a room using a mercury sphygmomanometer with a suitable cuff size. Three measurements were generally performed for calculating the mean values, with 30 seconds between the measurements. | Subgroup: Adolescents Diastolic BP-sitting Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator MD -5.10 (95% CI: -5.51 - -4.69) Comparison: Intervention 2 vs Comparator MD -3.30 (95% CI: -3.74 - -2.86) Systolic BP-sitting Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator MD -7.20 (95% CI: -7.61 - -6.79) Comparison: Intervention 2 vs Comparator MD -7.10 (95% CI: -7.62 - -6.58) |
| Mulhauser, 199684  Location: Germany  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 16  Intervention 1: % Male: 62.5 Mean Age/Range/Age at Baseline: mean 35 (SD 11) Race: NR Systolic BP: 134 Diastolic BP: 87 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.9 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: 100 % with history of Kidney stones: NR  Comparator: % Male: 87.5 Mean Age/Range/Age at Baseline: mean 37 (SD 9) Race: NR Systolic BP: 139 Diastolic BP: 88 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: 100 % with history of Kidney stones: NR  Inclusion: IDDM on intensified insulin therapy, ages 18 -60 years, duration of diabetes more than 5 years, increased proteinuria ( > 60 mg/24 h in a minimum of two of three 24-h urine samples). Exclusion: Urinary tract infection, drugs (including oral contraceptives) except insulin, stable retinopathy, pregnancy and effective contraception; untreated 140< SBP < 160 mmHg and/or 85<DBP < 100 mmHg. A history of short-term treatment with antihypertensive drugs in the 4 weeks before start of study | Intervention Type:  Intervention 1: Placebo Description: Sodium intake of 90 mmol/day Form of Administration: Placebo Dose: placebo consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Use of salt pills to increase sodium intake Description: Sodium intake of 190 mmol/day Form of Administration: Sodium supplement Dose: 100 mmol/day sodium supplement consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NA | Sodium measure: Multiple 24-hour urine analysis with validation, Food diaries with reported validation Best sodium measure recorded: weekly for 12 weeks Sodium, Method of Validation: counting the number of returned pills, Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: 92 mmol/day Potassium measure: Food diaries without reported validation Best potassium measure recorded: weekly for 12 weeks Potassium Status Intervention 1: 85 mmol/day  How was blood pressure measured? BP Measured 12 times, over 12 weeks. Under standardized conditions with a random zero sphygmomanometer (Hawksley, Lancing, UK). For examinations 1-3: Two supine and two sitting blood pressure measurements were taken, the mean all four measurements was used for analysis. For examinations 4 to 12): after the patient had a 10-min rest in the supine position, four supine measurements were taken at 5- min intervals. After another 5 min of rest in the sitting position, four sitting measurements were taken at 5-min intervals. The mean of all eight measurements used in the analysis. | Subgroup: Diabetic with nephropathy Diastolic-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -5.30 (95% CI: -10.15 - -0.45) Systolic-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -4.90 (95% CI: -13.95 - 4.15) |
| Naismith, 200385  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 59  Intervention 1: % Male: 47 Mean Age/Range/Age at Baseline: mean 44.5 (SD 2.1) Race: European: 83%; Middle-Eastern: 7%; South Asian: 3%; East Asian: 7% Systolic BP: 118 Diastolic BP: 75 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26 % with Hypertension: 20 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 65 Mean Age/Range/Age at Baseline: mean 41.7 (SD 2.2) Race: European: 83%; South Asian: 7%; Middle-Eastern: 7%; East Asian 3% Systolic BP: 115 Diastolic BP: 70 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.9 % with Hypertension: 28 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Postgraduate and Academic research staff at King’s College London Exclusion: diabetes mellitus, diabetes insipidus, cardiovascular diseases or previous cardiovascular events, any types of renal diseases, metabolic acidosis, current peptic ulcers, dysphagia, general digestive problems, gastric surgery, pregnancy and lactation, taking of anti-hypertensive drugs, and taking drugs known to interfere with K metabolism. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: KCl was given as one slow-release tablet containing 8 mmol KCl Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, 6 weeks apart Sodium Status Intervention 1: 166.3 mmol/d Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times, 6 weeks apart Potassium Status Intervention 1: NR  How was blood pressure measured? BP taken at the same time of day at each appointment and were performed after the subjects had rested quietly, seated for at least 5 min. Three readings taken at each visit using a semi-automated device employing the oscillometric method. Average of the last two readings were taken and were confirmed by a Hawksley random zero sphygmomanometer | Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -6.47 (95% CI: -8.70 - -4.24) Nausea Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator RR 3.10 (95% CI: 0.13 - 73.14) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -7.60 (95% CI: -10.40 - -4.80) |
| Nakano, 201686; UMIN-CTR Clinical Trial87  Location: Japan  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: 2012-2014 | Study of: Adults N: 101  Intervention 1: % Male: 31 Mean Age/Range/Age at Baseline: mean 57.5 (SD 13.7) Race: NR Systolic BP: 132 Diastolic BP: 82 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 6 % with Kidney disease: 20 % with history of Kidney stones: NR  Comparator: % Male: 45.5% Mean Age/Range/Age at Baseline: mean 60.1 (SD 13.1) Race: NR Systolic BP: 135 Diastolic BP: 83 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.1 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: 7 % with Kidney disease: 20 % with history of Kidney stones: NR  Inclusion: >20 years old, Stable hypertensive outpatients who are performing antihypertensive and non-antihypertensive treatment. Exclusion: Hemodialysis, Dementia from whom we cannot obtain informed consent, attending doctor consider that the patient is not appropriate for the study. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: The goal was to restrict salt to no more than 6 g of salt per day Form of Administration: Dietary Modification: Nutritionists performed intensive nutritional education Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: No indication participants asked to change diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Food diaries with reported validation, Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, baseline and 3 months Sodium, Method of Validation: Food diaries with reported validation Sodium Status Intervention 1: 6.8 g/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times, baseline and 3 months Potassium Status Intervention 1: 1.6 g/24 h  How was blood pressure measured? Self-measured home BP was taken in the morning and evenings using a validated upper arm cuff oscillometric device (HEM-5001; Omron, Kyoto, Japan). Ambulatory BP monitoring (ABPM) was performed every 30 minutes using a validated monitor with an upper arm cuff. BP measurements taken at baseline and after 3 months | Subgroup: Hypertensive under pharma or non-pharma treatment Diastolic BP-24H AMB Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD 0.00 (95% CI: -3.23 - 3.23) Systolic BP-24H AMB Follow-Up Time: 12 weeks Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -5.44 - 3.44) |
| Nestel, 199388  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 66  Participants: % Male: 54.5 Mean Age/Range/Age at Baseline: Women: mean 65 (SD 3); Men: mean 66 (SD 5) Race: NR Systolic BP: Women: 120; Men: 129 Diastolic BP: Women: 68; Men: 77 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Women: 24; Men 25 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Normotensive men and women, aged 60-79, free of clinical cardiac, renal, hepatic and endocrine disorders. Not taking any drugs that might affect blood pressure. | Intervention Type(s):  Intervention 1: Other: No added salt Description: NR Form of Administration: Other: low salt diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Added Salt Description: NR Form of Administration: Other: low salt diet + added salt Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2.5 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 6 times separated by 2 weeks Sodium, Method of Validation: Compliance with urine collection assessed from the within-individual variation in 24-h creatinine excretion between visits, Single 24-hour urine analysis with validation Sodium Status Intervention 1: Women: 77 mmol/day; Men: 106 mmol/day Best potassium measure recorded: 6 times separated by 2 weeks Potassium, Method of Validation: Compliance with urine collection assessed from the within-individual variation in 24-h creatinine excretion between visits Potassium Status Intervention 1: Women: 78 mmol/day; Men: 83 mmol/da  How was blood pressure measured? Subjects either had fasted overnight, or had not eating in the 2 hours prior to measurement. After sitting quietly, for 5 min, BP was taken using a Dinamao automated sphygmomanometer fitted with an appropriate arm cuff. After the first reading was discarded, 4 measures were taken and averaged. | Subgroup: Women Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -5.00 (95% CI: -11.44 - 1.44) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -7.00 (95% CI: -16.73 - 2.73)  Subgroup: Men Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD 0.00 (95% CI: -4.95 - 4.95) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -9.54 - 3.54) |
| Nowson, 200389  Location: Australia  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: NR days  Study Years: NR | Study of: Adults N: 108  Participants: % Male: 41 Mean Age/Range/Age at Baseline: 47 Race: NR Systolic BP: 126.4+/-18.6 Diastolic BP: 79.2+/-11.9 Magnesium: NR Calcium: NR Other Minerals: sodium: 138.7+/-53.9; potassium: 78.6+/-23.7 Mean BMI: 26.1+/-4.2 % with Hypertension: 15 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Twin pairs 30 years or older Exclusion: currently undergoing treatment for cancer or renal disease; requiring insulin treatment for diabetes | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Low sodium/high potassium diet to achieve 50 mmol sodium and 80 mmol potassium Form of Administration: Dietary Modification: Low sodium, high potassium diet and placebo sodium pills Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Low sodium/high potassium diet to achieve sodium mmol and 80 mmol potassium and sodium supplementation with slow sodium tablets to achieve 130 mmol/d sodium Form of Administration: Dietary Modification: Low sodium, high potassium diet Sodium supplement Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 weeks Exposure to Follow Up Time: 0 months | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 24-hour urine 3 times, 1 week apart during each 4-week phase Sodium, Method of Validation: creatinine, Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: 89.4+/-4.2 mmol/d Best potassium measure recorded: 24-hour urine 3 times, 1 week apart during each 4-week phase Potassium, Method of Validation: NR Potassium Status Intervention 1: 87.1+/-2.1 mmol/d  How was blood pressure measured? mercury sphygmomanometer (model ALPK2; Stethoscope and Sphygmomanometer Specialists, Melbourne, Australia) while seated | Home measured BP, diastolic Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -1.10 (95% CI: -1.44 - -0.76) Home measured BP, systolic Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -2.50 (95% CI: -2.95 - -2.05) |
| Nowson, 198890; Australian National Health and Medical Research Council Management Committee, 198791; Chalmers, 198692  Location: Australia  Setting: Community  Design: Randomized, parallel  Study Name: Australian National Health and Medical Research Council dietary salt study in mild hypertension  Number of Sites: 3  Study Years: 1984-1986 | Study of: Adults N: 212  Intervention 1: % Male: 81 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 83 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 3: % Male: 89 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 89 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  Inclusion: Untreated hypertension, mean 90<=DBP<=100 mmHg Exclusion: Receiving treatment for CVD, hypertension, ischemic disease or any major hypertension complications or of ischemic disease. Grade III or IV hypertensive retinopathy, diabetes, glycosuria, clinical evidence of cardiomegaly or heart failure. Women who were pregnant or on contraceptives. Plasma creatinine>0.12 mmol/L, plasma potassium<3.5 mmol/L or >5.8 mmol/L. Patients receiving prednisone, indomethacin, antihypertensive drugs, or psychotropics. | Intervention Type(s):  Intervention 2: Other: High Potassium Description: Increase potassium intake above 100 mmol/day Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Low Sodium Description: Reduce sodium intake to 50-70 mmol/day Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Low Sodium, High Potassium Description: Reduce sodium intake to 50-70 mmol/day, increase potassium intake above 100 mmol/day Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: 70 mmol/day Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation, 24-hour diet recall Best sodium measure recorded: Every 2 weeks over the 3 month intervention period Sodium, Method of Validation: Multiple 24-hour urine analysis with validation, 24-hour "diet recall" Sodium Status Intervention 2: 145 mmol/day Sodium Status Comparator: 86 mmol/day Sodium Status Intervention 3: 73 mmol/day Best potassium measure recorded: Every 2 weeks over the 3 month intervention period Potassium Status Intervention 2: 96 mmol/day Potassium Status Comparator: 70 mmol/day Potassium Status Intervention 3: 87 mmol/day  How was blood pressure measured? BP was measured using a Dinamap machine subsequent to subjects being seated for 5 minutes. Three measurements were taken; the first was discarded and the average of last two measures was used. | Subgroup: 90<DBP<100 Diastolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 2 vs Intervention 1 MD -3.10 (95% CI: -4.91 - -1.29) Comparison: Comparator vs Intervention 1 MD -4.20 (95% CI: -5.86 - -2.54) Comparison: Intervention 3 vs Comparator MD 1.60 (95% CI: -0.21 - 3.41) Systolic BP-sitting Follow-Up Time: 12 weeks Comparison: Intervention 2 vs Intervention 1 MD -3.90 (95% CI: -6.81 - -0.99) Comparison: Comparator vs Intervention 1 MD -5.10 (95% CI: -7.87 - -2.33) Comparison: Intervention 3 vs Comparator MD 1.00 (95% CI: -1.64 - 3.64) |
| Obel, 198993  Location: Nairobi  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 48  Intervention 1: % Male: 47.82% Mean Age/Range/Age at Baseline: 40 (SD 9) Race: NR Systolic BP: Standing: 171; Supine 174 Diastolic BP: Standing 103; Supine 100 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: 41.67 Mean Age/Range/Age at Baseline: 40 (SD 8) Race: NR Systolic BP: Standing: 167; Supine 173 Diastolic BP: Standing: 101; Supine 100 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: Mild hypertension, age 20-60, 90<DBP<109, SBP >160, serum potassium <4.5 mM, serum creatinine 60-130 uM | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 8 tablets of 64 mmol potassium per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Other: Oral placebo Dose: 8 placebo tablets per day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 months Exposure to Follow Up Time: NR | Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times, 16 weeks apart Potassium Status Intervention 1: 102 mmol/24 h  How was blood pressure measured? Supine, Standing, patients rested for 30 minutes before readings. Same observer using a Hawksley random zero sphygmomanometer, each record was the mean of two readings. 5 minutes equilibrium period was taken between readings. Measured 5 times, 4 weeks apart. | Subgroup: Black, mild HTN Diastolic BP-supine Follow-Up Time: 16 weeks Comparison: Intervention 1 vs Comparator MD -17.00 (95% CI: -19.26 - -14.74) Systolic BP-supine Follow-Up Time: 16 weeks Comparison: Intervention 1 vs Comparator MD -39.00 (95% CI: -43.88 - -34.12) |
| Parker, 199094  Location: Australia  Setting: Community  Design: Randomized Factorial Design individual  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 28  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: mean 49.8 (SD 3.1) Race: NR Systolic BP: 136.1 (supine) Diastolic BP: 83.9 (supine) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29.3 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 1: NR % Male: 100 Mean Age/Range/Age at Baseline: mean 51 (SD 3.1) Race: NR Systolic BP: 139.6 (supine) Diastolic BP: 83.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 100 Mean Age/Range/Age at Baseline: mean 52.8 (SD 2) Race: NR Systolic BP: 139.9 (supine) Diastolic BP: 86.6 (supine) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 2: NR % Male: 100 Mean Age/Range/Age at Baseline: mean 54.2 (SD 2.6) Race: NR Systolic BP: 139.9 (supine) Diastolic BP: 86.6 (supine) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 30.1 % 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 20-70 years, regular treatment with antihypertensive drugs for a minimum of 6 months, alcohol intake of at least 210 ml/wk, no history of renal or hepatic disease or diabetes mellitus, not on current treatment with nonsteroidal anti-inflammatory drugs, and no history of a MI, stroke, or coronary artery bypass surgery within the last12 months. 125 mm Hg <=SBP <= 180 mm Hg, and a DBP of less than 115 mm Hg Exclusion: Underlying renal disease, average 24-hour urinary sodium excretion less than 80 mmol/day (estimated from two urine collections 1 week apart) | Intervention Type(s): Intervention 1: Other: Low alcohol - low salt Description: NR Form of Administration: Other: Placebo Dose: low sodium diet (60 mmol/day) + placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Other: Low alcohol - normal salt Description: NR Form of Administration: Sodium supplement Dose: low sodium diet (60 mmol/day) + supplementation with 100 mmol enteric-coated sodium chloride (5 10 mmol tablets twice daily) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Normal alcohol - low salt Description: NR Form of Administration: Placebo Dose: low sodium diet (60 mmol/day) + placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 2: Other: Normal alcohol - normal salt Description: NR Form of Administration: Sodium supplement Dose: low sodium diet (60 mmol/day) + supplementation with 100 mmol enteric-coated sodium chloride (5 10 mmol tablets twice daily) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Sodium, Method of Validation: detailed food records on the day that urine was collected, weekly tablet counts Sodium Status Intervention 1: 68.6 mmol/day (average of the two low sodium groups) Sodium Status Intervention 2: 68.6 mmol/day (average of the two low sodium groups) Sodium Status Comparator 2: 141.7 mmol/day (average of the normal sodium groups)  How was blood pressure measured? average of two sets of five readings measured at 2-minute intervals 1 week apart using with automatic oscillometric device, the Dinamap 845XT | Subgroup: Male, HTN on antihypertensives (normal alcohol) Diastolic BP-supine Follow-Up Time: 4 weeks Comparison: Comparator 2 vs Intervention 2 MD -0.80 (95% CI: -3.84 - 2.24) Systolic BP-supine Follow-Up Time: 4 weeks Comparison: Comparator 2 vs Intervention 2 MD 0.10 (95% CI: -5.15 - 5.35) |
| Patki, 199095  Location: India  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: 14 days  Study Years: unclear | Study of: Adults N: 37  Participants: % Male: 21.6 Mean Age/Range/Age at Baseline: mean 49.9 (SD 7.6) Race: NR Systolic BP: 155 Diastolic BP: 100 Magnesium: 0.88 mmol/l 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: SBP 90-110 mm Hg without any underlying cause Exclusion: renal failure, liver-failure, stroke, ischaemic heart disease, evidence of hyperkalaemia | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: potassium 30 mmol/15 ml Na/K ratio: NR Magnesium: 0.94 mmol/l Calcium: NR Other Minerals: NR  Intervention 2: Other: Potassium + magnesium supplement Description: NR Form of Administration: Oral potassium supplement Dose: potassium 30 mmol/15 ml + plus magnesium 10 mmol/15 ml Na/K ratio: NR Magnesium: 0.94 mmol/l Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: placebo Na/K ratio: NR Magnesium: 0.86 mmol/l Calcium: NR Other Minerals: NR  Duration: 8 months Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: at 0 and 8 weeks for each treatment period Sodium Status Intervention 1: 184 mmol/24h Sodium Status Intervention 2: 196 mmol/24h Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: at 0 and 8 weeks for each treatment period Potassium Status Intervention 1: 82 mmol/24h Potassium Status Intervention 2: 80 mmol/24h  How was blood pressure measured? Phase V DBP was measured with a mercury sphygmomanometer from the left arm, after a five minutes resting in the supine position or two minutes standing. | Subgroup: Hypertensives Diastolic - supine Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -10.10 (95% CI: -15.60 - -4.60) Comparison: Intervention 1 vs Comparator MD -13.60 (95% CI: -21.00 - -6.20) Systolic - supine Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -8.90 (95% CI: -13.75 - -4.05) Comparison: Intervention 1 vs Comparator MD -12.10 (95% CI: -18.69 - -5.51) |
| Pinjuh Markota, 201596  Location: Bosnia & Herzegovina  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 2012-2013 | Study of: NR N: 150  Intervention 1: % Male: 47.3 Mean Age/Range/Age at Baseline: mean 59.4 (SD 13) Race: NR Systolic BP: 142.8 Diastolic BP: 84.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.1 % 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: 50 Mean Age/Range/Age at Baseline: mean 59.3 (SD 12) Race: NR Systolic BP: 143.7 Diastolic BP: 84.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.4 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: All consecutive adults who were treated hypertensives | Intervention Type(s):  Intervention 1: Other: Individual information leaflets about the negative effects of excessive salt consumption + warning stickers that were mounted on all salt containers Description: NR Form of Administration: Other: Individual information leaflets about the negative effects of excessive salt consumption + warning stickers that were mounted on all salt containers Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Individual information leaflets about the negative effects of excessive salt consumption Description: NR Form of Administration: Other: Individual information leaflets about the negative effects of excessive salt consumption Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times 1 month apart Sodium Status Intervention 1: 176.4 mmol/24h  How was blood pressure measured? BP (standard mercury sphygmomanometry) following standard methods. BP taken 3 times 1 month apart | Subgroup: Treated hypertensive Diastolic BP-NS Follow-Up Time: 2 months Comparison: Intervention 1 vs Comparator MD -1.40 (95% CI: -4.19 - 1.39) Systolic BP-NS Follow-Up Time: 2 months Comparison: Intervention 1 vs Comparator MD -5.70 (95% CI: -11.26 - -0.14) |
| Pomeranz, 200297  Location: Israel  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Children N: 58  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: mean 0.76 (SD 0.03) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 3.2 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: mean 0.77 (SD 0.025) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 3.2 Kg % with Hypertension: NR % 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 0.77 (SD 0.021) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 3.1 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Jewish infants enrolled in the study hospital's neonatal unit Exclusion: Infants from families with a history of hypertension | Intervention Type:  Intervention 1: Other: Control - Breastfeeding Description: Babies fed breastmilk Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Low sodium formula Description: NR Form of Administration: Dietary Modification: low sodium baby formula Dose: Baby formula with 32 mg/l (8.5 mmol/l) sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Other: High sodium formula Description: NR Form of Administration: Dietary Modification: high sodium baby formula Dose: Baby formula with 196 mg/l (8.5 mmol/l) sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: 4 months | Sodium measure: Chemical analysis of diet with intervention/exposure adherence measure, urinary sodium to creatinine ratio Best sodium measure recorded: sodium to creatinine ratio was determined monthly during the initial 2 months Sodium Status Intervention 1: Urinary Na:Cr ratio: 1.1 Sodium Status Intervention 2: Urinary Na:Cr ratio: 1.2  How was blood pressure measured? Non-invasive BP monitoring was performed with a Dinamap 8100 Vital Signs Monitor which measures BP and pulse using the Doppler technique. BP was recorded at the infant's home during sleep after feeding, with an appropriately sized cuff on the right upper extremity. | Subgroup: Newborn infants Diastolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -11.10 (95% CI: -14.43 - -7.77) Systolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -5.30 (95% CI: -9.36 - -1.24) |
| Puska, 198398  Location: Finland  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 1981 | Study of: Adults N: 114  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 138.9 Diastolic BP: 89.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 76.2 kg % with Hypertension: NR % 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: Range: 30-50 Race: NR Systolic BP: 137.8 Diastolic BP: 89.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 70.6 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: 30 - 50 years old, had no major health problems, not undergoing antihypertensive treatment . | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Limit salt intake to less than half the level before the study (assumed to be over 10 g/day). Form of Administration: Dietary Modification: Provided with several low-salt products including salt substitutes, advised to avoid salty foods, counselling with dietitians Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: No dietary change Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1.5 months Exposure to Follow Up Time: 1 month | Sodium measure: Single 24-hour urine analysis with validation, Food diaries without reported validation Best sodium measure recorded: 3 times, at run in, after 6 week intervention, then after 4 week washout Sodium, Method of Validation: Comparing urine excretion values and results of the duplicate diet analyses from the previous study, Single 24-hour urine analysis with validation Sodium Status Intervention 1: 77 mmol/24h Potassium measure: Food diaries without reported validation Best potassium measure recorded: 3 times, at run in, after 6 week intervention, then after 4 week washout Potassium, Method of Validation: Comparing urine excretion values and results of the duplicate diet analyses from the previous study Potassium Status Intervention 1: 73mmol/24h  How was blood pressure measured? Trained staff measured the BP with an automatic recorder (’Infrasonde SR-2’, Sphyngometrics, Inc.). Two blood-pressure measurements were made on the right arm after 5 minutes of quiet sitting. The mean of two measurements was used for analysis. BP Measured 2 times a week for the 3 month duration of the study | Diastolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -0.40 (95% CI: -4.99 - 4.19) Systolic BP-sitting Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD 1.20 (95% CI: -5.50 - 7.90) |
| Rahimi, 200799  Location: Iran  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: 2002-2003 | Study of: Adults N: 103  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: mean 50.13 (SD 16.54) Race: NR Systolic BP: 133.9 Diastolic BP: 83.6 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  Intervention 2: % Male: NR Mean Age/Range/Age at Baseline: Mean 46.04 (SD 11.11) Race: NR Systolic BP: 131.6 Diastolic BP: 82.4 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  Intervention 3: % Male: NR Mean Age/Range/Age at Baseline: Mean 47.78 (SD 14) Race: NR Systolic BP: 127.3 Diastolic BP: 83.8 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  Comparator: % Male: NR Mean Age/Range/Age at Baseline: mean 50.71 (SD 15.49) Race: NR Systolic BP: 138 Diastolic BP: 88 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: grade I HTN (140-159/90-99mmHg) or high normal NP (130-139/85-89mmHg) | Intervention Type(s):  Intervention 1: Other: Group C: High calcium diet Description: NR Form of Administration: Dietary Modification: NR Dose: diet with>= 800mg calcium Na/K ratio: NR Magnesium: NR Calcium: 800mg calcium Other Minerals: NR  Intervention 2: Other: Group P: High Potassium diet Description: NR Form of Administration: Dietary Modification: NR Dose: Diet with >=4000mg potassium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Group CP: High Potassium, high calcium diet Description: NR Form of Administration: Dietary Modification: NR Dose: Diet with >=4000mg potassium + 800mg calcium Na/K ratio: NR Magnesium: NR Calcium: 800mg calcium Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium Status Intervention 1: difference of urine electrolytes before and after intervention: +581.3 Sodium Status Intervention 2: difference of urine electrolytes before and after intervention: -382.9 Sodium Status Intervention 3: difference of urine electrolytes before and after intervention: +519.25 Potassium measure: Single 24-hour urine analysis without validation, 2-day food record questionnaire Best potassium measure recorded: 1 time (post intervention) Potassium Status Intervention 1: difference of urine electrolytes before and after intervention: +55.32 Potassium Status Intervention 2: difference of urine electrolytes before and after intervention: +935 Potassium Status Intervention 3: difference of urine electrolytes before and after intervention: +907.08  How was blood pressure measured? BP measured twice | Subgroup: Grade one hypertension and high normal Diastolic BP-NS Follow-Up Time: 1 month Comparison: Intervention 3 vs Comparator MD -4.20 (95% CI: -8.44 - 0.04) Comparison: Intervention 1 vs Comparator MD -4.40 (95% CI: -8.01 - -0.79) Comparison: Intervention 2 vs Comparator MD -5.60 (95% CI: -9.29 - -1.91) Systolic BP-NS Follow-Up Time: 1 month Comparison: Intervention 3 vs Comparator MD -11.00 (95% CI: -17.80 - -4.20) Comparison: Intervention 1 vs Comparator MD -4.10 (95% CI: -10.34 - 2.14) Comparison: Intervention 2 vs Comparator MD -6.40 (95% CI: -11.58 - -1.22) |
| Redon-Mas, 1993100  Location: Spain  Setting: Community  Design: Randomized, parallel  Number of Sites: 13  Study Years: unclear | Study of: Both adults and children N: 418  Intervention 1: % Male: 47 Mean Age/Range/Age at Baseline: mean 54.5 (SD 11.1) Race: NR Systolic BP: 161.7 Diastolic BP: 100.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 68.8 % 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: 47 Mean Age/Range/Age at Baseline: mean 56.1 (SD 10.2) Race: NR Systolic BP: 165.2 Diastolic BP: 100.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 68.5 Kg % 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 18-80, BMI<30, mild to moderate essential hypertension. Exclusion: Secondary or severe hypertension, MI or stroke in the last 3 months, unstable angina, heart failure, major arrhythmia or conduction disturbance. Significant renal or hepatic dysfunction, concurrent use of anti-hypertensive drugs or diuretic agents, pregnancy or intended pregnancy, known or suspected contraindication for verapamil, history of poor compliance, drug or alcohol abuse. | Intervention Type(s):  Intervention 1: Other: Low salt diet Description: Reduce sodium intake Form of Administration: Dietary Modification: reduced sodium Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Regular salt diet Description: Unrestricted sodium intake Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, 4 weeks apart Sodium Status Intervention 1: 81.9 mmol/24h  How was blood pressure measured? BP measured 3 times at 5 min intervals, after 2 min of sitting, using a conventional mercury sphygomomanometer. Phases I were used for SBP and V for DBP, of the Korotkoff sounds. Mean of 3 readings were used. | Subgroup: Mild-mod hypertension on verapamil Diastolic BP-sitting Follow-Up Time: 28 days Comparison: Intervention 1 vs Comparator MD 1.80 (95% CI: 0.18 - 3.42) Systolic BP-sitting Follow-Up Time: 28 days Comparison: Intervention 1 vs Comparator MD 0.90 (95% CI: -1.86 - 3.66) |
| Richards, 1984101  Location: New Zealand  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: 4 days days  Study Years: NR | Study of: Adults N: 12  Participants: % Male: 66 Mean Age/Range/Age at Baseline: 19-52 years Race: NR Systolic BP: 140-180 Diastolic BP: 90-105 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: 0  Inclusion: untreated blood-pressure of between 140/90 and 180/105 mm Hg (taking phase V as the diastolic reading) after resting supine for 15 min, on 2 consecutive outpatient visits at least 10 days apart; otherwise well, withdrawn from antihypertensive drugs for 1 month or longer, and normal plasma urea, creatinine, sodium, potassium, calcium, and liver function tests Exclusion: NR | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: To decrease sodium intake to 80 mM Form of Administration: Dietary Modification: instructions to consume low sodium foods Dose: 80 mmol sodium/d consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: NR Description: To increase potassium intake while maintaining usual diet Form of Administration: Oral potassium supplement Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: To maintain usual sodium intake, 80mmol sodium diet was supplemented with sodium chloride capsules to achieve 180 mmol/d Form of Administration: Dietary Modification: Low sodium diet Sodium supplement Dose: 180mmol/d sodium consumed; 60 mmol/d potassium consumed Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 periods of 4-6 weeks each Exposure to Follow Up Time: 0 months | Sodium, Method of Validation: Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: 80 mmol/d Sodium Status Intervention 2: 200 mmol/d Best potassium measure recorded: Multiple 24-hour urine analysis with validation: Twice weekly for 4-6 weeks Potassium, Method of Validation: Creatinine concentration Potassium Status Intervention 1: 60 mmol/d Potassium Status Intervention 2: 180 mmol  How was blood pressure measured? Arterial pressures measured twice with an automated version of the London School of Hygiene sphygmomanometer; supine, by one person | Subgroup: Hypertensives Diastolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD -1.00 (95% CI: -7.67 - 5.67) Comparison: Intervention 1 vs Comparator MD -1.80 (95% CI: -8.76 - 5.16) Systolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 2 vs Comparator MD -1.90 (95% CI: -10.04 - 6.24) Comparison: Intervention 1 vs Comparator MD -5.20 (95% CI: -13.24 - 2.84) |
| Sacks, 2001102; Vollmer, 2001103; Svetkey, 2004104; Harsha, 2004105; Akita, 2003106; Juraschek, 2017107; Juraschek, 2017108  Location: US  Setting: Community  Design: Randomized Cross-over individual  Study Name: DASH-Sodium  Number of Sites: multiple  Crossover: Length of washout period: <5 days  Study Years: NR | Study of: Adults N: 79  Mean Age/Range/Age at Baseline: 49(10) Race: 56% black; 40% NH white; 5% Asian/other Systolic BP: 135(10) Diastolic BP: 86(4) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 30(5) % with Hypertension: 41 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: 0  Mean Age/Range/Age at Baseline: 47+/-10 Race: 57% black; 40% NH white; 3% Asian/other Systolic BP: 134+/-10 Diastolic BP: 86+/-5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 29+/-5 % with Hypertension: 41 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: 0  Comparator: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: 22 years old or more, average systolic blood pressure 120 to 159 mm Hg (over 3 visits) and average diastolic blood pressure 80 to 95 mm Hg Exclusion: heart disease, renal insufficiency, poorly controlled hyperlipidemia or diabetes mellitus, diabetes requiring insulin, special dietary requirements, more than 14 alcoholic drinks per week, or use of antihypertensive drugs or other medications that would affect blood pressure or nutrient metabolism | Intervention Type:  Intervention 1: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Control High Sodium: To replicate typical diet with high sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to achieve high sodium intake Dose: 150 mmol sodium/d in control diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Control Intermediate Sodium: To replicate typical diet with intermediate sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to achieve intermediate sodium intake Dose: 100 mmol sodium/d in control diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Control Low Sodium: To replicate typical diet with low sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to achieve low sodium intake Dose: 50 mmol/d Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: NR Description: DASH High Sodium: To impose DASH diet with high sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to follow DASH with high sodium intake Dose: 150 mmol sodium/d in DASH diet Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 4: Prescribed or synthetic diet (all food provided) with sodium quantified Description: DASH intermediate Sodium: To impose DASH diet with intermediate sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to follow DASH with intermediate sodium intake Dose: 100 mmol/d Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Prescribed or synthetic diet (all food provided) with sodium quantified Description: DASH Low Sodium: To achieve DASH diet with low sodium content Form of Administration: Dietary Modification: All foods provided, menu designed to follow DASH with low sodium intake Dose: 50 mmol/d Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 periods of 30 days each, including run-in Exposure to Follow Up Time: 0 months | Sodium measure: Chemical analysis of diet with intervention/exposure adherence measure, Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: Single 24-hour urine analysis without validation measured at least 4 times, 4 weeks apart; chemical analysis of diet; Food diaries completed daily without validation; Sodium, Method of Validation: NR, Chemical analysis of diet with intervention/exposure adherence measure Sodium Status Intervention 1: 141+/-55 mmol/d Sodium Status Intervention 2: 106+/-44 mmol/d Sodium Status Comparator: 64+/-37mmol/d Sodium Status Intervention 3: 144+/-58 mmol/d Sodium Status Intervention 4: 107+/-52 mmol/d Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: Single 24-hour urine analysis without validation measured at least 4 times, 4 weeks apart; chemical analysis of diet; Food diaries completed daily without validation; Potassium, Method of Validation: Adherence checks via food diaries, supervised meals Potassium Status Intervention 1: 40+/-14 mmol/d Potassium Status Intervention 2: 41+/-14 mmol/d Potassium Status Comparator: 42+/-14 mmol/d Potassium Status Intervention 3: 75+/-27 mmol/d Potassium Status Intervention 4: 81+/-31 mmol/d  How was blood pressure measured? Random-zero sphygmomanometers, seated, 3 times during screening, weekly during 1st 3 weeks of intervention periods, and 5 times during last 9 days of intervention periods | Diastolic BP Follow-Up Time: 30 days Comparison: Intervention 3 vs Intervention 5 MD -1.60 (95% CI: -2.50 - -0.80) Comparison: Intervention 1 vs Comparator MD -3.50 (95% CI: -4.30 - -2.60) Systolic BP Follow-Up Time: 30 days Comparison: Intervention 3 vs Intervention 5 MD -3.00 (95% CI: -4.30 - -1.70) Comparison: Intervention 1 vs Comparator MD -6.70 (95% CI: -8.00 - -5.40) |
| Santos, 2010109  Location: Portugal  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: 42 days  Study Years: unclear | Study of: Adults N: 17  Intervention 1: % Male: 47% Mean Age/Range/Age at Baseline: median 29 (range: 24-53) Race: NR Systolic BP: median 115.7 Diastolic BP: median 64.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: median 22 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 47% Mean Age/Range/Age at Baseline: median 29 (range: 24-53) Race: NR Systolic BP: median 114 Diastolic BP: median 69.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: median 22.4 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: SBP/DBP below 140/90 mmHg Exclusion: None of the patients had any chronic disease (heart, liver, kidney, diabetes mellitus), were pregnant or consumed mineral supplements | Intervention Type:  Intervention 1: Other: Low salt water (Vitalis) Description: NR Form of Administration: Dietary Modification: mineral water Dose: mineral water with 3.8 mg/l sodium Na/K ratio: NR Magnesium: 0.7 mg/l Calcium: 0.4 mg/l Other Minerals: NR   Comparator: Other: high salt water (Água das Pedras®) Description: NR Form of Administration: Dietary Modification: NR Dose: mineral water with 622 mg/l sodium Na/K ratio: NR Magnesium: 28 mg/l Calcium: 103 mg/l Other Minerals: NR  Duration: 1.75 months Exposure to Follow Up Time: NR | Sodium Status Intervention 1: 115 mmol/day Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times 7 weeks apart Potassium Status Intervention 1: 49.3 mmol/day  How was blood pressure measured? BP was taken using a validated automated oscillometric upper arm BP monitor after 5 minutes of rest in the supine position. The blood pressure values used are the average of three recordings. | Diastolic BP Follow-Up Time: 7 weeks Comparison: Intervention 1 vs Comparator MD -0.71 (95% CI: -2.51 - 1.09) Systolic BP Follow-Up Time: 7 weeks Comparison: Intervention 1 vs Comparator MD 0.50 (95% CI: -1.44 - 2.44) |
| Saptharishi, 2009110  Location: India  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 58  Participants: % Male: 66.7 Mean Age/Range/Age at Baseline: mean 22.5 (SD 1.3) Race: NR Systolic BP: 125.5 Diastolic BP: 84.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 32.4 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Hypertension or pre-hypertension Exclusion: Severe hypertension | Intervention Type(s):  Intervention 1: Other: Walking Description: NR Form of Administration: Other: instructed to increase walking Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Salt Reduction Description: The goal was for subjects to reduce their daily salt intake to at least half of their previous intake. Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Yoga Description: NR Form of Administration: Other: instructed to do yoga Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: The ‘questionnaire method’ Best sodium measure recorded: No reference or explanation of ‘questionnaire method’ Sodium Status Intervention 1: NR Sodium Status Intervention 2: NR Sodium Status Intervention 3: NR  How was blood pressure measured? Subjects blood pressure was measured using a mercury sphygmomanometer | Subgroup: Pre HTN and HTN Diastolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -2.50 (95% CI: -5.59 - 0.59) Systolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 2 vs Comparator MD -2.90 (95% CI: -7.51 - 1.71) |
| Sarkkinen, 2011111  Location: Finland  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 50  Participants: % Male: 61 Mean Age/Range/Age at Baseline: mean 54 (SD 11) Race: NR Systolic BP: 138 Diastolic BP: 88 Magnesium: 4.67 mmpl Calcium: NR Other Minerals: NR Mean BMI: 28 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Aged 25-75 years old, with SBP in the range of 130-159 mmHg and/or DBP in the range of 85-99 mmHg, BMI between 23 and 40 kg/m2 and a stable body weight Exclusion: Receiving antihypertensive drugs, non-steroidal antiinflammatory agents, cyclosporine or tacrolimus. Secondary hypertension, diabetes (type 1 or 2), a history of active heart disease or cancer, abnormal electrolytes, proteinuria, abnormal liver, kidney or thyroid function. Currently on a low-salt diet (six or less points in the salt intake test by the Finnish Heart Association, Helsinki). Subjects with alcohol abuse or drug abuse, pregnancy. | Intervention Type(s):  Intervention 1: Use of potassium product as salt (sodium) substitute to reduce sodium intake Description: The aim was to replace approximately 60% of the regular sources of sodium with Smart Salt products. Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Daily sodium intake in the Regular Salt arm was designed to stay at the same level as typical for that individual. Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, Food diaries without reported validation Best sodium measure recorded: 2 times, at baseline and at 2 months Sodium, Method of Validation: Single 24-hour urine analysis with validation Sodium Status Intervention 1: 100 mmol Potassium measure: Food diaries without reported validation Best potassium measure recorded: 2 times, at baseline and at 2 months Potassium Status Intervention 1: 95 mmol  How was blood pressure measured? BP measured using an automatic sphygmomanometer after 10 minutes rest in a sitting position. BP was measured three times with intervals of at least two minutes, between 7:00 am and 12:00 noon. The mean of the last records was used. | Subgroup: High normal Diastolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -4.00 (95% CI: -8.09 - 0.09) Systolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -6.00 (95% CI: -10.70 - -1.30) Decreased quality of life Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator RR 0.40 (95% CI: 0.17 - 0.95) |
| Schorr, 1996112  Location: NR  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14 days  Study Years: unclear | Study of: Adults N: 16  Intervention 1: % Male: 43.75 Mean Age/Range/Age at Baseline: 64.1 (SD 3.6) Race: NR Systolic BP: Day:136; night 121 Diastolic BP: Day: 83; Night: 68 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.1 % with Hypertension: NR % 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: NR 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: normotensive, elderly, healthy, Exclusion: Hypertension, diabetes, CHF, abnormal renal or liver function | Intervention Type:  Intervention 1: Other: Low Sodium Mineral Water Description: NR Form of Administration: Sodium supplement Dose: <.1 mmol/l Sodium consumed Na/K ratio: NR Magnesium: <.1 mmol/l Calcium: <.1 mmol/l Other Minerals: NR   Comparator: Other: High sodium chloride mineral water Description: NR Form of Administration: NR Dose: 56.3 mmol/l sodium consumed Na/K ratio: NA Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: High Sodium bicarbonate Mineral Water Description: NR Form of Administration: NR Dose: 26.2 mmol/l sodium consumed Na/K ratio: NA Magnesium: 2.2 mmol/l Calcium: 3.1 mmol/l Other Minerals: NR  Duration: 3 periods 4 weeks each Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 3 times, baseline, 1 week, 4 weeks Sodium, Method of Validation: 24 h urinary electrolyte excretion Sodium Status Intervention 1: 104.6 mmol/24h Sodium Status Comparator: 175.2 mmol/24h Potassium Status Comparator: NA  How was blood pressure measured? Resting blood pressure (Dinamap 1846 SX; Criticon, Tampa, Florida, USA). Also, 24 hour ambulatory BP measurements (90297; SpaceLabs, Redmond, WA, USA). Measured at baseline, week 1, week 4. | Diastolic bp 24 hour ambulatory -daytime Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Intervention 2 MD 0.00 (95% CI: -4.90 - 4.90) Comparison: Intervention 1 vs Comparator MD 0.00 (95% CI: -4.90 - 4.90) Systolic bp 24 hour ambulatory - daytime Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Intervention 2 MD -1.00 (95% CI: -9.67 - 7.67) Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -9.86 - 7.86) |
| Sciarrone, 1992113  Location: Australia  Setting: Community  Design: Randomized Factorial Design individual  Number of Sites: multiple  Study Years: 1987-1988 | Study of: Adults N: 81  Intervention 1: % Male: 50 Mean Age/Range/Age at Baseline: mean 51.4 Race: NR Systolic BP: 134.3 Diastolic BP: 83.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 68.4 Mean Age/Range/Age at Baseline: mean 53.4 Race: NR Systolic BP: 139 Diastolic BP: 83.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.4 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 3: % Male: 82.3 Mean Age/Range/Age at Baseline: 54.9 Race: NR Systolic BP: 138.1 Diastolic BP: 82.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.5 % 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: 52.3 Mean Age/Range/Age at Baseline: mean 54.2 Race: NR Systolic BP: 134.6 Diastolic BP: 82.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: 20-69 years old, <120% ideal body weight, consumed <30 ml ethanol/24h and BP > 1330/80 mmHg (untreated) or 125/85 mmHg (treated) Exclusion: Cardiac failure, diabetes, kidney, liver or heart disease, taking NSAID medications | Intervention Type:  Comparator: Other: Normal Sodium - Notmal fat/normal fibre Description: Diet with an aim of 60 mmol/day sodium intake plus sodium supplement Form of Administration: Sodium supplement Dose: 100 mmol NAcl/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Intervention 2: Other: Low sodium - Normal fat/normal fibre Description: Diet with an aim of 60 mmol/day sodium intake plus sodium placebo Form of Administration: Dietary Modification: Other: Placebo pill Dose: Placebo (10 lactose tablets per day) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Low Sodium - Low fat/high fibre Description: Diet with an aim of 60 mmol/day sodium intake plus placebo Form of Administration: Dietary Modification: Other: Placebo pill Dose: Placebo (10 lactose tablets per day) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Normal Sodium - Low fat/high fibre Description: Diet with an aim of 60 mmol/day sodium intake plus sodium supplement Form of Administration: Salt substitute Dietary Modification: NR Dose: 100 mmol NAcl/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, Food diaries without reported validation Best sodium measure recorded: Measured 3 times in the screening phase and 5 times over the 8 week intervention Sodium, Method of Validation: Single 24-hour urine analysis with validation Sodium Status Comparator: 136.2 mmol/24h Sodium Status Intervention 2: 58.1 mmol/24h Sodium Status Intervention 3: 53.1 mmol/24h Potassium measure: Food diaries without reported validation Best potassium measure recorded: Measured 3 times in the screening phase and 5 times over the 8 week intervention Potassium Status Comparator: 65.8 mmol/24h Potassium Status Intervention 2: 75.4 mmol/24h Potassium Status Intervention 3: 97.1 mmol/24h  How was blood pressure measured? BP measurements taken at the same time of day for a given individual. Taken in a non-fasting state and subjects asked to not smoke, drink coffee or engage in vigorous exercise for 2 hours prior to measurement. A sohygmomanometer cuff appropriate for arm size was applied to the right arm. SBP, DBP were measured using a semi-automatic Dinamap 845XT oscillometric recorder. BP was measured at 2 min intervals for 20 min in the supine position then at 1-min intervals for 5 minutes after standing. Averages of 8 supine and 5 separate standing measures were taken. BP measured once every 2 weeks | Subgroup: HTN Diastolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 3 vs Intervention 1 MD -1.80 (95% CI: -5.40 - 1.80) Comparison: Intervention 2 vs Comparator MD 0.70 (95% CI: -3.17 - 4.57) Systolic BP-supine Follow-Up Time: 8 weeks Comparison: Intervention 3 vs Intervention 1 MD -8.00 (95% CI: -13.54 - -2.46) Comparison: Intervention 2 vs Comparator MD -4.80 (95% CI: -9.98 - 0.38) |
| Seals, 2001114  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 39  Intervention 1: % Male: 0 Mean Age/Range/Age at Baseline: mean 65 (SD 10) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.1 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 0 Mean Age/Range/Age at Baseline: mean 62 (SD 9) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 28.1 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: postmenopausal status (amenorrheic for at least two years and follicle stimulating hormone plasma concentrations .40 IU/l); >50 years of age, during sitting rest: SBP 130 to 159 mm Hg with diastolic BPDBP<=99 mm Hg. No antihypertensive medications taken in the last two months; and a body mass index (BMI) < 35 Exclusion: Other chronic disease, on a low-sodium diet, performed regular exercise during the preceding two years, smoking | Intervention Type(s):  Intervention 1: Prescribed or synthetic diet (all food provided) with sodium quantified Description: Reduce sodium intake to <100 mmol/day Form of Administration: Dietary Modification: low sodium Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Exercise Description: Exercise arm, no diet changes Form of Administration: Other: Exercise arm Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: Chemical analysis of diet with intervention/exposure adherence measure, Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, 3 months apart Sodium Status Intervention 1: 86 mmol/day  How was blood pressure measured? BP measured at rest in the upright seated position between 7 and 11 AM after an overnight fast. Recordings were obtained in triplicate in three separate sessions at least one week apart in order to establish the stable readings | Subgroup: Women Diastolic BP-24H AMB Follow-Up Time: 13 weeks Comparison: Intervention 1 vs Comparator MD -2.11 (95% CI: -4.99 - 0.77) Systolic BP-24H AMB Follow-Up Time: 13 weeks Comparison: Intervention 1 vs Comparator MD -7.11 (95% CI: -11.82 - -2.40) |
| Siani, 1987115  Location: Italy  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 37  Intervention 1: % Male: 61% Mean Age/Range/Age at Baseline: mean 45 (SD 2) Race: NR Systolic BP: 144 Diastolic BP: 97 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: 63.1 Mean Age/Range/Age at Baseline: mean 45 (SD 2) Race: NR Systolic BP: 14 Diastolic BP: 91 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: mild hypertension Exclusion: Possibility that patient has secondary hypertension, or any associated illness or severe complication of the hypertensive disease | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 48 mmol potassium daily Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: Placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3.75 months Exposure to Follow Up Time: NR | Sodium, Method of Validation: Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: 189 mmol/24 h Best potassium measure recorded: 2 times 15 weeks apart (baseline, end of follow up) Potassium, Method of Validation: Pill counting Potassium Status Intervention 1: 87 mmol/24 h  How was blood pressure measured? BP measured 7 times, 1 week apart during baseline, 3 weeks apart during intervention. BP was taken by a single observer, blinded to treatment status, using a Hawksley random zero sphygmomanometer. After quietly resting for 30 minutes in the supine position the SBP (phase V Korotkoff sounds) was measured three times two minutes apart; the same measurements were taken after the patient had been standing upright for two minutes. The average of each measurement in each position for all the patients was used for analysis. | Subgroup: Mild HTN Diastolic BP-supine Follow-Up Time: 15 weeks Comparison: Intervention 1 vs Comparator MD -10.50 (95% CI: -16.32 - -4.68) Systolic BP-supine Follow-Up Time: 15 weeks Comparison: Intervention 1 vs Comparator MD -14.00 (95% CI: -21.78 - -6.22) |
| Siani, 1991116  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 54  Intervention 1: % Male: 57.7 Mean Age/Range/Age at Baseline: mean 48.8 (SD 7.8 Race: NR Systolic BP: 138.2 Diastolic BP: 81.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27 % 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: 52.3 Mean Age/Range/Age at Baseline: mean 49.3 (SD 9.4) Race: NR Systolic BP: 138.3 Diastolic BP: 80.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: BP under good pharmacologic control, aged 30-65 years and a BP below 160/95 mm Hg at the last two clinic visits. Exclusion: Secondary hypertension, ischemic heart or brain disease, renal failure, any illness requiring adherence to a strict dietary regimen (e.g. diabetes mellitus or obesity). Use of oral contraceptives; poor compliance with their prescribed drug regimen. | Intervention Type(s):  Intervention 1: NR Description: Dietary advice to selectively increase potassium intake Form of Administration: Oral potassium supplement Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 2 times in run in then monthly over 12 months follow up Sodium, Method of Validation: Assessment of the reliability of urine collection was done by interviewing the patient and by measuring 24-hour creatinine excretion., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 163 mmol/24h Best potassium measure recorded: 2 times in run in then monthly over 12 months follow up Potassium, Method of Validation: Assessment of the reliability of urine collection was done by interviewing the patient and by measuring 24-hour creatinine excretion. Potassium Status Intervention 1: 73 mmol/24h  How was blood pressure measured? Blood pressure measured by an operator who was blinded to the patient’s assigned treatment. Measurements taken using a Sentron automatic oscillometric recorder. Patients first rested for 10 minutes in the supine position in a quiet and comfortable room. SBP and DBP were measured three times at 2-minute intervals; the average of all measurements was used in the analysis. | Subgroup: HTN under control Diastolic BP-supine Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD 1.10 (95% CI: 0.11 - 2.09) Percent of baseline drug consumption Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator RR 2.50 (95% CI: 1.16 - 5.39) Systolic BP-supine Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD 3.40 (95% CI: 2.11 - 4.69) |
| Silman, 1983117  Location: UK  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: unclear | Study of: Adults N: 28  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 165.3 Diastolic BP: 158.7 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: NR Race: NR Systolic BP: 160.5 Diastolic BP: 98.3 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: Patients who were between 50 and 64 years old from 2 general practices got screened for BP. If DBP was between 95 and 104 mm Hg (fifth diastolic sound, average of two readings at 5 minute intervals) .they were rescreened 12 months later, and if their DBP was in the same range and remained so for a further 1 month, they were included. | Intervention Type(s):  Intervention 1: NR Description: Taught to take a diet with 100 mmol sodium per day Form of Administration: Dietary Modification: Instructed to take a diet that contained 100 mmol sodium per day, as well as general healthy dietary advice Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Advised regarding regular healthy eating habits Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: First-morning urine specimens and two-day diet records Best sodium measure recorded: Taken 5 times, at 0,1,3,6 and 12 months Sodium Status Intervention 1: 117 mmol/24h Potassium measure: First-morning urine specimens and two-day diet records Best potassium measure recorded: Taken 5 times, at 0,1,3,6 and 12 months Potassium Status Intervention 1: 60.8  How was blood pressure measured? BP was measured in a standardized manner with a random zero sphygmomanometer by the same observer. | Subgroup: HTN Diastolic BP-NS Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -6.30 (95% CI: -15.12 - 2.52) Systolic BP-NS Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -8.70 (95% CI: -29.16 - 11.76) |
| Sinaiko, 1993118; Gomez-Marin, 1991119  Location: US  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 1986-1987 | Study of: Children N: 210  Intervention 1: % Male: 50 Mean Age/Range/Age at Baseline: 13.2 Race: NR Systolic BP: 113.6 Diastolic BP: 63.4 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 22.5 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 52 Mean Age/Range/Age at Baseline: mean 13.3 (SD 0.1) Race: NR Systolic BP: 114.2 Diastolic BP: 66.6 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 22.3 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 51 Mean Age/Range/Age at Baseline: mean 13.4 (SD .01) Race: NR Systolic BP: 113.7 Diastolic BP: 65.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 22.2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Blood pressure at rescreening was > 109 mm Hg for boys and 108 mm Hg for girls Exclusion: SBP>=140/DBP>=90 on average, DBP>100 on any visit, history of renal disease with significant hematuria or proterinuria, or serum creatinine>1.5 mg/dl. Hypokalemia, chronic system illness, compliance issues | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Reduce sodium intake to 70 mmol/day Form of Administration: Dietary Modification: Trained nutritionists instructed patients on how to reduce dietary sodium Dose: NR Na/K ratio: Boys: 2.9 ; Girls: 2.7 Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: 1 mmol/kg body weight potassium chloride per 24 hours (Max 80 mmol per 24 hours) administered in capsules Na/K ratio: Boys:2.1 mmol/24h; Girls: 2.2 mmol/24h Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Participants asked not to change their usual diet Form of Administration: Placebo Dose: placebo capsules same shape and color as the potassium chloride Na/K ratio: Boys: 3; Girls 3.5 Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 36 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times, 1 year apart Sodium, Method of Validation: Pill counts, Single 24-hour urine analysis with validation Sodium Status Intervention 1: Boys: 162 mmol/24h; Girls: 119 mmol/24h Sodium Status Intervention 2: Boys: 176 mmol/24h; Girls: 173 mmol/24h Best potassium measure recorded: 3 times, 1 year apart Potassium, Method of Validation: Pill counts Potassium Status Intervention 1: Boys: 64 mmol/24h; Girls: 49 mmol/24h Potassium Status Intervention 2: Boys: 100 mmol/24h; Girls: 93 mmol/24h  How was blood pressure measured? Measured two times on the right arm and with the student in the seated position by trained personnel using a standard clinical sphygmomanometer (following a standardized protocol).Blood pressure was measured every 3 months for 3 years. | Subgroup: Girls Rate of increase in diastolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator MD -1.70 (95% CI: -3.09 - -0.31) Comparison: Intervention 2 vs Comparator MD -0.90 (95% CI: -2.29 - 0.49) Rate of increase in systolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator MD -1.90 (95% CI: -3.01 - -0.79) Comparison: Intervention 2 vs Comparator MD -0.90 (95% CI: -2.01 - 0.21)  Subgroup: Boys Rate of increase in diastolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator MD -1.40 (95% CI: -3.48 - 0.68) Comparison: Intervention 2 vs Comparator MD -1.60 (95% CI: -3.54 - 0.34) Rate of increase in systolic BP-sitting Follow-Up Time: 3 years Comparison: Intervention 1 vs Comparator MD 0.60 (95% CI: -0.65 - 1.85) Comparison: Intervention 2 vs Comparator MD 0.30 (95% CI: -0.81 - 1.41) |
| Singer, 1991120  Location: UK  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: 0 days  Study Years: NR | Study of: Adults N: 21  Participants: % Male: 62 Mean Age/Range/Age at Baseline: 53.9+/-2.5 Race: 71% white; 29% black Systolic BP: 158+/-5 Diastolic BP: 100+/-2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: NR  Inclusion: Essential, uncomplicated hypertension, treated with captopril (50 mg twice daily) and hydrochlorothiazide (25 mg once daily) for at least 1 month before study entry Exclusion: ischemic heart disease; cerebrovascular disease; renal or hepatic impairment; and diabetes mellitus; or receiving any additional treatment | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Sodium restriction diet + slow sodium placebo tablets to achieve low sodium diet Form of Administration: Other: Low sodium diet + placebo salt pills Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Use of salt pills to increase sodium intake Description: Usual sodium intake achieved via sodium restriction + slow sodium tablets Form of Administration: Sodium supplement Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: NR Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 2 consecutive 24-hour urine samples Sodium, Method of Validation: creatinine, Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: 104+/-11 mmol Best potassium measure recorded: 2 consecutive 24-hour urine samples Potassium, Method of Validation: NR Potassium Status Intervention 1: 66+/-3 mmol/d  How was blood pressure measured? Supine and standing blood pressure measured every 2 weeks under identical conditions with semiautomatic ultrasound sphygmomanometers | Subgroup: Hypertensives Diastolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -4.13 - -1.87) Systolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -9.00 (95% CI: -10.70 - -7.30) |
| Steegers, 1991121  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites: 1  Study Years: unclear | Study of: Adults N: 42  Intervention 1: % Male: 0 Mean Age/Range/Age at Baseline: mean 27 (Range: 20-34) Race: NR Systolic BP: 122 Diastolic BP: 71 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 69.4 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 0 Mean Age/Range/Age at Baseline: mean 27 (Range: 22-35) Race: NR Systolic BP: 125 Diastolic BP: 72 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 65.8 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: nulliparous healthy women with singleton pregnancies | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Target of 20 mmol sodium daily Form of Administration: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Continue unrestricted dietary intake Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 5-6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation, Food diaries with reported validation Best sodium measure recorded: Measured at 12, 16 , 20, 24, 28, 32 and 36 weeks of gestation and then at 1 and 6 weeks postpartum Sodium Status Intervention 1: 58 mmol/24h  How was blood pressure measured? BP was measured after patients rested for 5 minutes in a sitting position with an automatic microcomputer assisted instrument (Dinamap). | Diastolic BP-sitting Follow-Up Time: 22 weeks Comparison: Intervention 1 vs Comparator MD 2.00 (95% CI: -3.54 - 7.54) Systolic BP-sitting Follow-Up Time: 22 weeks Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -7.93 - 5.93) |
| Sundar, 1985122  Location: NR  Setting: Community  Design: Randomized, parallel  Number of Sites:  Study Years: unclear | Study of: Adults N: 50  Intervention 1: % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 164.1 Diastolic BP: 102.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 63.4 Kg % 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: NR Race: NR Systolic BP: 164.3 Diastolic BP: 102.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 60 Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Mild to moderate essential hypertension Exclusion: Any complications of hypertension, impaired renal function or any other illness | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: Oral potassium supplement Dose: Patients given 126 tabs containing 6.47 mEq potassium for 14 days (3 tabs per day) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 5 times 1 weeks apart Sodium Status Intervention 1: 96.6 mEq/L Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 5 times 1 weeks apart Potassium Status Intervention 1: 81.08 mEq/L  How was blood pressure measured? Basal supine BP measured on the right arm measured 3 times by the same observer. | Subgroup: Mild-moderate HTN Diastolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -3.20 (95% CI: -7.40 - 1.00) Systolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -11.30 (95% CI: -22.95 - 0.35) |
| Suppa, 1988123  Location: Italy  Setting: Community  Design: Randomized, parallel  Number of Sites: 32  Study Years: unclear | Study of: Adults N: 322  Intervention 1: % Male: 64 Mean Age/Range/Age at Baseline: mean 47.1 (SD 9.8) Race: NR Systolic BP: 149.2 Diastolic BP: 93.5 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  Comparator: % Male: 61 Mean Age/Range/Age at Baseline: mean 47.8 (SD 10.1) Race: NR Systolic BP: 159 Diastolic BP: 93.6 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: SBP >=95 Exclusion: Contraindications to beta blockers, women of childbearing potential, individuals with secondary hypertension, renal failure, or other major diseases. | Intervention Type(s):  Intervention 1: Use of potassium product as salt (sodium) substitute to reduce sodium intake Description: 193.2 Form of Administration: Oral potassium supplement Dose: Twice daily 2-g packets of diet salt (%50 NaCl, 25% KCl, 15% K3C6H5O7) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Regular salt Description: NR Form of Administration: Regular Salt Dose: Twice daily 2-g packets of regular sale (100% NaCl) Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times 2 weeks apart Sodium, Method of Validation: 24 hour urinary excretion was considered correct when urinary creatinine was >900 mg/24h in women and >1000 mg/24h in men., Single 24-hour urine analysis with validation Sodium Status Intervention 1: 77.4 Best potassium measure recorded: 3 times 2 weeks apart Potassium, Method of Validation: 24 hour urinary excretion was considered correct when urinary creatinine was >900 mg/24h in women and >1000 mg/24h in men.  How was blood pressure measured? Measured by standard mercury sphygmomanometer as per WHO guidelines. The first and fifth Korotkoff phases were used for SBP and DBP respectively. | Subgroup: HTN on antihypertensive Diastolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -4.02 - 0.02) Systolic BP-supine Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -4.20 (95% CI: -8.46 - 0.06) |
| Svetkey, 1987124  Location: US  Setting:  Design: Randomized, parallel  Number of Sites: 2  Study Years: unclear | Study of: Adults N: 116  Intervention 1: % Male: 76 Mean Age/Range/Age at Baseline: mean 51.3 (SD 12.3) Race: white 89% Systolic BP: 147.5 Diastolic BP: 95.2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight mean 83.8 (SD 14.4) kg % 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: 72 Mean Age/Range/Age at Baseline: mean 50.9 (SD 12.3) Race: White 83% Systolic BP: 142.1 Diastolic BP: 147.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight mean 81.7 (SD 11.9) Kg % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ambulatory hypertensive adults Exclusion: history or physical examination revealed any of : a single DBP> 114 mm Hg, prior episode of malignant hypertension or hypertensive encephalopathy, angina, myocardial infarction within the prior 6 months, CHF, arrhythmia, transient ischemic, cerebrovascular accident, attacks, the presence of a terminal illness. Secondary hypertension excluded by physical examination, history, serum electrolyte levels, and measurements of renal function (plasma creatinine concentration, creatinine clearance, and complete urinalysis). Patients who might be at risk from high potassium intake were also excluded: those with renal insufficiency or baseline serum potassium values > 5.0 mEq/L, patients taking digitalis preparations, and those with chronic diarrhea or history of ulcer disease. Pregnant and nursing women. | Intervention Type(s):  Intervention 1: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: NR Dose: 120 mEq/ day potassium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Placebo Description: Usual diet, placebo Form of Administration: NR Dose: Placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium Status Intervention 1: NR Potassium measure: Compliance assessed by pill count Best potassium measure recorded: 0 Potassium, Method of Validation: Compliance assessed by pill count. Potassium Status Intervention 1: NR  How was blood pressure measured? Measured 2-4 times, weekly during run in, 4 times every 2 weeks during trial. During each visit, three blood pressure measurements were recorded and the average value was considered to be the blood pressure for that day. BP measurements taken at the same time of day and by the same staff. using a random zero sphygmomanometer (Hawksley and Sons, Lancing, Sussex, England) where the subject was seated for 10 minutes before the readings. DBP was recorded as the fifth Korotkoff sound. Patients were advised not to smoke or eat for 30 minutes before each blood pressure reading. | Subgroup: Mild HTN Diastolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -2.50 (95% CI: -5.39 - 0.39) Lethargy Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator RR 1.04 (95% CI: 0.07 - 16.16) Systolic BP-sitting Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator MD -6.29 (95% CI: -11.50 - -1.08) Decreased quality of life Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Comparator RR 0.68 (95% CI: 0.43 - 1.06) |
| Takahashi, 2006125  Location: Japan  Setting: Community  Design: Randomized, parallel  Number of Sites: 2  Study Years: 1998-2000 | Study of: Adults N: 448  Intervention 1: % Male: 31.7 Mean Age/Range/Age at Baseline: mean 56.3 (95% CI 41.2 - 71.4) Race: NR Systolic BP: 127.9 Diastolic BP: 75.9 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.6 % with Hypertension: 23.7 % with history of CVD: NR % with Type 2 diabetes: 3.6 % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 33 Mean Age/Range/Age at Baseline: mean 56.4 (95% CI 40.5-72.4) Race: NR Systolic BP: 128 Diastolic BP: 76.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.2 % with Hypertension: 24.1 % with history of CVD: NR % with Type 2 diabetes: 3.1 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 40–69 years, physician permission to participate for those under medical treatment or dietary control. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Reduce sodium intake to less than 8 and 10 g/day in women and men, respectively Form of Administration: Dietary Modification: Two individual 15-min diet counseling sessions, a group class, and two newsletters Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Not asked to change diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 12 months Exposure to Follow Up Time: NR | Sodium measure: Validated dietary questionnaire and 48 hour urine analysis Best sodium measure recorded: Collected two times 1 year apart. Collected two times 1 year apart. For calculating 24 hour urine, samples were analyzed using a flame photometry and creatinine by Jaffe’s procedure with an autoanalyzer. The expected intakes were calculated using observed urinary excretion, as reported in a carefully designed balance study. Sodium Status Intervention 1: 199 mmol/day Potassium measure: Validated dietary questionnaire and 48 hour urine analysis Best potassium measure recorded: Collected two times 1 year apart. For calculating 24 hour urine, samples were analyzed using a flame photometry and creatinine by Jaffe’s procedure with an autoanalyzer. The expected intakes were calculated using observed urinary excretion, as reported in a carefully designed balance study. Potassium Status Intervention 1: 59 mmol/day  How was blood pressure measured? BP measured by a trained nurse, using sphygmomanometer OKOSE- 300 model based on a common protocol. A single measurement was used. | Diastolic BP-NS Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -0.70 (95% CI: -2.64 - 1.24) Systolic BP-NS Follow-Up Time: 12 months Comparison: Intervention 1 vs Comparator MD -3.20 (95% CI: -5.82 - -0.58) |
| The Trials of Hypertension Prevention Collaborative Research Group, 1992126; Erratum, 1992127; Satterfield, 1991128; Whelton, 1992129; Whelton, 1997130; He, 1999131; Kumanyika, 1993132; Whelton, 1994133; Cook, 200757; Cook, 1998134; Yamamoto, 1995135; Cook, 201662  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The Trials of Hypertension Prevention, phase 1 (TOHP-1)  Number of Sites: 10  Study Years: 1987-1995 (2013 follow-up) | Study of: Adults N: 744  Intervention 1: % Male: 70.9 Mean Age/Range/Age at Baseline: mean 43.4 (SD 6.6) Race: 78 Systolic BP: 124.8 Diastolic BP: 83.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 82.7 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 69.7 Mean Age/Range/Age at Baseline: mean 43.1 (SD 6.6) Race: 84 Systolic BP: 122.6 Diastolic BP: 81.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 83.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 3: % Male: 74.7 Mean Age/Range/Age at Baseline: mean 42.8 (SD 6.5) Race: white 88.8% Systolic BP: 120.7 Diastolic BP: 80.8 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 81.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 71.7 Mean Age/Range/Age at Baseline: mean 42.6 (SD 6.5) Race: white 76.5% Systolic BP: 125.1 Diastolic BP: 83.9 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 82.8 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Healthy adults, ages 30-54 with high normal DBP, not taking antihypertensive drugs for the prior 2 months Exclusion: Clinical or lab evidence of cardiovascular or other disabling or life threatening diseases. Conditions that would contraindicate or require any of the interventions. Unwillingness or inability to comply with data collection or intervention procedures. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: NR Form of Administration: Dietary Modification: Life-style interventions, provided by psychologists, nutritionists, or other experienced counselors, mostly group educational sessions, with some individual counseling Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Other: placebo Dose: Placebo Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Use of potassium supplement to increase potassium levels Description: NR Form of Administration: NR Dose: potassium chloride, 60 mmol/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: Lifestyle intervention 18 months; Nutritional supplement 6 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation, 24-hour diet recall Best sodium measure recorded: 0, 3, 6, months, 12 and 18 months for lifestyle groups Sodium, Method of Validation: Multiple 24-hour urine analysis with validation, 24-hour "diet recall" Sodium Status Intervention 1: 99.4 mmol/24 h Sodium Status Intervention 2: NR Sodium Status Intervention 3: NR Best potassium measure recorded: 0, 3, 6, months, 12 and 18 months for lifestyle groups Potassium Status Intervention 1: NR Potassium Status Intervention 2: Change from baseline -2.4 mmol/24 h Potassium Status Intervention 3: Change from baseline 37.4 mmol/24h  How was blood pressure measured? Collected at 0, 3, 6, months, 12 and 18 months for lifestyle groups. BP was measured with a Hawksley random-zero sphygmomanometer, after sitting at rest for 5 minutes . The average of three readings (first and fifth Korotkoffs sounds) were recorded at each visit. | Subgroup: TOHP-1 CVD disease (myocardial infarction, stroke, revascularisation, or death due to cardiovascular causes) Follow-Up Time: 15 years Comparison: Intervention 1 vs Comparator RR 1.40 (95% CI: 0.80 - 2.46) Total mortality Follow-Up Time: Comparison: Intervention 1 vs Comparator RR 1.05 (95% CI: 0.68 - 1.60) Follow-Up Time:15 years Comparison: Intervention 1 vs Comparator RR 1.10 (95% CI: 0.49 - 2.44)  Cumulative incidence of HTN Follow-Up Time: 7 years Comparison: Intervention 1 vs Comparator RR 1.47 (95% CI: 2.63 - 0.82) Diastolic BP-sitting Follow-Up Time: 7 years Comparison: Intervention 1 vs Comparator MD 0.45 (95% CI: -2.35 - 0.21) Systolic BP-sitting Follow-Up Time: 7 years Comparison: Intervention 1 vs Comparator MD 0.26 (95% CI: -3.22 - 0.13) |
| Todd, 2012136  Location: New Zealand  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14 days  Study Years: unclear | Study of: Adults N: 23  Comparator: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Absence of pre-hypertension or hypertension (i.e SBP >130 mmHg and DBP >85 mmHg or current treatment with antihypertensive therapy); ages 20-65 years; non-smokers; BMI <30 (kg/m2); no history of cardiovascular disease, diabetes or renal disease. | Intervention Type:  Intervention 1: Other: Dietary sodium - low Description: NR Form of Administration: Sodium supplement Dose: Dietary sodium 60 mmol/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Dietary sodium - medium Description: NR Form of Administration: Sodium supplement Dose: Dietary sodium 150 mmol/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Other: Dietary sodium - medium Description: NR Form of Administration: Sodium supplement Dose: dietary sodium 200–250 mmol/day Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: NR Exposure to Follow Up Time: NR | Sodium measure: 8h urine no mention of equation Best sodium measure recorded: collected at weeks 0 and 4 Sodium, Method of Validation: compliance assessed by dietary diaries, urinary electrolytes and plasma LF Sodium Status Intervention 1: Urinary Na : Cr ratio 10.2 Sodium Status Intervention 2: Urinary Na : Cr ratio 18.4  How was blood pressure measured? BP measured at the clinic with a calibrated digital blood pressure monitor at screening and at weeks 0, 1, 2 and 4 of each intervention period. The patients were seated for 5 min at rest before a minimum of four blood pressure readings were taken over a 10 min period. The first reading was not used, and the subsequent three readings were averaged. | Diastolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD 0.40 (95% CI: -2.10 - 2.90) Comparison: Intervention 1 vs Intervention 2 MD 1.40 (95% CI: -0.50 - 3.30) Comparison: Intervention 2 vs Comparator MD 1.00 (95% CI: 0.30 - 1.70) Systolic bp Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD 0.10 (95% CI: -3.40 - 3.60) Comparison: Intervention 1 vs Intervention 2 MD -0.80 (95% CI: -3.30 - 1.70) Comparison: Intervention 2 vs Comparator MD -1.00 (95% CI: -6.70 - 4.70) |
| Todd, 2010137  Location: NR  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: 14 days  Study Years: unclear | Study of: Adults N: 35  Intervention 1: % Male: 38 Mean Age/Range/Age at Baseline: mean 51.8 (SD 7.6) Race: European: 97%; Indian/Asian: 3% Systolic BP: 134 Diastolic BP: 7.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.7 % 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: NR 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: Prehypertension or hypertension, ages 20-65 years, nonsmoker, BMI<30, no history of cardiovascular disease, diabetes, or renal disease. | Intervention Type:  Intervention 1: Other: No Sodium Tomato Juice Description: NR Form of Administration: Dietary Modification: NR Dose: consumption of 500 mL tomato juice/d with 0 mmol sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: 90 mmol sodium - Tomato Juice Description: NR Form of Administration: Dietary Modification: NR Dose: consumption of 500 mL tomato juice/d with 90 mmol sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Other: 140 mmol sodium - Tomato Juice Description: NR Form of Administration: Dietary Modification: NR Dose: consumption of 500 mL tomato juice/d with 140 mmol sodium Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 1 month Exposure to Follow Up Time: NR | Sodium measure: Partial or spot urine without validated prediction equation Best sodium measure recorded: Collected at entry, and at weeks 0 and 4 of intervention Sodium Status Intervention 1: 7.6 sodium:creatinine Sodium Status Comparator: 11.8 sodium:creatinine  How was blood pressure measured? BP was measured with a calibrated digital BP monitor during screening and at weeks 0, 1, 2, and 4 of each intervention. Participants sat for 5 min to rest before 4 BP readings were taken over a 10-min period. The first reading was discarded, and the mean of the subsequent 3 readings were used. | Diastolic BP Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Intervention 2 MD -5.60 (95% CI: -8.50 - -2.70) Comparison: Intervention 1 vs Comparator MD -3.30 (95% CI: -5.10 - -1.50) Systolic BP Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Intervention 2 MD -4.40 (95% CI: -7.60 - -1.20) Comparison: Intervention 1 vs Comparator MD -2.40 (95% CI: -4.00 - -0.80) |
| Tuthill, 1985138  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The Massachusetts Blood Pressure Study, Part 4  Number of Sites: 2  Study Years: unclear | Study of: Children N: 65  Intervention 1: % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 113 Diastolic BP: 71 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  Intervention 3: % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 113.9 Diastolic BP: 71.4 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  Comparator 1: NR % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 113.4 Diastolic BP: 70.1 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  Intervention 2: % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 113.1 Diastolic BP: 69.7 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  Intervention 4: % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 112.4 Diastolic BP: 68.9 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  Comparator 2: NR % Male: 0 Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 111.7 Diastolic BP: 69.3 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: Young females in grades 9-12 Exclusion: One or more of the three consulting physicians considered the student at medical risk if exposed to extra dietary salt. A medical condition, or taking medication which might affect their blood pressure. | Intervention Type(s): Intervention 1: Other: Placebo - Campus 1 Description: NR Form of Administration: Placebo Dose: Placebo tablet twice daily Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 3: Other: Salt pill in evening - Campus 1 Description: NR Form of Administration: Salt substitute Dose: 0.8 gram salt pill in the evening, placebo in morning Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Other: Salt pill in morning - Campus 1 Description: NR Form of Administration: Sodium supplement Dose: 0.8 gram salt pill in the morning, placebo in evening Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Placebo - Campus 2 Description: NR Form of Administration: Other: placebo Dose: Placebo tablet twice daily Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 4: Other: Salt pill in evening - Campus 2 Description: NR Form of Administration: NR Dose: 0.8 gram salt pill in the evening, placebo in morning Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 2: Other: Salt pill in morning - Campus 2 Description: NR Form of Administration: Sodium supplement Dose: 0.8 gram salt pill in the morning, placebo in evening Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 months Exposure to Follow Up Time: NR | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 2 times at baseline, then 8 times 1 week apart Sodium, Method of Validation: Study pills were swallowed in the presence of a research staff member, Multiple 24-hour urine analysis with validation Sodium Status Intervention 1: +250 mg compared to baseline Sodium Status Intervention 3: +550 mg change from baseline Sodium Status Comparator 1: +650 mg change from baseline Sodium Status Intervention 2: -50 mg change from baseline Sodium Status Intervention 4: +450 mg change from baseline Sodium Status Comparator 2: +800 mg compared to baseline Best potassium measure recorded: 2 times at baseline, then 8 times 1 week apart  How was blood pressure measured? BP was measured by two technicians who were blind to each other’s readings and also to the girls intervention status | Subgroup: Girls Diastolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Intervention 5 MD -0.79 (95% CI: NC - NC) Comparison: Intervention 2 vs Arm 8 MD -2.70 (95% CI: NC - NC) Systolic BP-NS Follow-Up Time: 8 weeks Comparison: Intervention 1 vs Intervention 5 MD 0.76 (95% CI: NC - NC) Comparison: Intervention 2 vs Arm 8 MD -0.64 (95% CI: NC - NC) |
| Van Buul, 1997139  Location: Netherlands  Setting: Community  Design: Randomized, parallel  Number of Sites: 2  Study Years: 1986-1993 | Study of: Adults N: 270  Intervention 1: % Male: 0 Mean Age/Range/Age at Baseline: mean 28.1 (min 19.8, max 41.3) Race: NR Systolic BP: 120 Diastolic BP: 65 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  Comparator: % Male: 0 Mean Age/Range/Age at Baseline: mean 28.3 (min 18.1, max 40.5) Race: NR Systolic BP: 121 Diastolic BP: 68 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26.5 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Women with healthy nulliparous pregnant woman with singleton pregnancies were considered Exclusion: Preexisting hypertension, diabetes mellitus, cardiovascular disorder, renal diseases. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Diet containing about 20 mmol/day of sodium Form of Administration: Dietary Modification: Trained dietitians gave oral and written dietary instructions as well as guidance throughout pregnancy Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: No dietary restrictions Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: 1.5 months | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 11 times over 8.5 months Sodium Status Intervention 1: 75 mmol /24 h  How was blood pressure measured? After resting for 5-min, BP was measured in the sitting position using an automatic device (Dinamap 1846 SX, Critikon Inc, Tampa, FL) with an adequately sized cuff. The average of 2 measurements was used for analysis. BP was taken a 9 times over the study period | Diastolic BP-sitting Follow-Up Time: 34 weeks Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -4.53 - 0.53) Incidence of gestation hypertension Follow-Up Time: 34 weeks Comparison: Intervention 1 vs Comparator RR 0.95 (95% CI: 0.50 - 1.81) Systolic BP-sitting Follow-Up Time: 34 weeks Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -6.54 - 0.54) |
| Vongpatanasin, 2016140  Location: US  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: multiple  Crossover: Length of washout period: >=7 days  Study Years: NR | Study of: Adults N: 30  Participants: % Male: 47 Mean Age/Range/Age at Baseline: mean 54 (SD 12) Race: black 40% Systolic BP: 125 Diastolic BP: 81 Magnesium: 2.2 mg/dl Calcium: 9.5 mg/dl Other Minerals: NR Mean BMI: 31 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Prehypertension or stage I hypertension. SBP between 120 and 159 mm Hg, and DBP 80 - 99 mm Hg. No history of: diabetes mellitus renal impairment (serum creatinine > 1.4 mg/dl), active cardiac or liver disease, esophageal-gastric ulcer, gastroesophageal reflux disease, chronic diarrhea, chronic nonsteroidal anti-inflammatory drug use, treatment with diuretics, renal tubular acidosis, hypocalcemia, or hypercalcemia. | Intervention Type(s):  Intervention 1: Other: Potassium Chloride Description: NR Form of Administration: Oral potassium supplement Dose: 40 meq KCl powder/day Na/K ratio: NR Magnesium: 104 mg/day Calcium: 160 mg/day Other Minerals: NR  Intervention 2: Other: Potassium Citrate Description: NR Form of Administration: Oral potassium supplement Dose: 40 meq K3Cit powder/day diluted in water Na/K ratio: NR Magnesium: 100 mg/day Calcium: 148 mg/day Other Minerals: NR  Intervention 3: Other: Potassium Magnesium Citrate Description: NR Form of Administration: Oral potassium supplement Dose: KMgCit, 40 meq K, 20 meq Mg, 74 meq citrate powder/day Na/K ratio: NR Magnesium: 121 mg/day Calcium: 158 mg/day Other Minerals: NR  Comparator: Placebo Description: NR Form of Administration: Placebo Dose: Placebo Na/K ratio: NR Magnesium: 97 mg/day Calcium: 181 mg/day Other Minerals: NR  Duration: 4 periods of 4 weeks each Exposure to Follow Up Time: 0 months | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Collected during the last week of treatment Sodium, Method of Validation: creatinine, Composition of potassium supplement with intervention/exposure adherence measure Sodium Status Intervention 1: 184 meq/day Sodium Status Intervention 2: 190 meq/day Sodium Status Intervention 3: 187 meq/day Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: Collected during the last week of treatment Potassium Status Intervention 1: 58 meq/day Potassium Status Intervention 2: 84 meq/day Potassium Status Intervention 3: 91 meq/day  How was blood pressure measured? At each visit, BP was taken by nursing staff with the same validated oscillometric device, after the patient had been in rest quietly for 5 minutes. Four BP measurement during a single visit was repeated 3 times 1 minute apart, and the mean was taken. | Subgroup: Hypertensives and prehypertensives 24 hr diastolic BP Follow-Up Time: 4 weeks Comparison: Intervention 3 vs Comparator MD -1.00 (95% CI: -4.77 - 2.77) Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -5.63 - 1.63) Comparison: Intervention 2 vs Comparator MD -2.00 (95% CI: -5.63 - 1.63) 24 hr systolic BP Follow-Up Time: 4 weeks Comparison: Intervention 3 vs Comparator MD -2.00 (95% CI: -6.34 - 2.34) Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -7.13 - 1.13) Comparison: Intervention 2 vs Comparator MD -2.00 (95% CI: -6.22 - 2.22) |
| Weir, 2010141  Location: US  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: Multiple  Crossover: Length of washout period: 0 days  Study Years: NR | Study of: Adults N: 132  Intervention 1: % Male: 55 Mean Age/Range/Age at Baseline: 51.5+/-7.4 Race: 86% white; 11% black; 2% Asian; 1% Hispanic Systolic BP: 138.9+/-8.4 Diastolic BP: 87.1+/-7.0 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.4+/-2.8 % with Hypertension: 100 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: NR  Comparator: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: 18 to 60 years of age; provision of written informed consent; mean daytime SBP at screening 135 mm Hg and <160 mm Hg, and use of acceptable form of contraception for women of childbearing potential. Exclusion: secondary hypertension, history of myocardial infarction, or heart failure within the preceding 6 months, unstable angina pectoris, second- or third-degree heart block, clinically significant arrhythmias or use of antiarrhythmic drugs (including digoxin), clinically significant valvular heart disease, diabetes mellitus, estimated glomerular filtration rate <60 mL/min per 1.73 m2 , body mass index (BMI) >30 kg/m2, use of a-blockers or >2 antihypertensive agents, pregnancy or lactation, or history of malignancy within the past 5 years | Intervention Type:  Intervention 1: Usual Diet Description: To achieve dietary sodium >200 mmol/d sodium Form of Administration: Dietary Modification: low sodium diet, not described Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: To achieve sodium status <=100 mmol/d Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 4 weeks Exposure to Follow Up Time: 0 months | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: 3 times, at baseline and at the end of each treatment period Sodium, Method of Validation: Creatinine Sodium Status Intervention 1: 207.6 mmol/d Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: Twenty-four hour ABPM was conducted on all patients at baseline, week 4, and week 8 Potassium, Method of Validation: NR Potassium Status Intervention 1: NR  How was blood pressure measured? calibrated standard mercury sphygmomanometers and the recommended cuff sizes in accordance with the 1988 American Heart Association Committee Report on Blood Pressure Determination; Twenty-four hour ABPM was conducted on all patients at baseline, week 4, and week 8. | Subgroup: Hypertensives Diastolic BP, 24 hr mean ambulatory Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -5.70 (95% CI: -6.90 - -4.40) Systolic BP, 24 hr mean ambulatory Follow-Up Time: 4 weeks Comparison: Intervention 1 vs Comparator MD -9.40 (95% CI: -11.40 - -7.50) |
| Whelton, 1998142; Appel, 2001143; Espeland, 1999144; Banson, 1997145; Appel, 1995 146; Kostis, 1998147; Whelton, 1997148  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Trial of nonpharmacological interventions in the elderly (TONE)  Number of Sites: 4  Study Years: 1992-1995 | Study of: Adults 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. | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: 24/h dietary sodium intake <= 80 mmol Form of Administration: Dietary Modification: Nutritionists conducted small group and individual meetings to advise patients on ways to change eating patterns Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: NR Description: 24/h dietary sodium intake <= 80 mmol Form of Administration: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: NR Description: Participants asked not to change their usual diet Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: NR Exposure to Follow Up Time: NR | 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 Intervention 1: 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 | Angina Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 1.88 (95% CI: 0.85 - 4.17) CVD(Stroke, Transient ischemic attack, MI, Arrythmia, Congestive heart failure, Angina, Other) Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 1.27 (95% CI: 0.85 - 1.92) Diastolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -3.19 - -0.81) Dizziness Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 0.62 (95% CI: 0.33 - 1.17) MI Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 1.99 (95% CI: 0.37 - 10.81) Percent free of elevated BP Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 1.60 (95% CI: 1.29 - 1.98) Stroke Follow-Up Time: 33 months Comparison: Intervention 1 vs Comparator RR 1.99 (95% CI: 0.18 - 21.89) Systolic BP-sitting Follow-Up Time: 3.5 months Comparison: Intervention 1 vs Comparator MD -4.20 (95% CI: -5.93 - -2.47) |
| Whitten, 1980149  Location: US  Setting: Community  Design:  Number of Sites: multiple  Study Years: unclear | Study of: Children N: 27  Intervention 1: % Male: 100 Mean Age/Range/Age at Baseline: NR Race: black: 100% Systolic BP: 97 Diastolic BP: 49 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 6.9 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 100 Mean Age/Range/Age at Baseline: NR Race: black: 100% Systolic BP: 102 Diastolic BP: 50 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 7 Kg % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Infants that had experienced no illnesses other than respiratory infections and were products of full term pregnancies. | Intervention Type:  Intervention 1: Other: Low salt group Description: Intended sodium intake of 2 mEq Na/100 kcal Form of Administration: Dietary Modification: low salt baby formula Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR   Comparator: Other: High salt Description: Intended sodium intake of 9 mEq Na/100 kcal Form of Administration: Dietary Modification: higher salt baby formula Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 5 months Exposure to Follow Up Time: NR | Sodium measure: 72 hour urine analysis Best sodium measure recorded: 3 times, 2 months apart Sodium Status Intervention 1: 11.3 mEq 24 h Potassium measure: 72 hour urine analysis Best potassium measure recorded: 3 times, 2 months apart Potassium Status Intervention 1: 13.1 mEq 24 h  How was blood pressure measured? BP measurements were done using an Air Shield Blood Pressure Monitor attached to the right arm of infant which automatically inflated the cuff to 180 mmHg every 5 min. Readings were recorded 6 to 12 times during the 3 daily nursing shifts over a 72-hour period or longer. Only measurements made while the infants were asleep and approximately an hour after feeding were used. | Subgroup: Black male infants Diastolic BP-sitting Follow-Up Time: 8 years Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -6.16 - 2.16) Diastolic BP-supine Follow-Up Time: 5 months Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -4.77 - 2.77) Systolic BP-sitting Follow-Up Time: 8 years Comparison: Intervention 1 vs Comparator MD -1.00 (95% CI: -5.18 - 3.18) Systolic BP-supine Follow-Up Time: 5 months Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -6.16 - 2.16) |
| Wing, 1998150  Location: Australia  Setting: Community  Design: Randomized Cross-over individual  Number of Sites: 1  Crossover: Length of washout period: 0 days  Study Years: NR | Study of: Adults N: 17  Participants: % Male: 82 Mean Age/Range/Age at Baseline: 61 median Race: NR Systolic BP: 165+/-4 Diastolic BP: 104+/-2 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 100 % with history of CVD: 0 % with Type 2 diabetes: 0 % with Kidney disease: 0 % with history of Kidney stones: NR  Inclusion: essential hypertensives; aged 18–80 years; untreated sitting clinic diastolic blood pressure of >95 and <115 mmHg measured by standard mercury sphygmomanometer Exclusion: secondary hypertension of any cause, a past history of malignant hypertension, myocardial infarction or unstable angina in the previous 6 months, a stroke or transient cerebral ischaemic attack in the previous year, any evidence of cardiac failure or haemodynamically significant valvular heart disease, unstable diabetes mellitus (50% of home blood glucose values >12 mmol/L or haemoglobin A1C >8.5%), any significant renal or hepatic disease, any other significant illness likely to interfere with survival (e.g. malignancy), known intolerance to the classes of drug being used in the study or the presence of conditions likely to be exacerbated by the study treatments (e.g. plasma potassium concentration <3.0 mmol/L, gout or plasma uric acid >0.50 mmol/L), were women who were pregnant or lactating or if they had anticipated poor compliance with the study protocol or treatment regimens | Intervention Type(s):  Intervention 1: Dietary/lifestyle counseling (single or multiple sessions, including dietary advice) to reduce sodium intake Description: Use of low sodium diet and placebo salt pills to reduce sodium intake to <100mM in participants on perindopril Form of Administration: Dietary Modification: Low sodium diet not described Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Use of salt pills to increase sodium intake Description: Administration of salt tablets to participants on low sodium diet in participants on perindoprilto achieve usual sodium intake Form of Administration: Dietary Modification: Low sodium diet not described Sodium supplement Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 2 periods of 4 weeks each Exposure to Follow Up Time: 0 months | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: NR Sodium, Method of Validation: creatinine Sodium Status Intervention 1: 99 mmol/d Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: NR Potassium, Method of Validation: NR Potassium Status Intervention 1: NR  How was blood pressure measured? semiautomatic sphygmomanometer (Dinamap Vital Signs Monitor 8100, CRITIKON) and an inflatable cuff appropriate for the patient’s arm size | Subgroup: Hypertensives 24-h ambulatory diastolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -2.00 (95% CI: -4.11 - 0.11) 24-h ambulatory systolic BP Follow-Up Time: 6 weeks Comparison: Intervention 1 vs Comparator MD -5.00 (95% CI: -9.22 - -0.78) |
| Xie, 1998151  Location: China  Setting: Community  Design: Cluster RCT Parallel  Number of Sites:  Study Years: unclear | Study of: Adults N: 169  Intervention 1: % Male: 80 Mean Age/Range/Age at Baseline: mean 60 (SD 6) Race: NR Systolic BP: 161.86 Diastolic BP: 96.47 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.9 % 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: 62.3 Mean Age/Range/Age at Baseline: mean 55 (SD 6) Race: NR Systolic BP: 168.79 Diastolic BP: 100.41 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 26 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: persistently elevated DBP of >= 95 mmHg and/or SBP >= 160 mmHg | Intervention Type(s):  Intervention 1: NR Description: The education included counselling on nonpharmacological treatment (weight reduction, salt moderation, physical exercise, alcohol moderation, and psychological relaxing assisted by biofeedback instrument), medication compliance, monitoring of progress toward target BP, self-measurement of BP, other risk reduction (smoking, lipids), and the keeping of appointments. Form of Administration: Dietary Modification: NR Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Other: Usual care Description: NR Form of Administration: Usual diet Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 36 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times over 3 years Sodium Status Intervention 1: 98.24 mmol/24h  How was blood pressure measured? unclear CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Unclear | Subgroup: Chinese Diastolic BP-NS Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator MD 0.50 (95% CI: -1.96 - 2.96) Left ventricular hypertrophy-PWT (cm) Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator MD 0.11 (95% CI: -0.60 - 0.82) Percent under control Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator RR 1.31 (95% CI: 1.04 - 1.65) Systolic BP-NS Follow-Up Time: 2 years Comparison: Intervention 1 vs Comparator MD 2.60 (95% CI: -1.99 - 7.19) |
| Zhao, 2014152  Location: Tibet  Setting: Community  Design: Randomized, parallel  Number of Sites: multiple  Study Years: 2009 | Study of: Adults N: 282  Participants: % Male: 41.1 Mean Age/Range/Age at Baseline: 63.1 Race: NR Systolic BP: 176.9 Diastolic BP: 104.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.6 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Aged>40, SBP > 140 mmHg Exclusion: Not able to travel, living to far | Intervention Type(s):  Intervention 1: Use of potassium product as salt (sodium) substitute to reduce sodium intake Description: Salt substitute to decrease sodium intake Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator: Usual Diet Description: Regular salt Form of Administration: Regular Salt Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 3 months Exposure to Follow Up Time: NR | Sodium measure: For 'selected' families, salt that was delivered as part of the study was weighed at baseline then at follow up. Questions were also asked to gauge salt consumption. Daily salt and potassium intake as estimated based on this. Sodium Status Intervention 1: 20 grams/day Potassium measure: For 'selected' families, salt that was delivered as part of the study was weighed at baseline then at follow up. Questions were also asked to gauge salt consumption. Daily salt and potassium intake as estimated based on this. Potassium Status Intervention 1: 7.7 grams/day higher than control group  How was blood pressure measured? BP taken with three consecutive blood pressure measurements (with at least one minute’s rest between each measurement) from a seated patients’ right arm in a quiet room. A previously validated electronic sphygmomanometer was used. BP taken at baseline and after 3 months of follow up. | Subgroup: HTN Deaths Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 2.00 (95% CI: 0.18 - 21.81) Diastolic BP-sitting Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -3.00 (95% CI: -5.64 - -0.36) Percent taking antihypertensives Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 1.34 (95% CI: 0.96 - 1.87) Percent under control Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 2.18 (95% CI: 1.07 - 4.46) Systolic BP-sitting Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator MD -7.70 (95% CI: -12.78 - -2.62) Decreased quality of life Follow-Up Time: 3 months Comparison: Intervention 1 vs Comparator RR 0.50 (95% CI: 0.05 - 5.45) |
| Zhou, 2016153; Zhou, 2013154  Location: China  Setting: Community  Design: Cluster RCT Parallel  Number of Sites: multiple  Study Years: unclear | Study of: Both adults and children N: 462  Participants: % 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Families were at least one member was a hypertension patient; the participant had an estimated daily sodium intake of \_260 mmol per day; Individuals were at least 18 years of age and had no significant renal impairment or other indication for a potassium-sparing medication. Exclusion: Moving | Intervention Type(s): Duration: NR Exposure to Follow Up Time: NR |  | Diastolic BP-sitting Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator MD -4.62 (95% CI: -6.62 - -2.62) Percent taking antihypertensives Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator RR 1.68 (95% CI: 1.26 - 2.23) Systolic BP-sitting Follow-Up Time: 36 months Comparison: Intervention 1 vs Comparator MD -5.72 (95% CI: -8.65 - -2.79) |
| Zhou, 2009155  Location: China  Setting: Community  Design: Randomized, parallel  Number of Sites: 10  Study Years: 2003-2004 | Study of: Adults N: 248  Intervention 1: % Male: 43.5 Mean Age/Range/Age at Baseline: mean 67.5 (SD 5.2) Race: NR Systolic BP: 159.7 Diastolic BP: 83.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 25.2 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 1: NR % Male: 42.2 Mean Age/Range/Age at Baseline: mean 65.7 (SD 6.3) Race: NR Systolic BP: 157.7 Diastolic BP: 82.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 24.9 % with Hypertension: 100 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 49.1 Mean Age/Range/Age at Baseline: mean 68.1 (SD 8.3) Race: NR Systolic BP: 125 Diastolic BP: 74.3 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.9 % with Hypertension: 0 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator 2: NR % Male: 44.6 Mean Age/Range/Age at Baseline: mean 65.4 (SD 4.5) Race: NR Systolic BP: 123.8 Diastolic BP: 74.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 23.7 % with Hypertension: 0 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 50–80, with normal BP or mild to moderate hypertension. No more than one meal outside the home per week, not currently taking potassium-sparing drugs, willingness to undertake long-term use of CISalt. Serum potassium <5.5mmol/l and net elevation of serum potassium <1.0mmol/l at the end of the run-in period Exclusion: Heart attack or stroke within the last 6 months, current angina pectoris, congestive heart failure, diabetes mellitus, serious mental or physical illness, secondary hypertension, malignancy, use of potassium-sparing diuretics, impairment of renal function. | Intervention Type(s): Intervention 1: Other: Low sodium salt-Hypertensives Description: Total of 3 kg a month of study salt (lower sodium) was given to each participant’s family to cover all cooking and other uses Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 1: Other: Normal salt - Hypertensives Description: Total of 3 kg a month of normal salt was given to each participant’s family to cover all cooking and other uses Form of Administration: Regular Salt Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Intervention 2: Other: Low sodium salt-Normotensives Description: Total of 3 kg a month of study salt (lower sodium) was given to each participant’s family to cover all cooking and other uses Form of Administration: Salt substitute Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Comparator 2: Other: Normal salt - Normotensives Description: Total of 3 kg a month of normal salt was given to each participant’s family to cover all cooking and other uses. Form of Administration: Other: Regular salt Dose: NR Na/K ratio: NR Magnesium: NR Calcium: NR Other Minerals: NR  Duration: 6 months Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 2 times, 6 months apart Sodium Status Intervention 1: 162 mmol/24 h Sodium Status Comparator 1: 233 mmol/24 h Sodium Status Intervention 2: 162 mmol/24 h Sodium Status Comparator 2: 231 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 2 times, 6 months apart  Potassium Status Intervention 1: 34.2 mmol/24 h Potassium Status Comparator 1: 27.0 mmol/24 h Potassium Status Intervention 2: 33.1 mmol/24 h Potassium Status Comparator 2: 23.0 mmol/24 h  How was blood pressure measured? BP was measured by two experienced physicians. SBP was taken as the point of appearance (phase 1) of Korotkoff sounds and DBP was measured as the point of disappearance (phase 5). | Subgroup: Normotensive Diastolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 2 vs Comparator 2 MD -4.80 (95% CI: -7.05 - -2.55) Systolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 2 vs Comparator 2 MD -5.80 (95% CI: -8.66 - -2.94)  Subgroup: Hypertensive Diastolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator 1 MD -5.20 (95% CI: -8.09 - -2.31) Systolic BP-NS Follow-Up Time: 6 months Comparison: Intervention 1 vs Comparator 1 MD -9.80 (95% CI: -13.75 - -5.85) |

**Table C2. Evidence table for all observational studies**

| **Study** | **Participants** | **Exposure** | **Intake Status Ascertainment** | **Results** |
| --- | --- | --- | --- | --- |
| Adebamowo, 2015156; Erratum, 2015157; Iso, 1999158; Stampfer, 1985159  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Nurses Health Study  . | Study of: Adults N: 180864  % Male: NR Mean Age/Range/Age at Baseline: reported by study cohort and K quartile NHS I q1 mean 58 (SD 7) years q3 mean 60 (SD 7) years q5 mean 62 (SD 7) years NHS II q1 mean 40 (SD 5) years q3 mean 41 (SD 5) years q5 mean 42 (SD 4) years Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: reported by study cohort and K quartiles NHS I q1 26.4 (SD 5.5) q3 26.4 (SD 5.1) q5 26.5 (SD 5.2) NHS II q1 26.0 (SD 6.5) q3 25.6 (SD 5.7) q5 25.6 (SD 5.5) % 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 female registered nurses between 25 to 55 years old who enrolled in 1976 or 1989 Exclusion: Excluded those with prevalent cancer, stroke, or IHD at baseline, and those showed evidence of possible low or high energy intakes, and those failed to provide complete diet info. | Exposure Type: Total potassium intake (dietary + supplemental) Exposure Unit: mg/day  Exposure Type: Total potassium intake (dietary) Exposure Unit: mg/day  Exposure Type: Total potassium intake (supplemental) Exposure Unit: mg/day  Duration: NR Exposure to Follow Up Time: 30 years of follow-up in NHS I and 22 years of follow-up in NHS II  Dose format: median Q1, Dose: 2275 for I; 2381 for II Q1, Dose: 2282 for I; 2386 for II Q1, Dose: NR Q2, Dose: 2623 for I; 2744 for II Q2, Dose: 2633 for I; 2750 for II Q2, Dose: NR Q3, Dose: 2865 for I; 2992 for II Q3, Dose: 2879 for I; 3000 for II Q3, Dose: NR Q4, Dose: 3115 for I; 3248 for II Q4, Dose: 3133 for I; 3257 for II Q4, Dose: NR Q5, Dose: 3500 for I; 3642 for II Q5, Dose: 3526 for I; 3654 for II Q5, Dose: NR | Sodium, Method of Validation: Food diaries with reported validation Best potassium measure recorded: Used food frequency questionnaire to collect diet info with specific questions about potassium supplements Potassium, Method of Validation: Cited a validation study testing the correlations between mineral intake assessed by FFQ and by 1-week diet records. Mortality Outcomes-Method of Ascertainment: Death certificate, Postal authorities, National death index, Medical records, Autopsy reports CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Medical files, Followup questionnaire | Total stroke (Self-report and medical record reviews) (mg/day/Outcome): 30 y in the NHS I; 22 y in the NHS II FU Q1 cases: 662, total: 35570, Q1 cases: 666, total: NR, Q1 cases: NR, total: NR, Q2 cases: 679, total: 37364, Q2 cases: 736, total: NR, Q2 cases: NR, total: NR, Q3 cases: 735, total: 35631, Q3 cases: 746, total: NR, Q3 cases: NR, total: NR, Q4 cases: 782, total: NR, Q4 cases: 836, total: 37363, Q4 cases: NR, total: NR, Q5 cases: 850, total: NR, Q5 cases: 868, total: 34936, Q5 cases: NR, total: NR Adjustment: Age, calendar year, total calories (quintiles of kcal), BMI (in kg/m2; ,25, 25 to ,30, or $30), parental history of heart disease (aged #60 y), alcohol intake (0, 0 to ,5, 5 to ,10, 10 to ,15, or $15 g/d), physical activity (,3, 3 to ,9, 9 to,18, 18 to ,27, or $27 metabolic equivalent tasks/wk), smoking, postmenopausal hormone therapy, oral contraceptive use (never, past, or current), menopausal status (premenopausal or postmenopausal), aspirin (0 to ,2 or $2 pills/wk), multivitamin, history of hypertension, hypercholesterolemia, diabetes at baseline, and thiazide use (yes or no); for intakes of magnesium and calcium (quintiles of g/d). NHS, Nurses’ Health Study. No association between potassium intake and total stroke risk among NHS I and NHS II participants. Total potassium intake was inversely associated with risk of total stroke, but not ischemic or hemorrhagic stroke. Comparing women in the highest to lowest quintiles of total potassium intake, the pooled multivariate RR for total stroke was 0.89 (95% CI: 0.80, 0.99; P-trend = 0.01). |
| Alderman, 1997160; Alderman, 1995161  Location: US  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults N: 2937  % Male: 64.7 Mean Age/Range/Age at Baseline: men mean 52 (SD 10) years; women mean 54 (SD 9) years Race: NR Systolic BP: men mean 150; women mean 150 Diastolic BP: men mean 98; women mean 94 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: men mean 27.5; women mean 28.2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Need Alderman article to answer this question Exclusion: Need Alderman article to answer this question | Exposure Type: 24-h urinary sodium excretion Exposure Unit: mmol/d  Duration(in months): unclear Exposure to Follow Up Time: 3.8 years  Dose format: range Q1, Dose: <89 mmol Q2, Dose: 89-126 mmol Q3, Dose: 127-174 mmol Q4, Dose: >=175 mmol | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Single 24-hr urine analysis at beginning of the program Sodium, Method of Validation: Validated by using formula described by Cockcroft and Gault and Robertshaw et al. Only included patients whose estimated urinary creatinine clearance values fall within +/-35% of the observed values Mortality Outcomes-Method of Ascertainment: Hospital records, Death certificate CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports | CVD (Cardiovascular disease, includes myocardial infarction (MI), stroke, coronary revascularization, unstable angina, congestive heart failure. and other CVD deaths. CVD events included MI (code 410) and cerebrovascular disease (codes 430 to 434 and 436 to 43) (mmol/d/Outcome): Average 3.8 years FU Q1 cases: 14.2 (unadjusted case specific incidence rates per 1000 person-years), total: NR, Q2 cases: 9.6, total: NR, Q3 cases: 10.5, total: NR, Q4 cases: 7.6, total: NR Adjustment: Unadjusted No statistically significant association was observed.  MI (Myocardial Infarction incidence code 410) (mmol/d/Outcome): Average 3.8 years FU Q1 cases: 8.1 (unadjusted case specific incidence rates per 1000 person-years), total: NR, Q2 cases: 4.1, total: NR, Q3 cases: 4.5, total: NR, Q4 cases: 2.9, total: NR Adjustment: Unadjusted No statistically significant association was observed.  Non-CVD (Includes hospitalizations, emergency room visits, and deaths.) (mmol/d/Outcome): Average 3.8 years FU Q1 cases: 18.8 (unadjusted case specific incidence rates per 1000 person-years), total: NR, Q2 cases: 12.7, total: NR, Q3 cases: 11.6, total: NR, Q4 cases: 15.9, total: NR Adjustment: Unadjusted No statistically significant association was observed.  Stroke (Stroke Incidence) (mmol/d/Outcome): Average 3.8 years FU Q1 cases: 2.1 (unadjusted case specific incidence rates per 1000 person-years), total: NR, Q2 cases: 2.1, total: NR, Q3 cases: 2.2, total: NR, Q4 cases: 1.8, total: NR Adjustment: Unadjusted No statistically significant association was observed. |
| Alderman, 1998162  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES I  . | Study of: Adults N: 11346  % Male: 39.5 Mean Age/Range/Age at Baseline: men 52 (SD9) years; women 46 (SD 7) years Race: NR Systolic BP: men 138 women 134 Diastolic BP: men 86 women 82 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight men 76 (SD 6) kg; women 66 (SD 1) kg % with Hypertension: men 18 women 15 % with history of CVD: men 15 women 11 % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: NHANES I participants who underwent medical examination, underwent a 24h recall nutrition investigation Exclusion: Those whose sodium intake data were missing | Exposure Type: Sodium Exposure Unit: mg  Duration: NR Exposure to Follow Up Time: up to 21 years  CVD mortality (CVD mortality) Dose format: NR per SD (1313mg), Dose: NR  All-cause mortality (All-cause mortality) Dose format: NR per SD (1313mg), Dose: mean 2515 mg and 1701 mg in men and women | Sodium measure: 24-hour diet recall Best sodium measure recorded: Single 24h diet recall Sodium, Method of Validation: NR Mortality Outcomes-Method of Ascertainment: Interview, tracing, national death index searches, deaths confirmed from death certificates | All-cause mortality (All-cause mortality) (mg/Outcome): NR FU per SD (1313mg) cases: NR, total: 11346 Adjustment: Male, black race, history of CVD, history of hypertension, age (years), BMI (kg/m2), systolic blood pressure (mm Hg), calories (kcal), sodium/calories (mg/kcal), table salt use (always), table salt use (never) No significant association between sodium intake and all-cause mortality.  CVD mortality (CVD mortality) (mg/Outcome): NR FU per SD (1313mg) cases: NR, total: 11346 Adjustment: Male, black race, history of CVD, history of hypertension, age (years), BMI (kg/m2), systolic blood pressure (mm Hg), calories (kcal), sodium/calories (mg/kcal), table salt use (always), table salt use (never) No significant association between sodium intake and CVD mortality. |
| Araki, 2015163; Araki, 2013164  Location: Japan  Setting: Community  Design: Prospective Cohort study  Study Name: Shiga Prospective Observational Follow-up Study  . | Study of: Adults  % Male: 57.8 Mean Age/Range/Age at Baseline: mean 59 (SD 10) years Race: NR Systolic BP: mean 134 (SD 18) Diastolic BP: mean 77 (SD 10) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 23.5 (SD 3.3) % with Hypertension: 46.9 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included patients with type 2 diabetes and with eGFR>=60 ml/min per 1.73 m2 Exclusion: Excluded those with a history of CVD and those using any diuretics. | Duration: NR Exposure to Follow Up Time: a median of 11 years | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: completed one 24-hr urine analysis at baseline Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: completed one 24-hr urine analysis at baseline | See subgroup table for results |
| Ascherio, 1992165; Rimm, 1991166; Ascherio, 1997167  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: Health Professionals Follow-up Study  . | Study of: Adults N: 30681  % Male: 100 Mean Age/Range/Age at Baseline: 40 to 75 yr Race: NR Systolic BP: mean= 125.5 mmHg at age 40-44 and 133.7 mmHg at age 70-75 Diastolic BP: mean= 79.3 mmHg at age 40-44, 80.4 mmHg at age 60-64, and 79.7 at age 70-75 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: HPFS began in 1986 and follow-up questionnaires were sent in 1987, 1988, and 1990 and included health professionals 40 - 75 years old. Exclusion: Analyses excluded men who did not satisfy the a priori criteria of daily caloric intake between 800 and 4200 kcal and fewer than 70 blanks out of 131 total listed food items in FFQ; and men who reported on the 1986 questionnaire a diagnosis of cancer, MI, angina, stroke, coronary artery surgery, HTN, diabetes, renal failure, high blood cholesterol, or use of digoxin, nitrates, diuretics, beta-blockers, calcium antagonists, or other antihypertensive drugs. | Exposure Type: Potassium intake Exposure Unit: g/day  Duration(in months): about 4 years Exposure to Follow Up Time: NR  Diastolic BP (Self reported), Systolic BP (Self reported) Dose format: continuous All, Dose: NR Q1, Dose: <2.40 Q2, Dose: 2.40-2.79 Q3, Dose: 2.80-3.19 Q4, Dose: 3.20-3.59 Q5, Dose: >=3.60  Hypertension (Self reported) Dose format: range Q1, Dose: <2.40 Q2, Dose: 2.40-2.79 Q3, Dose: 2.80-3.19 Q4, Dose: 3.20-3.59 Q5, Dose: >=3.60 | Sodium, Method of Validation: Use of a published food frequency questionnaire Best potassium measure recorded: 1 time at baseline Potassium, Method of Validation: The reproducibility and validity of the FFQ was previously measured compared with 2 weeks dietary records in a subsample of 127 men.  How was blood pressure measured? Self-reported BP and HTN diagnosis at baseline and subsequent biennial questionnaires. A random sample of 100 participants were contacted to obtain confirmation of the HTN diagnosis. | Diastolic BP (Self reported) (g/day/Outcome): 4 years FU All cases: NR, total: 18676, 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: Age, age^2, Quetelet's index, alcohol consumption, and intakes of calcium, magnesium, potassium, and fiber No significant association between potassium intake and diastolic blood pressure. Significant inverse association between potassium intake and diastolic blood pressures while the four nutrients were controlled simultaneously.  Hypertension (Self reported) (g/day/Outcome): 4 years FU Q1 cases: 79, total: 1466, Q2 cases: 170, total: 3857, Q3 cases: 270, total: 7002, Q4 cases: 322, total: 7520, Q5 cases: 407, total: 10836 Adjustment: Age, Quetelet's index, alcohol consumption, and intakes of magnesium, potassium, and fiber No significant association between potassium intake and risk for hypertension.  Systolic BP (Self reported) (g/day/Outcome): 4 years FU All cases: NR, total: 10911, 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: Age, age^2, Quetelet's index, alcohol consumption, and intakes of calcium, magnesium, potassium, and fiber No significant association between potassium intake and systolic blood pressure. No significant association between potassium intake and systolic blood pressure. |
| Ascherio, 1998167; Ascherio, 1992165  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: Health Professionals Follow-up Study  . | Study of: Adults N: 43738  % Male: NR Mean Age/Range/Age at Baseline: NR Race: NR Systolic BP: 131 Diastolic BP: 82 Magnesium: 277 Calcium: 0.7 Other Minerals: NR Mean BMI: NR % with Hypertension: 18.5 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: HPPS included male health professionals between 40-75 years old, including 1600 podiatrists, 2218 osteopathic physicians, 3745 optometrists, 4185 pharmacists, 10098 veterinary surgeons, and 29 683 dentists. Exclusion: Analysis excluded men who failed to meet a priori criteria of daily caloric intake between 800-4200 kcal and leaving 70/131 food items blank. Excluded men with prior diagnosis of myocardial infarction, angina, coronary artery surgery, stroke, transient ischemic attack, peripheral arterial disease, or diabetes. | Exposure Type: Potassium calculations based on FFQ Exposure Unit: g/d  Duration: NR Exposure to Follow Up Time: up to 9 years  Dose format: median Q1, Dose: 2.4 Q2, Dose: 3 Q3, Dose: 3.3 Q4, Dose: 3.6 Q5, Dose: 4.3 | Sodium, Method of Validation: Use of a published food frequency questionnaire Best potassium measure recorded: one food frequency questionnaire Potassium, Method of Validation: Study assessed questionnaire validity in a random sample of 127 men who completed two 1-week diet records. Mortality Outcomes-Method of Ascertainment: National death index CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Death certificate reports, medical records | Total stroke (Fatal and nonfatal strokes occurring between the return of the baseline questionnaire and January 31, 1994) (g/d/Outcome): 8 years FU Q1 cases: 76, total: NR, person-years: 67605, Q2 cases: 65, total: NR, person-years: 67003, Q3 cases: 62, total: NR, person-years: 65826, Q4 cases: 64, total: NR, person-years: 63708, Q5 cases: 61, total: NR, person-years: 59253 Adjustment: Age (5-year categories), total energy intake (continuous variable), smoking (current, past, and 1–14, 15–24, and 25 cigarettes/d), alcohol consumption ( 5, 5–9, 10–14, 15–29, 30 g/d), history of hypertension, history of hypercholesterolemia, parental history of myocardial infarction before age 65 years, profession, and quintiles of body mass index and physical activity, fiber intake, magnesium intake Comparing men in the top fifth to those in bottom fifth of potassium intake, the age-adjusted RR of total stroke was 0.59. After adjusting for non-dietary risk factors, this age-adjusted RR was slightly attenuated (RR 0.62); and it was further attenuated by additional adjustment for intakes of magnesium and dietary fiber (RR 0.69). |
| Bazzano, 2001168  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES I  . | Study of: Adults N: 9805   Inclusion: NHANES I participants between 25-74 years old at baseline examinations. Exclusion: Excluded those who self-reported history of heart attack, heart failure, or stroke at baseline or had used medication for heart disease 6 months before baseline examinations. Excluded participants who did not complete a 24-hour dietary recall. | Exposure Type: Dietary potassium intake Exposure Unit: mmol/24h  Duration: NR Exposure to Follow Up Time: up to 10 years  Dose format: range Q1, Dose: <34.6 Q2, Dose: 34.6-49.8 Q2+Q3+Q4 vs Q1, Dose: NR Q3, Dose: 49.8-68.4 Q4, Dose: >68.4 | Sodium, Method of Validation: 24-hour "diet recall" Best potassium measure recorded: one 24 hour dietary recall CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Interview with participant or proxy, Death certificate reports | Incident stroke ((ICD-9) code of 430– 434.9, 436, or 437.0 – 437.1 or 1 hospital and/or nursing home stay in which the participant had a discharge diagnosis with 1 of these codes.) (mmol/24h/Outcome): Average 19 years FU Q1 cases: 287, total: 2452, person-years: 39214, Q2+Q3+Q4 vs Q1 cases: NR, total: NR, Q2 cases: 230, total: 2451, person-years: 39945, Q3 cases: 235, total: 2450, person-years: 40978, Q4 cases: 175, total: 2452, person-years: 41834 Adjustment: Age, race, sex, energy intake, systolic BP, serum cholesterol, body mass index, history of diabetes, regular alcohol consumption, current cigarette smoking, vitamin supplement use, saturated fat intake, cholesterol intake, sodium intake, calcium intake, dietary fiber, vitamin C intake, and vitamin A intake (n 9244). Among quartiles of potassium intake, stroke hazard was significantly different (likelihood ratio P 0.03); although linear trend across quartiles did not yield statistically significant result (P 0.14). No significant association between potassium intake and risk of stroke. |
| Bongard, 2016169  Location: France  Setting: Community  Design: Prospective Cohort study  Study Name: The MONICA (MONItoring of trends and determinants in CArdiovascular disease) Project  . | Study of: Adults N: 960  % Male: NR Mean Age/Range/Age at Baseline: mean 55.5 (SD 6.2) years Race: NR Systolic BP: mean 139.5 (SD 19.2) Diastolic BP: mean 86.3 (SD 11.7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 27.2 (SD 4) % with Hypertension: NR % with history of CVD: 62% % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included participants who were randomly selected from nearby French neighborhoods, and who agreed to participate in the study without financial compensation. Exclusion: Excluded those who had incomplete baseline evaluation data. | Exposure Type: Dietary sodium Exposure Unit: mg/day  Duration: NR Exposure to Follow Up Time: a median of 14.8 years  Dose format: range Q1, Dose: 297-1580 mg/day Q2, Dose: 1580-2061 mg/day Q3, Dose: 2061-2699 mg/day Q4, Dose: 2699-7626 mg/day | Sodium measure: 3-day food record with reported validation Best sodium measure recorded: one 3-day food record at baseline. Sodium, Method of Validation: Participants were followed up by a dietitian to verify the reliability of their food records. Mortality Outcomes-Method of Ascertainment: National database | All-cause mortality (Death from all causes) (mg/day/Outcome): Median 14.8 years FU Q1 cases: NR, total: NR, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Center, age, payment of income tax, obesity, alcohol consumption (no consumption, moderate intake, high intake or former consumption), smoking habits (never, past or current smoking), physical activity (light, moderate or high), presence of a serious chronic condition and diet quality score. Higher dietary sodium intake associated with greater risk of all-cause mortality. |
| Buendia, 2015170; The NHLBI Growth and Health Study, 1992171  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The National Heart, Lung, and Blood Institute’s Growth and Health Study (NGHS)  . | Study of: Children N: 2185  % Male: NR Mean Age/Range/Age at Baseline: by sodium intake groups g1 mean 10.0 (SD 0.6) g2 mean 10.0 (SD 0.6) g3 mean 10.0 (SD 0.6) g4 mean 10.1 (SD 0.5) Race: NR Systolic BP: by sodium intake groups g1 mean 101.4 (SD 9.0) g2 mean 100.4 (SD 9.2) g3 mean 101.8 (SD 9.2) g4 mean 100.9 (SD 8.6) Diastolic BP: by sodium intake groups g1 mean 57.2 (SD 11.5) g2 mean 56.6 (SD 12.3) g3 mean 57.4 (SD 11.8) g4 mean 57.9 (SD 11.7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by sodium intake groups g1 mean 19.1 (SD 3.9) g2 mean 18.4 (SD 3.8) g3 mean 18.6 (SD 3.8) g4 mean 18.1 (SD 3.5) % 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 Black and White girls initially aged 9 to 10 years. Exclusion: Excluded girls with missing data on diet, BP, or potential confounding variables included in the final models. | Exposure Type: Daily potassium intake Exposure Unit: mg/d  Exposure Type: Daily sodium intake Exposure Unit: mg/d  Exposure Type: Potassium to sodium ratio Exposure Unit: NR  Duration: NR Exposure to Follow Up Time: NR  Dose format: range Category 1, Dose: <0.6 Category 1, Dose: <1800 Category 1, Dose: <2500 Category 2, Dose: 0.6- <0.7 Category 2, Dose: 1800- <2100 Category 2, Dose: 2500- <3000 Category 3, Dose: 0.7- <0.8 Category 3, Dose: 2100- <2400 Category 3, Dose: 3000- <4000 Category 4, Dose: >= 0.8 Category 4, Dose: >= 2400 Category 4, Dose: >= 4000 | Sodium measure: 3-day diet records Best sodium measure recorded: Complete 8 3-day diet records (2 weekdays and 1 weekend day) during examination years 1-5, 7, 8, and 10. Sodium, Method of Validation: NR Potassium measure: 3-day diet record Best potassium measure recorded: Complete 8 3-day diet records (2 weekdays and 1 weekend day) during examination years 1-5, 7, 8, and 10. Potassium, Method of Validation: NR  How was blood pressure measured? Measured annually with a V-Lok Cuff mercury sphygmomanometer (Baum Desktop Model). | Diastolic blood pressure (V-Lok Cuff mercury sphygmomanometer (BaumDesktopModel).) (mg/d/Outcome): 10 years FU Category 1 cases: NR, total: 425, Category 1 cases: NR, total: 699, Category 2 cases: NR, total: 644, Category 2 cases: NR, total: 685, Category 3 cases: NR, total: 422, Category 3 cases: NR, total: 905, Category 4 cases: NR, total: 211, Category 4 cases: NR, total: 379 Adjustment: Race (for all participant models), height, activity, television/video time, percentage of calories from solid fats and added sugars, and dietary fiber. No significant association between absolute sodium intake and adolescent diastolic blood pressure. No significant association between potassium to sodium ratio and diastolic blood pressure.  Systolic blood pressure (V-Lok Cuff mercury sphygmomanometer (BaumDesktopModel).) (mg/d/Outcome): 10 years FU Category 1 cases: NR, total: 425, Category 1 cases: NR, total: 699, Category 2 cases: NR, total: 644, Category 2 cases: NR, total: 685, Category 3 cases: NR, total: 422, Category 3 cases: NR, total: 905, Category 4 cases: NR, total: 211, Category 4 cases: NR, total: 379 Adjustment: Race (for all participant models), height, activity, television/video time, percentage of calories from solid fats and added sugars, and dietary fiber. Increase in potassium to sodium ratio associated with decrease in systolic blood pressure. No significant association between absolute sodium intake and adolescent systolic blood pressure.  Diastolic blood pressure (V-Lok Cuff mercury sphygmomanometer (BaumDesktopModel).) (mg/d/Outcome): 10 years FU Category 1 cases: NR, total: 786, Category 2 cases: NR, total: 573, Category 3 cases: NR, total: 411, Category 4 cases: NR, total: 415 Adjustment: Race (for all participant models), height, activity, television/video time, percentage of calories from solid fats and added sugars, and dietary fiber. Adolescent female being in the highest category of potassium intake was associated with lower diastolic blood pressure.  Systolic blood pressure (V-Lok Cuff mercury sphygmomanometer (BaumDesktopModel).) (mg/d/Outcome): 10 years FU Category 1 cases: NR, total: 786, Category 2 cases: NR, total: 573, Category 3 cases: NR, total: 411, Category 4 cases: NR, total: 415 Adjustment: Race (for all participant models), height, activity, television/video time, percentage of calories from solid fats and added sugars, and dietary fiber. Adolescent female being in the highest category of potassium intake was associated with lower systolic blood pressure. |
| Catena, 2016172; Sechi, 2009173; Catena, 2007174; Catena, 2006175; Catena, 2007176  Location: Italy  Setting: Clinical research center based  Design: Prospective Cohort study  . | Study of: Adults N: 65  % Male: 72 Mean Age/Range/Age at Baseline: mean 52 (SD 12) Race: NR Systolic BP: mean 167 (SD 16) Diastolic BP: mean 102 (SD 9) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 28,5 (SD 4.2) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Patients with all grades of hypertension living in northeast Italy were included. Exclusion: Patients who had diabetes mellitus, renal insufficiency with 24-h creatinine clearance of less than 30 ml/min per 1.73 m^2 of body surface area, urinary protein excretion of more than 1.0 g/d; and congestive heart failure were excluded. | Exposure Type: Urinary sodium excretion Exposure Unit: mmol/d  Duration: NR Exposure to Follow Up Time: NR  Dose format: mean+/-SD T1, Dose: 100+/-25 T2, Dose: 137+/-28 T3, Dose: 158+/-27 | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, baseline and at the end of follow- up  How was blood pressure measured? BP was measured by an automated device (Omron M6; OMRON Healthcare Co, Kyoto, Japan). CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Cardiac ultrasound examination | Change in LVMI (g/m) (Blood pressure measured with Omron M6 device) (mmol/d/Outcome): 12 months FU T1 cases: NR, total: 21, T2 cases: NR, total: 22, T3 cases: NR, total: 22 Adjustment: Patients with or without plasma aldosterone Significant association between changes in LV mass index and urinary sodium excretion (beta=0.334; p=0.012). |
| Chien, 2008177  Location: Taiwan  Setting: Community  Design: Prospective Cohort study  Study Name: The Chin-Shan Community Cardiovascular Cohort Study (CCCC)  . | Study of: Adults N: 1520  % Male: by sodium excretion quartiles q1 50% q2 47.9% q3 48.7% q4 45.3% Mean Age/Range/Age at Baseline: by sodium excretion quartiles q1 mean 51.5 (SD 12) q2 mean 52.9 (SD 11.9) q3 mean 52.4 (SD 11.4) q4 mean 51.3 (SD 10.6) Race: NR Systolic BP: by sodium excretion quartiles q1 mean 115.1 (SD 11.3) q2 mean 114.5 (SD 11.3) q3 mean 115.5 (SD 10.9) q4 mean 117 (SD 10.8) Diastolic BP: by sodium excretion quartiles q1 mean 72.4 (SD 7.8) q2 mean 72.3 (SD 8.2) q3 mean 72.7 (SD 7.8) q4 mean 74 (SD 7.6) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by sodium excretion quartiles q1 mean 22.7 (SD 3.1) q2 mean 22.8 (SD 3) q3 mean 23.3 (SD 3) q4 mean 23.6 (SD 3.6) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: by sodium excretion quartiles q1 10.6% q2 9.8% q3 0.3% q4 15.1% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included participants 35 years and older, living in the Chin-Shan township, 30 km north of metropolitan Taipei, Taiwan. Exclusion: Excluded Participants with a baseline diagnosis of hypertension (n = 1096) or incomplete urine collection data at baseline (n = 986). | Exposure Type: Urinary potassium excretion Exposure Unit: mmol/24h  Exposure Type: Urinary sodium excretion Exposure Unit: mmol/24h  Exposure Type: Urinary sodium to potassium ratio Exposure Unit: mmol/mmol  Duration: NR Exposure to Follow Up Time: NR  Diastolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was used as described previously), Systolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was Dose format: NR All, Dose: NR  Hypertension (Incident hypertension cases were ascertained through biennial BP measurements and medication history was obtained from questionnaires, and was defined as sitting systolic BP of at least 140 mmHg, diastolic BP of at least 90 mmHg, or antihypertensive treat) Dose format: NR Q1, Dose: NR Q1, Dose: 63 (<84) Q2, Dose: NR Q2, Dose: 103 (84-122) Q3, Dose: NR Q3, Dose: 147 (122-178) Q4, Dose: NR Q4, Dose: 231 (>=178) | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: single 24hr urine analysis Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: single 24hr urine analysis  How was blood pressure measured? Measured twice in the right arm by a mercury sphygmomanometer. | Diastolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was used as described previously) (mmol/24h/Outcome): Median 7.93 (IQR 4.07-9.04) years FU All cases: NR, total: 1520 Adjustment: Age and sex A positive association between incidence rates of hypertension and increasing quartiles of urinary sodium excretion, except for the first quartile. There was a significant J-shape relationship between urinary sodium excretion and the risk of hypertension. The incidence rates were similar across the quartiles for urinary potassium and sodium as compared with potassium ratio values, and the RRs were not significant.  Q1 cases: 160, total: NR, person-years: 2482, Q1 cases: 165, total: NR, person-years: 2432, Q2 cases: 144, total: NR, person-years: 2558, Q2 cases: 163, total: NR, person-years: 2565, Q3 cases: 167, total: NR, person-years: 2581, Q3 cases: 168, total: NR, person-years: 2482, Q4 cases: 178, total: NR, person-years: 2494, Q4 cases: 193, total: NR, person-years: 2432 Adjustment: Age groups, sex, BMI groups, smoking (yes/no or abstinence), current alcohol drinking (regular/no), marital status (single, married and living with spouse, or divorced and separated), education level (less than 9 years, at least 9 years), occupation (no work, labor, official or business), and regular exercise habit (yes/no), baseline systolic blood pressure (continuous variable) and diabetes status (yes/no) A positive association between incidence rates of hypertension and increasing quartiles of urinary sodium excretion, except for the first quartile. There was a significant J-shape relationship between urinary sodium excretion and the risk of hypertension. The incidence rates were similar across the quartiles for urinary potassium and sodium as compared with potassium ratio values, and the RRs were not significant.  Systolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was used as described previously) (mmol/24h/Outcome): Median 7.93 (IQR 4.07-9.04) years FU All cases: NR, total: 1520 Adjustment: Age and sex A positive association between incidence rates of hypertension and increasing quartiles of urinary sodium excretion, except for the first quartile. There was a significant J-shape relationship between urinary sodium excretion and the risk of hypertension. The incidence rates were similar across the quartiles for urinary potassium and sodium as compared with potassium ratio values, and the RRs were not significant.  Diastolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was used as described previously) (mmol/24h/Outcome): Median 7.93 (IQR 4.07-9.04) years FU All cases: NR, total: 1520 Adjustment: Age and sex The incidence rates of hypertension were similar across the quartiles for urinary potassium; the RRs across urinary potassium quartiles were not significant.  Hypertension (Incident hypertension cases were ascertained through biennial BP measurements and medication history was obtained from questionnaires, and was defined as sitting systolic BP of at least 140 mmHg, diastolic BP of at least 90 mmHg, or antihypertensive treat) (mmol/24h/Outcome): Median 7.93 (IQR 4.07-9.04) years FU Q1 cases: 151, total: NR, person-years: 2455, Q2 cases: 177, total: NR, person-years: 2498, Q3 cases: 169, total: NR, person-years: 2585, Q4 cases: 172, total: NR, person-years: 2487 Adjustment: Age groups, sex, BMI groups, smoking (yes/no or abstinence), current alcohol drinking (regular/no), marital status (single, married and living with spouse, or divorced and separated), education level (less than 9 years, at least 9 years), occupation (no work, labor, official or business), and regular exercise habit (yes/no), baseline systolic blood pressure (continuous variable) and diabetes status (yes/no) The incidence rates of hypertension were similar across the quartiles for urinary potassium; the RRs across urinary potassium quartiles were not significant.  Systolic blood pressure (BP was measured twice in the right arm by a mercury sphygmomanometer with the participant seated comfortably and arms supported and positioned at the level of the heart. The average of the BP measurements was used as described previously) (mmol/24h/Outcome): Median 7.93 (IQR 4.07-9.04) years FU All cases: NR, total: 1520 Adjustment: Age and sex The incidence rates of hypertension were similar across the quartiles for urinary potassium; the RRs across urinary potassium quartiles were not significant. |
| Cohen, 2006178; US Department of Health and Human Services, 2005179  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The NHANES II Mortality study (a followup to NHANES II)  . | Study of: Adults N: 7154  % Male: 47% Mean Age/Range/Age at Baseline: mean 48 (SE 0.26) Race: White 88% black 9% other 2% Systolic BP: mean 127 (SE 0.60) Diastolic BP: mean 81 (SE 0.52) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 25.7 (SE 0.07) % with Hypertension: BP > 140/90 mmHg 30%; treatment for hypertension 3.9% % with history of CVD: NR % with Type 2 diabetes: 3.1% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants in NHANES II aged 30 to 73 tears at entry were included. Exclusion: People with self-reported history of heart disease or stroke, or who reported a low salt diet for medical reasons, or who died with <= 6 months follow-up, or who reported either the highest or lower 1 % of sodium or calories were excluded. | Exposure Type: Sodium from 24-hour dietary recall Exposure Unit: < residuals adjusted median  Exposure Type: Sodium from 24-hour dietary recall Exposure Unit: <2300mg  Exposure Type: Sodium from 24-hour dietary recall Exposure Unit: mg  Exposure Type: Sodium from 24-hour dietary recall Exposure Unit: mg per calorie  Exposure Type: Sodium from 24-hour dietary recall Exposure Unit: mg/d  Duration(in months): 164.4 (13.7 years) Exposure to Follow Up Time: NR  Cerebrovascular disease (ICD-9 (430-438)), Coronary heart disease (ICD-9 (410-414)) Dose format: NR NR, Dose: NR per 1000mg, Dose: NR  CVD (ICD\_9 (390-459)) Dose format: range <2300mg, Dose: <2300mg >=2300mg, Dose: >=2300mg NR, Dose: NR Q1, Dose: NR Q2, Dose: NR Q3, Dose: NR Q4, Dose: NR per 1000mg, Dose: NR  All-cause mortality (ICD\_9 (390-459)) Dose format: range <2300mg, Dose: <2300mg >=2300mg, Dose: >=2300mg NR, Dose: NR per 1000mg, Dose: mean 2719 (SD 23) mg | Sodium measure: 24-hour diet recall Best sodium measure recorded: once, baseline Mortality Outcomes-Method of Ascertainment: Death certificate | All-cause mortality (ICD\_9 (390-459)) (mg/Outcome): Mean 13.7 (range 0.5-16.8) years FU <2300mg cases: NR, total: 3443, NR cases: 1343, total: 7154, per 1000mg cases: 1343, total: 7154, >=2300mg cases: NR, total: 3711 Adjustment: Age, sex, race, smoking, alcohol use, systolic blood pressure, anti-hypertensive treatment, body mass index, education high school, physical activity, body mass index, dietary potassium, history of diabetes, serum cholesterol Inverse associations with all-cause mortality of continuous sodium and sodium/calorie ratio were consistent. Inverse associations with all-cause mortality of continuous sodium and sodium/calorie ratio were consistent. No significant association between sodium intake and all-cause mortality. Compared to those with more than 2300 mg dietary sodium intake, those with less than 2300 mg had significantly higher age-sex adjusted mortality rates for CVD and all causes.  CVD (ICD\_9 (390-459)) (mg/Outcome): Mean 13.7 (range 0.5-16.8) years FU <2300mg cases: NR, total: 3443, NR cases: 541, total: 7154, Q1 cases: NR, total: NR, per 1000mg cases: 541, total: 7154, >=2300mg cases: NR, total: 3711, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Age, sex, race, smoking, alcohol use, systolic blood pressure, anti-hypertensive treatment, body mass index, education high school, physical activity, body mass index, dietary potassium, history of diabetes, serum cholesterol Statistically significant inverse association between sodium/ calorie ratio and CVD mortality. Statistically significant inverse association between sodium/ calorie ratio and CVD mortality. When dietary sodium was expressed as a continuous variable (per 1000 mg), there was a statistically significant inverse association between dietary sodium and CVD mortality after adjusting for calories and other covariables. Compared to those with more than 2300 mg dietary sodium intake, those with less than 2300 mg had significantly higher age-sex adjusted mortality rates for CVD and all causes. All-cause, CHD, and stroke mortality had similar HRs across quartiles of sodium intake.  Cerebrovascular disease (ICD-9 (430-438)) (mg per calorie/Outcome): Mean 13.7 (range 0.5-16.8) years FU NR cases: 79, total: 7154, per 1000mg cases: 79, total: 7154 Adjustment: Age, sex, race, smoking, alcohol use, systolic blood pressure, anti-hypertensive treatment, body mass index, education high school, physical activity, body mass index, dietary potassium, history of diabetes, serum cholesterol and calories No significant association between sodium intake and cerebrovascular disease.  Coronary heart disease (ICD-9 (410-414)) (mg per calorie/Outcome): Mean 13.7 (range 0.5-16.8) years FU NR cases: 282, total: 7154, per 1000mg cases: 282, total: 7154 Adjustment: Age, sex, race, smoking, alcohol use, systolic blood pressure, anti-hypertensive treatment, body mass index, education high school, physical activity, body mass index, dietary potassium, history of diabetes, serum cholesterol and calories No significant association between sodium intake and coronary heart disease. |
| Cook, 2009180; Satterfield, 1991128; Hebert, 199554; Cook, 201662; Cook, 2014181  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: TOHP Follow-up (TOHP I and TOHP II)  . | Study of: Adults N: 2306  % Male: 69.4 Mean Age/Range/Age at Baseline: Men: 30-44y, 915; 45-54y, 686; Women: 30-44y, 366; 45-55y, 339. Race: Men: white 1418; Black, 139; Other, 44; Women: white 504; Black, 183; Other, 18 Systolic BP: Men: < 125, 762; >= 125, 839; women: <125, 298; >= 125, 407 Diastolic BP: Men: 80-84, 894; 85-89, 707; women: 80-84, 387; 85-89, 318. Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Men: < 25, 238; 25 to <30. 777; >= 30 586; Women, <25 138; 25 to <30 279; >= 30 288. % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants who had not been randomized to an active sodium reduction intervention in TOHP I and II were included. Exclusion: Participants who had CVD events during the trial periods, and who had no valid urinary excretion measures were excluded. | Exposure Type: Potassium Excretion Exposure Unit: linear  Exposure Type: Potassium Excretion Exposure Unit: mmol/24 h  Exposure Type: Sodium Excretion Exposure Unit: linear  Exposure Type: Sodium Excretion Exposure Unit: mmol/24 h  Exposure Type: Sodium to Potassium Excretion Ratio Exposure Unit: linear  Exposure Type: Sodium to Potassium Excretion Ratio Exposure Unit: mmol/24 h  Duration(in months): 120 to 180 (10 to 15 years) Exposure to Follow Up Time: 10 years after the end of TOHP I and 5 years after the end of TOHP II  Dose format: NR 1, Dose: NR 2, Dose: NR 3, Dose: NR 4, Dose: NR NR, Dose: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Mortality Outcomes-Method of Ascertainment: National death index CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: medical records | 1 cases: 45, total: 587, 1 cases: 47, total: 563, NR cases: 166, total: 2084, 2 cases: 39, total: 573, 2 cases: 43, total: 585, 3 cases: 49, total: 589, 3 cases: 56, total: 589, 4 cases: 51, total: 581, 4 cases: 56, total: 554 Adjustment: Age, sex, race/ethnicity, clinic, and treatment assignment, education status, baseline weight, alcohol use, smoking, exercise, and family history of cardiovascular disease, changes in weight, smoking, and exercise After adjustment for baseline and lifestyle variables, there was a significant increasing trend in risk of CVD across quartiles of the sodium to potassium excretion ratio from lowest to highest. After adjustment for baseline and lifestyle variables, there was a nonsignificant trend in risk of CVD across quartiles of urinary sodium excretion from lowest to highest. Among all participants, no association between sodium to potassium excretion ratio and risk of CVD. No statistically significant association between risk of CVD events and sodium to potassium excretion ratio. No statistically significant linear coefficient for risk of CVD events and sodium excretion.  Cardiovascular Events (Including stroke, myocardial infarction (MI), coronary artery bypass graft, percutaneous transluminal coronary angioplasty, and death from cardiovascular causes) (mmol/24 h/Outcome): Median, 5; range, 1-7 in TOHP I; median, 4; range, 1-5 in TOHP II FU 1 cases: 50, total: 543, NR cases: 166, total: 2084, 2 cases: 53, total: 579, 3 cases: 51, total: 589, 4 cases: 39, total: 595 Adjustment: Age, sex, race/ethnicity, clinic, and treatment assignment, education status, baseline weight, alcohol use, smoking, exercise, and family history of cardiovascular disease, changes in weight, smoking, and exercise After adjustment for baseline and lifestyle variables, there was a nonsignificant trend in risk of CVD across quartiles of urinary potassium excretion from lowest to highest. No significant linear coefficient for potassium excretion and CVD events. |
| Cook, 2014181  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Trials of Hypertension Prevention, phase 1 (TOHP-1)  . | Study of: Adults N: 2312  % Male: NR Mean Age/Range/Age at Baseline: by sodium excretion group TOHP I men g1 mean 42.1 g2 mean 42.8 g3 mean 43.3 g4 mean 42.7 TOHP I women g1 mean 44.6 g2 mean 44.7 g3 mean 43.0 g4 mean 42.7 TOHP II men g1 mean 42.7 g2 mean 43.6 g3 mean 43.6 g4 mean 42.5 TOPH II women g1 mean 44.4 g2 mean 43.8 g3 mean 43.1 g4 mean 44.0 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 TOHP participants who were not in a sodium reduction intervention, had available sodium excretions, and remained alive and CVD free at the end of the trial periods. Exclusion: Excluded those in active sodium intervention, with missing sodium excretion data and those who did not respond to followup questionnaires. | Exposure Type: Urinary sodium excretion Exposure Unit: mg/d  Duration(in months): 120 to 180 (10 to 15 years) Exposure to Follow Up Time: NR  Dose format: range Q1, Dose: <2300 Q2, Dose: 2300 to <3600 Q3, Dose: 3600 to <4800 Q4, Dose: >=4800 | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Sodium, Method of Validation: NR Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Mortality Outcomes-Method of Ascertainment: National death index CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: medical records | Cardiovascular Events (mg/d/Outcome): 10 years for I, 5 years for II FU Q1 cases: 17, total: 236, Q2 cases: 61, total: 893, Q3 cases: 74, total: 768, Q4 cases: 41, total: 415 Adjustment: Age, sex, race/ethnicity, clinic, and treatment assignment; education status, baseline weight, alcohol use, smoking, exercise, potassium excretion, and family history of cardiovascular disease; changes in weight, smoking, and exercise during the trial periods. CI indicates confidence interval; CVD, cardiovascular disease; HR, hazard ratio; and TOHP, Trials of Hypertension Prevention After adjusting for multiple variables, risk of CVD events for those with urinary sodium excretion <2300 mg/d was 32% lower than those with sodium excretion between 3600 to <4800 mg/d (P for trend=0.13). |
| Cook, 201662  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Trials of Hypertension Prevention, phase 1 (TOHP-1)  . | Study of: Adults  % Male: 68.38 Mean Age/Range/Age at Baseline: mean mean Q1 42.5 Q2 42.7 Q3 42.9 Q4 42.3; women Q1 44.3 Q2 43.9 Q3 43.0 Q4 43.2 Race: % Black men Q1 16.0 Q2 9.7 Q3 10.4 Q4 8.8; women Q1 25.4 28.2 26.9 Q4 26.7 Systolic BP: mean men Q1 124.9 Q2 125.2 Q3 125.7 Q4 126.4; women Q1 126.2 Q2 126.5 Q3 126.8 Q4 126.4 Diastolic BP: mean men Q1 84.3 Q2 84.4 Q3 84.8 Q4 85.0; women Q1 84.2 Q2 84.6 Q3 85.0 Q4 85.0 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 TOHP participants who were not in a sodium reduction intervention Exclusion: missing sodium excretion or the occurrence of an incident CVD event or death during the period of exposure assessment | Duration: median 25.7 year for TOHP I; median 22.4 years for TOHP II Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice, at 5 (life- style interventions) or 7 (nutritional supplement interventions) scheduled collections in TOHP I and at 3 to 5 scheduled collections during TOHP II Mortality Outcomes-Method of Ascertainment: National death index | See subgroup table for results |
| Curhan, 2004182  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Nurses Health Study II  . | Study of: Adults  % Male: 0% Mean Age/Range/Age at Baseline: by calcium quintile q1 mean 36.7 q2 mean 36.5 q3 mean 36.2 q4 mean 35.8 q5 mean 35.5 Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by calcium quintile q1 mean 24.6 q2 mean 24.7 q3 mean 24.6 q4 mean 24.6 q5 mean 24.5 % 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 NHS II participants who provided dietary information in 1991. Exclusion: Excluded those whose kidney stone diagnosis date could not be confirmed and excluded those with asymptomatic stones. | Exposure Type: 1.2707154E-2 Exposure Unit: dietary potassium  Duration: NR Exposure to Follow Up Time: NR  Dose format: Q1 mg/d, Dose: NR mg/d, Dose: NR mg/d, Dose: NR mg/d, Dose: NR mg/d, Dose: NR | Potassium measure: semiquantitative food frequency questionnaires Best potassium measure recorded: 2 semiquantitative FFQ in 1991 and 1995 CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: self reported | Kidney stone incident (Kidney) (dietary potassium/Outcome): NR FU mg/d cases: NR, total: NR Adjustment: NR Age (in 5-year categories), body mass index (5 categories), family history of kidney stones, and intake of supplemental calcium (4 categories), dietary calcium, animal protein, potassium, sodium, sucrose, phytate, and fluid (quintile groups for the last 5 variables) |
| Du Shufa, 2014183  Location: China  Setting: Community  Design: Prospective Cohort study  Study Name: The China Health and Nutrition Survey (CHNS)  . | Study of: Adults N: (ranged between 6  % Male: 48 Mean Age/Range/Age at Baseline: mean 37.4 (SD 11.0) Race: NR Systolic BP: mean 112.2 (SD 15.6) Diastolic BP: mean 73.5 (SD 10.7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 21.7 (SD 2.5) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Not data Exclusion: Participants younger than 20 y or older than 60 y at difference follow up time were excluded. | Exposure Type: Potassium intake Exposure Unit: g/day  Exposure Type: Sodium intake Exposure Unit: g/d  Exposure Type: Sodium potassium ratio Exposure Unit: NR  Duration: NR Exposure to Follow Up Time: 18 y (but the percentage of participants who participated previously is different from the follow-up rate)  Dose format: range Q1, Dose: <1.2 Q1, Dose: <1.8 Q1, Dose: <3.2 Q2, Dose: 1.2-1.4 Q2, Dose: 1.8-12.5 Q2, Dose: 3.2-4.3 Q3, Dose: 1.5-1.7 Q3, Dose: 2.6-3.4 Q3, Dose: 4.4-5.5 Q4, Dose: 1.8-2.1 Q4, Dose: 3.5-4.8 Q4, Dose: 5.6-7.5 Q5, Dose: >=2.2 Q5, Dose: >=4.9 Q5, Dose: >=7.6 | Sodium measure: 24-hour diet recall Best sodium measure recorded: 6 times, 1991, 1993, 1997, 2999, 2994, 2996, and 2009 Sodium, Method of Validation: A validation study evaluated the accuracy of estimated sodium and potassium intakes at the individual level in one of the survey provinces (but not with CHNS participants) by measuring urinary sodium and potassium excretions from 24-h urine samples collected for 3 consecutive days and by using p-aminobenzoic acid as a marker of completeness of 24-h urine samples., 24-hour "diet recall" Best potassium measure recorded: 6 times, 1991, 1993, 1997, 2999, 2994, 2996, and 2009 Potassium, Method of Validation: A validation study evaluated the accuracy of estimated sodium and potassium intakes at the individual level in one of the survey provinces (but not with CHNS participants) by measuring urinary sodium and potassium excretions from 24-h urine samples collected for 3 consecutive days and by using p-aminobenzoic acid as a marker of completeness of 24-h urine samples.  How was blood pressure measured? Standard mercury sphygmomanometers with regular adult cuffs were used. The cuff was placed on the participant’s right arm (the lower edge 25 mm above the elbow) and inflated until the cuff pressure was 30 mm Hg above the level at which the pulse disappeared. DBPs were determined by using the fifth phase of the Korotkoff method. Three measurements were obtained with a 30-s interval between cuff inflations if the first measure was normal. Otherwise, participants were requested to take 10–30 min of rest before a second measurement was taken. | Hypertension (Standard mercury sphygmomanometers with regular adult cuffs) (g/d/Outcome): 10 years 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: Energy intake, age, sex, education, income, region, BMI, physical activity, smoking status, and alcohol consumption. Flexible parametric models for survival-time data and the macro %EMICM in SAS 9.2 (SAS Institute) were used to compute HRs and the survival curves. Na/K ratio, ratio of sodium to potassium. The region adjustment variable had a significant interaction with the effect of sodium to potassium ratio on the risk of hypertension. Significant dose-response associations between incident hypertension and the third to fifth quintiles.  Hypertension (Standard mercury sphygmomanometers with regular adult cuffs) (g/day/Outcome): 10 years 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: Sodium intake, energy intake, age, sex, education, income, region, BMI, physical activity, smoking status, and alcohol consumption. Flexible parametric models for survival-time data and the macro %EMICM in SAS 9.2 (SAS Institute) were used to compute HRs and the survival curves. Na/K ratio, ratio of sodium to potassium. Second to fifth quintiles of potassium intake were associated with lower risk of incident hypertension. |
| Dunkler, 2013184; Kawasaki, 1993185  Location: NR  Setting: Clinical research center based  Design: Prospective Cohort study  Study Name: Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint Trial (ONTARGET Sample)  . | Study of: Adults N: 3726  % Male: No renal Event 69.1 Renal Event 66 Died 71.3 Mean Age/Range/Age at Baseline: Median (IQR) No Renal event 65 (60-70) Renal Event 66 (61-71) Died 69 (63-74) y Race: NR Systolic BP: Median (IQR) No renal event 142 (130-154) Renal event 145 (133- 156) Diead 145 (133-156) nnHg Diastolic BP: Median (IQR) no renal event 82 (75-89) renal event 82 (75-89) died 80 (73-88) mmHg Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Median (IQR) No Renal Event 28.65 (25.71- 31.96) Renal Event 28.70 (25.83- 32.45) Died 28.04 (25.41-31.54) kg/m^2 % with Hypertension: no renal event 76.4 renal event 81.6 died 78.9 % with history of CVD: NR % with Type 2 diabetes: 100 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 55 years or older, from the ONTARFET trial, had a history of type 2 diabetes, normoalbuminuria or microalbuminuria at baseline, and UACR and GFR measurements at study entry and end. Exclusion: Not applicable. | Exposure Type: 24-h Urinary potassium Exposure Unit: g  Exposure Type: 24-h Urinary sodium Exposure Unit: g  Duration(in months): 66 (5.5 years) Exposure to Follow Up Time: NR  Dose format: Median T1, Dose: 1.7 T1, Dose: 3.47 T2, Dose: 2.13 T2, Dose: 4.89 T3, Dose: 2.71 T3, Dose: 6.41 | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: Single 24-hour urine analysis with validation Sodium, Method of Validation: Previous studies have reported that this approach provides a valid estimate of sodium intake in healthy control participants and patients taking antihypertensive therapy (ref 15 and 16)., Single 24-hour urine analysis with validation Best potassium measure recorded: Single 24-hour urine analysis with validation Potassium, Method of Validation: Previous studies have reported that this approach provides a valid estimate of sodium intake in healthy control participants and patients taking antihypertensive therapy (ref 15 and 16). Mortality Outcomes-Method of Ascertainment: Unclear CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: New microalbuminuria, new macroalbuminuria, GFR-decline of more than 5% per year, or end-stage renal disease | Incidence or progression of CKD (As at least 1 of the following renal events: new microalbuminuria, new macroalbuminuria, GFR-decline of more than 5% per year, or end-stage renal dis- ease.) (g/Outcome): 5.5 y FU T1 cases: NR, total: NR, T2 cases: NR, total: NR, T3 cases: NR, total: NR Adjustment: Age, duration of type 2 diabetes mellitus, albuminuria status, glomerular filtration rate, sex, Ongoing Telmisartan Alone and in Combination With Ramipril Global Endpoint Trial randomization arms, and urinary-albumin-creatinine ratio (UACR) to progression, which was defined as the difference between the participant-specific cutoff point of developing new microalbuminuria or macroalbuminuria and UACR at baseline on the log scale No association between sodium intake and risk of CKD.  Incidence or progression of CKD (As at least 1 of the following renal events: new microalbuminuria, new macroalbuminuria, GFR-decline of more than 5% per year, or end-stage renal dis- ease.) (g/Outcome): 5.5 y FU T1 cases: NR, total: NR, T2 cases: NR, total: NR, T3 cases: NR, total: NR Adjustment: Age, duration of type 2 diabetes mellitus, albuminuria status, glomerular filtration rate, sex, Ongoing Telmisartan Alone and in Combination With Ramipril Global Endpoint Trial randomization arms, and urinary-albumin-creatinine ratio (UACR) to progression, which was defined as the difference between the participant-specific cutoff point of developing new microalbuminuria or macroalbuminuria and UACR at baseline on the log scale Higher potassium was associated with reduced risk of CKD in adjusted single-variable and multivariable models |
| Dunkler, 2015186; Teo, 2004187  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: Ongoing Telmisartan Alone and in Combination with Ramipril Global Endpoint Trial (ONTARGET Sample)  . | Study of: Adults  % Male: 66.6% Mean Age/Range/Age at Baseline: median 65 (IQR 60-70) Race: 98.6% Caucasian Systolic BP: median 145 (IQR 133-155) Diastolic BP: meidan 82 (IQR 76-90) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: median 29.05 (IQR 26.26-32.01) % with Hypertension: 79.2% % with history of CVD: 60.4% % with Type 2 diabetes: 100% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included all European participants of The ONTARGET trial; all trial participants aged 55 years or older, and were diagnosed with vascular disease or type 2 diabetes mellitus with end-organ damage. Exclusion: Excluded participants with missing information on the renal outcome or relevant confounders. | Duration: NR Exposure to Follow Up Time: 0 | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: Estimated 24hr urinary sodium excretion from one fasting morning urine sample. Sodium, Method of Validation: NR Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: Estimated 24hr urinary potassium excretion from one fasting morning urine sample. Potassium, Method of Validation: NR Mortality Outcomes-Method of Ascertainment: Unclear | See subgroup table for results |
| Ekinci, 2011188  Location: Australia  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults N: 620  % Male: 56 Mean Age/Range/Age at Baseline: 64 Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 85 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included type 2 diabetes patients originally recruited for a long-term diabetes study. And included patients who reported at least three previous estimations of urinary AER, with at lease one AER measure taken in 2000. Exclusion: Excluded participants with type 1 diabetes or diabetes secondary to medication or pancreatitis. | Exposure Type: 24-h urinary sodium Exposure Unit: mmol/24h  Duration: NR Exposure to Follow Up Time: not clear  CVD mortality (CVD listed as a major contributing cause) Dose format: NR per 100 mmol/day, Dose: NR  All-cause mortality (All death) Dose format: NR per 100 mmol/day, Dose: mean 184 mmol/24 h | Sodium measure: Single 24-hour urine analysis with validation, Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: patients completed a 24-h urine collection Mortality Outcomes-Method of Ascertainment: Hospital records, Search national death registry | All-cause mortality (All death) (mmol/24h/Outcome): Median 9.9 years FU per 100 mmol/day cases: 175, total: 620 Adjustment: Age, sex, pre-existing CVD, eGFR, atrial fibrillation, log10AER, systolic blood pressure, diabetes duration (decades) No significant association was observed.  CVD mortality (CVD listed as a major contributing cause) (mmol/24h/Outcome): per 100 mmol/day cases: 75, total: 620 Adjustment: Age, sex, pre-existing CVD, eGFR, atrial fibrillation, log10AER, systolic blood pressure, diabetes duration (decades) No significant association was observed. |
| Fan, 2014189  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The MDRD (Modification of Diet in Renal Disease) Study  . | Study of: Adults  % Male: 60.5 Mean Age/Range/Age at Baseline: mean 51.7 (SD 12.4) years Race: white 85 Systolic BP: mean 131.9 (SD 17.6) Diastolic BP: mean 81.0 (SD 10.1) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 27.1 (SD 4.4) % with Hypertension: NR % with history of CVD: 13.1 % with Type 2 diabetes: 5.1 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included CKD patients age between 18 and 70 years. Included men with serum creatinine level of 1.4–7.0 mg/dL and women with serum creatinine level of 1.2–7.0 mg/dL. Exclusion: Excluded those who were pregnant, those with type 1 and 2 diabetes, those with glomerulonephritis caused by autoimmune diseases, those with obstructive uropathy, those with renal artery stenosis, those with proteinuria with protein greater than 10 g/d, those with mean arterial pressure greater than 125 mm Hg, or those with prior kidney transplantation. | Duration: 4 years Exposure to Follow Up Time: NA | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: Patients either had three (n=200) or four (n=640) 24-hour urine collections and analysis to calculate 24-h urinary sodium excretion. Mortality Outcomes-Method of Ascertainment: National death index CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: renal data system | See subgroup table for results |
| Fang, 2000190  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES I  . | Study of: Adults  % Male: 38.2 Mean Age/Range/Age at Baseline: NR Race: 83.5 white 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: NHANES I survey participants aged between 25-74 during baseline examination. Exclusion: Excluded those with missing potassium intake data. Excluded those with unknown vital status, and excluded those not being either black or white. Excluded the extreme 1% in both tails of the 24 hour dietary potassium intake. Excluded those with a history of myocardial infarction and/or stroke. | Duration: NR Exposure to Follow Up Time: up to 22 years | Sodium, Method of Validation: 24-hour "diet recall" Best potassium measure recorded: one 24 hour dietary recall Mortality Outcomes-Method of Ascertainment: Interview, tracing, national death index searches, deaths confirmed from death certificates | See subgroup table for results |
| Ferraro, 2016191; Taylor, 2004192  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: Health Professionals Follow-up Study  . | Study of: Adults  % Male: NR Mean Age/Range/Age at Baseline: mean 54.3 (SD 9.8) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 25.5 (SD 3.4) % with Hypertension: 21% % with history of CVD: NR % with Type 2 diabetes: 3% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included HPFS participants without a history of kidney stones at baseline. Exclusion: Excluded those with a history of malignancy (except for nonmelanoma skin cancer) at baseline and those who developed malignancies during follow-up. Excluded NHS I participants who answered questionnaires before 1992 (the year of the first lifetime kidney stone history inquiry). | Duration: NR Exposure to Follow Up Time: 0 | Sodium, Method of Validation: Use of a published food frequency questionnaire Best potassium measure recorded: One food frequency questionnaire at baseline and additional FFQ every 4 years Potassium, Method of Validation: FFQs were found to be reproducible and valid in the HPFS and the NHS I. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: supplementary questionnaire (self-report) | See subgroup table for results |
| Forman, 2012193  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: 5556  % Male: Q1 32.5, Q2 43.5, Q3 48.1, Q4 58.4 Mean Age/Range/Age at Baseline: Median (IQR): Q1 43 (36-52)y, Q2 43 (36-52), Q3 43 (36-51), Q4 44 (37-52) Race: NR Systolic BP: Median (IQR): Q1 116 (108-126), Q2 118 (110-127), Q3 119 (111-128), Q4 121 (!12-129) mmHg Diastolic BP: Median (IQR: Q1 69 (64-74), Q2 70 (65-75) Q3 70 (65-75), Q4 71 (66-76) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Median (IQR): Q1 23.7 (21.7- 26.2), Q2 24.2 (22.2-26.7), Q3 24.9 (22.6-27.3), Q4 25.7 (23.5- 28.4) kg/m^2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants who did not have prevalent hypertension (defined as a systolic pressure >= 140 mmHG, a diastolic pressure >= 90 mmHg, or both or the use of antihypertensive medications in concordance with recommendations from the Seventh JointNational Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.) at the time of their initial examination and had available measurements of urine sodium. Exclusion: People who were taking antihypertensive medications at the first or third examinations and who were with missing data on SUA or UAE. | Exposure Type: Urine sodium Exposure Unit: NR  Duration(in months): 76.8 (6.4 years) Exposure to Follow Up Time: NR  Dose format: NR NR, Dose: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 3 times, 1st- 1997 and 1998; 2 nd- 2001 and 2003, 3rd- 2003 and 2006  How was blood pressure measured? BP was measured on the right arm with an automated device (Dinamap XL model 9300; Johnson & Johnson Medical, Tampa, FL) for 8 to 10 minutes while the participant was supine. The BP for the visit was defined as the mean of the last 2 readings. | Hypertension (Measured on the right arm with an automated device) (NR/Outcome): Median followup 6.4 years FU NR cases: NR, total: NR Adjustment: Baseline level of serum uric acid, age, body mass index, sex, alcohol intake, smoking status, systolic and diastolic blood pressures, estimated glomerular filtration rate, plasma levels of glucose and cholesterol, and urinary levels of potassium, calcium, and creatinine Significant interaction between sodium intake and serum uric acid (SUA) levels. A 1-g-higher sodium intake was associated with higher risk of hypertension among those in the highest tertile of SUA. Significant interaction between sodium intake and urine albumin excretion (UAE). A 1-g-higher sodium intake was associated with greater risk of developing hypertension among participants whose UAE was greater than 15 mg/d. |
| Geleijnse, 1990194  Location: Netherlands  Setting: suburban town  Design: Prospective Cohort study  . | Study of: Children N: 596  % Male: 46.35 Mean Age/Range/Age at Baseline: mean 13.2 (SD 2.7) Range 5.9-17.0 Race: NR Systolic BP: mean 112.4 (SD 12.9) range 81.0-153.0 Diastolic BP: mean 68.4 (SD 8.7) range 44.0-97.0 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: Participants aged 5- 19 years were included Exclusion: Children who had established secondary hypertension were excluded. | Exposure Type: 24 hour potassium excretion Exposure Unit: mmol/24 h  Exposure Type: 24 hour sodium excretion Exposure Unit: mmol/24 h  Exposure Type: Sodium potassium ratio Exposure Unit: NR  Duration(in months): 84 (7 years) Exposure to Follow Up Time: immediately  Dose format: mean Level in lower third, Dose: 61.5 - 117.7 Level in middle third, Dose: NR Level in upper third, Dose: 147.5 - 251.5 | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: 6 times, every year Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: 6 times, every year  How was blood pressure measured? BP measurements were performed with a random zero sphygmomanometer. Cuffs 23 cm by 10 or 14 cm were used depending on the arm circumference. In children aged over 10 generally the largest cuff was used. BP was measured in the left arm after 15 minutes' sitting. DBP was recorded at the fifth Korotkoff phase. | Systolic blood pressure (Random zero sphygmomanometer) (mmol/24 h/Outcome): Level in lower third cases: NR, total: 596, Level in middle third cases: NR, total: 596, Level in upper third cases: NR, total: 596 Adjustment: Sex, initial age, and change in height and body weight. Significant positive association between sodium-potassium ratio and change in systolic blood pressure. No significant association between sodium excretion and change in blood pressure.  Systolic blood pressure (Random zero sphygmomanometer) (mmol/24 h/Outcome): Level in lower third cases: NR, total: 596, Level in middle third cases: NR, total: 596, Level in upper third cases: NR, total: 596 Adjustment: Sex, initial age, change in height and body weight, and sodium excretion. Significant inverse association between urinary potassium excretion and systolic blood pressure. |
| Geleijnse, 2007195; Hofman, 1991196  Location: Netherlands  Setting: Community  Design: Prospective Cohort study  Study Name: The Rotterdam Study  . | Study of: Adults N: 5531  % Male: 41 Mean Age/Range/Age at Baseline: mean 69.2 (SD 8.7) Race: NR Systolic BP: mean 140 (SD 22) Diastolic BP: mean 74 (SD 11) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 26.4 (SD 3.8) % with Hypertension: 37 % with history of CVD: 17 % with Type 2 diabetes: 10 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included all residents aged 55 years and older living in the Ommoord district of Rotterdam. Everyone who live there at a specific point in time and are willing to participate are eligible. Exclusion: Excluded those who did not provide informed consents. | Exposure Type: Dietary potassium Exposure Unit: mg/day  Exposure Type: Estimated 24-Hour Urinary Potassium Excretion (spot urine) Exposure Unit: mmol/24 h  Exposure Type: Urinary sodium Exposure Unit: mmol/24 h  Exposure Type: Urinary sodium/potassium ratio Exposure Unit: mmol/mmol  Exposure Type: Urinary sodium/potassium ratio Exposure Unit: ratio  Duration: NR Exposure to Follow Up Time: 5 years  Dose format: NR per 1 unit increase, Dose: NR for overall per standard deviation, Dose: Random subcohort mean 117 (SD 69) mmol/24h per standard deviation, Dose: Random subcohort mean 3.6 (SD 0.8) g/day per standard deviation, Dose: Random subcohort mean 45 (SD 22) mmol/24h | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: collected 1 overnight urine sample at baseline Sodium, Method of Validation: NR Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: collected 1 overnight urine sample at baseline Potassium, Method of Validation: NR Mortality Outcomes-Method of Ascertainment: Population registry CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital Discharge Registry, General Practitioner's Records | All-cause mortality (CVD mortality comprised fatal myocardial infarction, fatal stroke, sudden cardiac death and other forms of fatal CVD (ICD-10 codes I20-I25, I46, I49, I50, I60-I67, I70-I74, and R96).) (mmol/mmol/Outcome): Median 5.5 y FU per 1 unit increase cases: 795, total: control, per standard deviation cases: 795, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion No significant association between urinary sodium/potassium ratio and mortality.  CVD mortality (CVD mortality comprised fatal myocardial infarction, fatal stroke, sudden cardiac death and other forms of fatal CVD (ICD-10 codes I20-I25, I46, I49, I50, I60-I67, I70-I74, and R96).) (ratio/Outcome): Median 5.5 y FU per 1 unit increase cases: 217, total: control, per standard deviation cases: 217, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion No significant association between urinary sodium/potassium ratio and CVD events.  Incidence MI (Myocardial infarction comprised ICD-10 code I21. Both fatal and non- fatal incident events were recorded.) (ratio/Outcome): Median 5.5 y FU per 1 unit increase cases: 206, total: control, per standard deviation cases: 206, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion No association between sodium potassium ratio and risk of MI.  Incidence stroke (Stroke comprised ICD-10 codes I60-I67. Both fatal and non- fatal incident events were recorded.) (ratio/Outcome): Median 5.5 y FU per 1 unit increase cases: 181, total: control, per standard deviation cases: 181, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion No association between sodium potassium ratio and risk of stroke.  All-cause mortality (CVD mortality comprised fatal myocardial infarction, fatal stroke, sudden cardiac death and other forms of fatal CVD (ICD-10 codes I20-I25, I46, I49, I50, I60-I67, I70-I74, and R96).) (mmol/24 h/Outcome): Median 5.5 y FU per standard deviation cases: 795, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion For dietary potassium, similar results were obtained except for risk of all-cause mortality that was significantly reduced both in the entire cohort (RR = 0.78 (0.65–0.94 per 1-SD) and in subjects initially free of CVD and hypertension (RR = 0.71 (0.51–1.00), model 3). Urinary potassium did neither predict all-cause mortality.  CVD mortality (CVD mortality comprised fatal myocardial infarction, fatal stroke, sudden cardiac death and other forms of fatal CVD (ICD-10 codes I20-I25, I46, I49, I50, I60-I67, I70-I74, and R96).) (mmol/24 h/Outcome): Median 5.5 y FU per standard deviation cases: 217, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion No significant association between potassium intake and risk of CVD mortality. Urinary potassium tended to be positively associated with incident CVD events or mortality, especially in subjects who were initially free of CVD and hypertension. After full adjustment for confounders (model 3), however, none of these associations were statistically significant.  Incidence MI (Myocardial infarction comprised ICD-10 code I21. Both fatal and non- fatal incident events were recorded.) (mmol/24 h/Outcome): Median 5.5 y FU per standard deviation cases: 206, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion After full adjustment for confounders (model 3), however, none of these associations were statistically significant. No significant association between potassium intake and risk of MI.  Incidence stroke (Stroke comprised ICD-10 codes I60-I67. Both fatal and non- fatal incident events were recorded.) (mmol/24 h/Outcome): Median 5.5 y FU per standard deviation cases: 181, total: control Adjustment: Age, sex and (for urinary potassium) 24-h urinary creatinine excretion, body mass index, smoking status, diabetes, use of diuretics and highest completed education, daily intake of total energy, alcohol, calcium, saturated fat and 24-h urinary sodium excretion After full adjustment for confounders (model 3), however, none of these associations were statistically significant. No significant association between potassium intake and risk of stroke. |
| Green, 2002197  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Cardiovascular Health Study | Study of: Adults N: 5600  % Male: 72.8  Mean Age/Range/Age at Baseline: mean (SD ) Race: 15% black Systolic BP: by serum potassium level <=4.0 mEq/L 138; >4.0 mEq/L 135 Diastolic BP: by serum potassium level <=4.0 mEq/L 72; >4.0 mEq/L 70 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: by serum potassium level <=4.0 mEq/L 62%; >4.0 mEq/L 37%  % with history of CVD:  % with Type 2 diabetes: by serum potassium level <=4.0 mEq/L 62%; >4.0 mEq/L 37%  % with Kidney disease: NR % with history of Kidney stones: NR   Inclusion: patients randomly selected from Medicare eligibility lists in 4 U.S. communities: Forsyth County, NC; Sacramento County, CA; Washington County, MD; and Allegheny County, PA. Patients were all 65 years of age or older. An additional 687 minority individuals were recruited from 1992 to 1993.  Exclusion: those who did not complete initial enrollment testing, which included a medical history and physical examination. | Exposure Type: Potassium from NCI food frequency questionnaire with reported validation | Method of validation: quality control experiments  Outcome method of ascertainment: Interview with participant or proxy at annual visit |  |
| Gu, 200136  Location: China  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Potassium and Protein Supplementation Study (PAPSS)  . | Study of: Adults N: 140 N: 150  Intervention 1: % Male: 37.3 Mean Age/Range/Age at Baseline: 56.9 (SD 7.4) Race: NR Systolic BP: 136.9 Diastolic BP: 81.5 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 66.9 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 42.7 Mean Age/Range/Age at Baseline: 55 (SD 7.6) Race: NR Systolic BP: 134 Diastolic BP: 83 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: 27.3 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Ages 45-64. SBP 13-159 mmHg, DBP<95 mmHg OR SBP<160 mmHg AND DBP < 160 mmHg. Able to take potassium supplements in accordance with protocol Exclusion: blood pressure medication in the last 2 months, history of CVD, diabetes at any time, non-skin malignancy in the last 5 years, COPD, psychiatric disease, other life threatening illnesses. serum creatinine >=1.7 mg/dl or K+>=5.0 mmol/l at screening, alcohol use of >=21 drinks/week or >=40 g/day. Pregnancy, plans to move out of study area, or non-cooperation. | Exposure Type: Urinary potassium excretion Exposure Unit: mmol/24h  Exposure Type: Urinary sodium excretion Exposure Unit: mmol/24h  Duration(in months): 3 Exposure to Follow Up Time: NR  Dose format: NR all, Dose: NR | Sodium Status Arm 2: 185.7 mmol/24 h Potassium measure: Single 24-hour urine analysis without validation Best potassium measure recorded: 3 at screening, Once at 6 weeks, then at 12 weeks Potassium, Method of Validation: Pill count Potassium Status Arm 2: 54.2 mmol/24 h  How was blood pressure measured? Trained staff using Hawksley random zero sphygmomanometers. Taken on the right arm with appropriately sized cuffs after quietly sitting for 5 min. BP recorded three times at each screening, then at follow up visits at 6 and 12 weeks. | Diastolic blood pressure (Hawksley random zero sphygmomanometers) (mmol/24h/Outcome): 12 weeks FU all cases: NR, total: 140 Adjustment: Gender, baseline SBP, baseline body weight, potassium changes during intervention, sodium changes during intervention No association between urinary sodium excretion during the intervention and DBP.  Systolic blood pressure (Hawksley random zero sphygmomanometers) (mmol/24h/Outcome): all cases: NR, total: 140 Adjustment: Gender, baseline DBP, baseline body weight, potassium changes during intervention, sodium changes during intervention Borderline significant association between urinary sodium excretion during the intervention and reduction in SBP.  Diastolic blood pressure (Hawksley random zero sphygmomanometers) (mmol/24h/Outcome): 12 weeks FU all cases: NR, total: 140 Adjustment: Gender, baseline SBP, baseline body weight, potassium changes during intervention, sodium changes during intervention No association between urinary excretion of potassium during the intervention and DBP.  Systolic blood pressure (Hawksley random zero sphygmomanometers) (mmol/24h/Outcome): all cases: NR, total: 140 Adjustment: Gender, baseline DBP, baseline body weight, potassium changes during intervention, sodium changes during intervention Significant association between urinary excretion of potassium during the intervention and reduction in SBP. |
| Hajjar, 2001198  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES III | Study of: Adults N: 12267  % Male: 48.8% Mean Age/Range/Age at Baseline: ranged 25-74 years Race: White 42 African American 28 Hispanic 26 other 4 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 non pregnant adults ages 20 and older, those who completed a physical examination, and who had mortality follow-up information. Exclusion: Excluded survey participants with incomplete data on one or more 24-hour dietary recalls. Excluded those partaking a reduced salt diet for hypertension and those with a history of heart attack, stroke, or congestive heart failure. | 24-hour dietary recall |  | See Yang, 2011 |
| Haring, 2015199  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Strong Heart Study  . | Study of: Adults  % Male: pre-hypertension/hypertension 46.71%; normal blood pressure 78.04% Mean Age/Range/Age at Baseline: pre-hypertension/hypertension mean 29.29 (SD 6.51) years; normal blood pressure mean 27.4 (SD 6.79) years Race: NR Systolic BP: pre-hypertension/hypertension mean 126 (SD 11); normal blood pressure mean 108 (SD 7) Diastolic BP: pre-hypertension/hypertension mean 82 (SD 9);normal blood pressure mean 69 (SD 7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: pre-hypertension/hypertension mean 34.58 (SD 8.12); normal blood pressure mean 30.87 (SD 8.27) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: pre-hypertension/hypertension 16.37%; normal blood pressure 5.41% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included study participants between ages 14 to 39. Exclusion: Excluded participants with incomplete data or extreme energy intake. Excluded participants with a history of any cardiovascular disease or stroke, for example, myocardial infarction, angina pectoris, heart failure, coronary bypass surgery, angioplasty, carotid endarterectomy, valve replacement and significant valve disease (aortic or mitral stenosis or more than mild regurgitation). | Duration: 2 years Exposure to Follow Up Time: on average 4 years | Sodium measure: Food Frequency Questionnaire Best sodium measure recorded: One 119-item food frequency questionnaire at baseline Sodium, Method of Validation: FFQ administered by interviewer Potassium measure: Food Frequency Questionnaire Best potassium measure recorded: One 119-item food frequency questionnaire at baseline Potassium, Method of Validation: FFQ administered by interviewer  How was blood pressure measured? Blood pressure measured as the average of 2 blood pressure readings at baseline examination. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Physical examination | See subgroup table for results |
| He, 1999200  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES I  . | Study of: Adults  % Male: 38.9 Mean Age/Range/Age at Baseline: age reported by sodium quartile and weight status: non overweight q1 mean 46.2 (SD 15.4) years, non overweight q2 mean 48.3 (SD 15.8) years, non overweight q3 mean 49.3 (SD15.9) years, non overweight q4 mean 48.6 (SD 15.8) years; overweight q1 mean 50 (SD 14.9) years, overweight q2 mean 51.1 (SD 15) years, overweight q3 mean 52 (SD15) years, overweight q4 mean 51.3 (SD 14.8) years. Race: White race, % reported by sodium quartile and weight status: non overweight q1 mean 82.3, non overweight q2 mean 87.6, non overweight q3 mean 86.3, non overweight q4 mean 90.1; overweight q1 mean 73.5, overweight q2 mean 76.7, overweight q3 mean 77.4, overweight q4 mean 82.4. Systolic BP: Systolic blood pressure reported by sodium quartile and weight status: non overweight q1 mean 129.0 (SD 23.2), non overweight q2 mean 129.5 (SD 21.6), non overweight q3 mean 131.4 (SD 22.9), non overweight q4 mean 130.7 (SD 23.2); overweight q1 mean 141.7 (SD 24.1) years, overweight q2 mean 142.4 (SD 24.4), overweight q3 mean 144.8 (SD 25.2), overweight q4 mean 143.5 (SD 24.6). Diastolic BP: Diastolic blood pressure reported by sodium quartile and weight status: non overweight q1 mean 80.6 (SD 12.7), non overweight q2 mean 80.2 (SD 11.5), non overweight q3 mean 81.3 (SD 12.1), non overweight q4 mean 80.6 (SD 12.2); overweight q1 mean 89.0 (SD 12.9) years, overweight q2 mean 88.3 (SD 13.0), overweight q3 mean 89.1 (SD 13.4), overweight q4 mean 88.9 (SD 13.2). Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: BMI reported by sodium quartile and weight status: non overweight q1 mean 23.1 (SD 2.6), non overweight q2 mean 23.1 (SD 2.7), non overweight q3 mean 23.1 (SD 2.7), non overweight q4 mean 23.2 (SD 2.7); overweight q1 mean 32.0 (SD 4.4) years, overweight q2 mean 31.6 (SD 4.1), overweight q3 mean 32.0 (SD 4.7), overweight q4 mean 31.6 (SD 3.9). % with Hypertension: % with hypertension reported by sodium quartile and weight status: non overweight q1 mean 19.1, non overweight q2 mean 19.1, non overweight q3 mean 21.6, non overweight q4 mean 21.8; overweight q1 mean 42.2, overweight q2 mean 42.8, overweight q3 mean 43.8, overweight q4 mean 42.3. % with history of CVD: NR % with Type 2 diabetes: % with type 2 diabetes reported by sodium quartile and weight status: non overweight q1 mean 2.1, non overweight q2 mean 2.6, non overweight q3 mean 2.9, non overweight q4 mean 3.8; overweight q1 mean 4.2, overweight q2 mean 5.4, overweight q3 mean 5.6, overweight q4 mean 5.7. % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: NHANES I participants who were 25-74 years old during survey collection period 1971-1975 Exclusion: Exclude those who did not complete 24h dietary recall, who did not report sodium intake information, and those who self-reported history of heart attack, heart failure, or stroke at baseline, or taking medication for heart disease. Also excluded those who were taking a low-salt diet at baseline. | Duration: NR Exposure to Follow Up Time: 113,467 person-years; an average of 19 years | Sodium measure: 24-hour diet recall Best sodium measure recorded: single 24h dietary recall with 3-dimensional food-portion models CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Interview with participant or proxy, Death certificate reports | See subgroup table for results |
| He, 2002201  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The first National Health and Nutrition Examination Surbey (NHANES I) Epidemiologic Follow-up Study (NHEFS)  . | Study of: Adults  % Male: non overweight 36 overweight 44 Mean Age/Range/Age at Baseline: mean (SD) non overweight 48.2 (16.1) overweight mean 52.2 (SD 15.2) Race: African American race non overweight 13% overweight 19% Systolic BP: mean (SD) overweight 129.2(23.4) overweight 141.0 (24.7) Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: nonoverweight 20 overweight 38 % with history of CVD: valvular heart disease nonoverweight 5, overweight 5; coronary heart disease nonoverwieght 4, overweight 5 % with Type 2 diabetes: non overweight 3, overweight 6 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants in NHANES I aged 25 to 74 years were included. Exclusion: People who lacked 240hour dietary recall information, or who lacked sodium intake information, or who had a history of CHF at their baseline examination, or who were consuming a low-salt diet at baseline were excluded. | Duration: NR Exposure to Follow Up Time: 85035 person-years from 1971 through 1992 | Sodium measure: 24-hour diet recall Best sodium measure recorded: once CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records | See subgroup table for results |
| He, 2016202; Yang, 2014203; Lash, 2009204  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Chronic Renal Insufficiency Cohort (CRIC) Study  . | Study of: Adults N: 3757  % Male: by sodium excretion group g1 37.8% g2 48.1% g3 64% g4 72.4% Mean Age/Range/Age at Baseline: by sodium excretion group g1 mean 59.7 (SD 10.6) g2 mean 58.4 (SD 10.9) g3 mean 57.6 (SD 10.9) g4 mean 55.2 (SD 10.8) Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by sodium excretion group g1 mean 29.1 (SD 6.9) g2 mean 31.2 (SD 7.2) g3 mean 32.4 (SD 6.8) g4 mean 34.9 (SD 8.1) % with Hypertension: by sodium excretion group g1 83.4% g2 84.5% g3 88.5% g4 87.9% % with history of CVD: by sodium excretion group g1 31.3% g2 35.4% g3 32.3% g4 33% % with Type 2 diabetes: by sodium excretion group g1 40.2% g2 48% g3 47.7% g4 55.2% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included CRIC Study participants with eGFR between 20 and 70 ml/min per 1.73 m2 depending on age. Exclusion: Excluded participants who received dialysis, or a kidney transplant and excluded those with GN requiring immunosuppression, with advanced heart failure, cirrhosis, or polycystic kidney disease. Also excluded participants without a 24-hour urine specimen or with incomplete 24-hour urine collection. And excluded those with urinary sodium excretion less than 20 mmol/24 h. | Exposure Type: 24-h urinary sodium Exposure Unit: mmol/24h  Duration: NR Exposure to Follow Up Time: 0  Dose format: range Q1, Dose: <116.8 Q2, Dose: 116.8-153.6 Q3, Dose: 153.7-194.5 Q4, Dose: >=194.6 | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 24-hour urine analysis at baseline and twice during follow-up (years 1 and 2). Sodium, Method of Validation: Measured urinary sodium levels with flame emission spectrophotometry, and measured urinary creatinine using the Jaffe method, and measured urine total protein using the turbidimetric reaction method., Multiple 24-hour urine analysis with validation Best potassium measure recorded: 24-hour urine analysis at baseline and twice during follow-up (years 1 and 2). Potassium, Method of Validation: Measured urinary sodium levels with flame emission spectrophotometry, and measured urinary creatinine using the Jaffe method, and measured urine total protein using the turbidimetric reaction method. Mortality Outcomes-Method of Ascertainment: Death certificate CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Interview with participant or proxy, followup visit, US Renal Data System | All-cause mortality (Death from all causes) (mmol/24h/Outcome): 20,465 person-years FU Q1 cases: 144, total: 940, person-years: 4994, Q2 cases: 145, total: 939, person-years: 5080, Q3 cases: 123, total: 938, person-years: 5195, Q4 cases: 128, total: 940, person-years: 5196 Adjustment: Age, sex, race, urinary creatinine excretion, and clinic site. education, waist circumference, lean body mass, body mass index, cigarette smoking, alcohol drinking, physical activity, history of hypercholesterolemia, history of diabetes, history of CVD, use of diuretics, use of renin-angiotensin system blocking agents, and use of other antihypertensive medications. baseline eGFR. plus adjustment for urinary potassium excretion Higher dietary sodium intake associated with a non-significant increased risk of all-cause mortality. After adjusting for SBP, higher dietary sodium intake associated with a non-significant increased risk of all-cause mortality. |
| Hirvonen, 1999205; The ATBC Cancer Prevention Study Group, 1994206  Location: Finland  Setting: Community  Design: Prospective Cohort study  Study Name: the Alpha-Tocopherol, Beta-Carotene Lung Cancer Prevention  . | Study of: Adults    Inclusion: Included male smokers who smoked at least five cigarettes per day at study entry and signed written informed consent. Exclusion: Excluded those with a history of serious disease such as cancer, and those using vitamin E, vitamin A, or p-carotene supplements in excess of predefined doses; and those receiving treatment with anticoagulant agents. | Exposure Type: 1.21847E-2 Exposure Unit: Potassium intake  Duration: NR Exposure to Follow Up Time: 5 years  Dose format: Q1 g/day, Dose: median g/day, Dose: median g/day, Dose: median g/day, Dose: median | Sodium, Method of Validation: Use of a published food frequency questionnaire Best potassium measure recorded: self-administered diet history questionnaire Potassium, Method of Validation: Dietary assessment method was validated in a pilot study carried out among 190 men prior to the ATBC Study. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: self reported, followup visit | Kidney stones (Kidney) (Potassium intake/Outcome): Physician-diagnosed kidney stone for the first time FU g/day cases: NR, total: NR, person-years: 3.8, g/day cases: NR, total: NR, person-years: 4.6, g/day cases: NR, total: NR, person-years: 5.1, g/day cases: NR, total: NR, person-years: 5.7 Adjustment: NR Age, supplementation group, vocational training, marital status, and intakes of magnesium, fiber, and alcohol. |
| Inoue, 2016207  Location: Japan  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults  % Male: 0 Mean Age/Range/Age at Baseline: mean 34.1 (SD 4.9) Race: NR Systolic BP: mean 102 (SD 10) Diastolic BP: mean 63 (SD 8) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 21.7 (SD 4.7) % with Hypertension: 8.2 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Women with chronic hypertension or multiple pregnancy were included. Exclusion: Women who cannot undergo the first investigation (the first blood and urine sampling, and BP measurement) before the 20th gestational week, and those who had known heart disease or nephropathy were excluded. | Duration: 20 weeks of gestation to 30 weeks of gestation Exposure to Follow Up Time: NR | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, one before the 20th gestational week, and the other after the improvement of hyperemesis gravidarum  How was blood pressure measured? HBP was measured twice using an HEM- 7051 (Omron Healthcare, Kyoto, Japan) based on the cuff- oscillometric method. The paticipants were asked to measure HBP at their upper arm within 1h of waking up, after micturition, before breakfast, while seated, after resting >1 min. HBP was measured for 7 consecutive days including the day of home urine collection before 20 weeks of gestation. In addition, HBP was also measured for 7 consecutive days after 30 weeks of gestation. | See subgroup table for results |
| Joosten, 2014208  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: 7543  % 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: 123, total: 1885, person-years: 17638, continuous cases: 452, total: 7543, person-years: 71491, Q2 cases: 111, total: 1886, person-years: 17975, Q3 cases: 112, total: 1886, person-years: 17878, Q4 cases: 106, total: 1886, person-years: 18000 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 In multivariable analysis, there was no significant association between a continuous term of sodium excretion and risk of CHD. In multivariable analysis, there was no significant association between a continuous term of sodium excretion and risk of CHD. |
| Kagan, 1985209; Kagan, 1974210  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Hawaiian Study  . | Study of: Adults N: 8006  % Male: 100 Mean Age/Range/Age at Baseline: free of stroke mean 54.3 developed stroke mean 56.9 Race: NR Systolic BP: reported by age groups: 45-49 128.6; 50-54 132; 55-59 134.3; 60-64 138.6; 65-69 142.2 Diastolic BP: reported by age groups: 45-49 81.8; 50-54 82; 55-59 84.7; 60-64 83; 65-69 83.5 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 men of Japanese ancestry born between 1900-1010, lived on the island of Oahu. Included those who were successfully identified through Selective Service records from World War II, and also successfully located through searches of telephone, business, and state agency records. In addition, those included also returned a completed questionnaire in early 1965. Exclusion: 1st level analysis excluded 111 men with stroke; 2nd level analysis excluded individuals showing evidence of coroner heart disease or cancer at entry exam, also excluded those who reported atypical diet the day before dietary exam; | Exposure Type: Sodium intake Exposure Unit: g  Duration(in months): 2-6 years Exposure to Follow Up Time: 10 years  Dose format: range Q1, Dose: <=1.78 Q2, Dose: 1.79- Q3, Dose: 2.39- Q4, Dose: 3.01- Q5, Dose: 3.87+ | Sodium measure: 24-hour diet recall Best sodium measure recorded: 24h dietary recall Sodium, Method of Validation: Data validated by repeating 24-hr recall interviews and 7-day dietary records in a sample of the men examined 2 yr later. Correlation coefficients ranged from 0.4 to 0.6 for most of the nutrients, suggesting good reproducibility. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports, Physical examination | Total stroke (g/Outcome): 10 years FU Q1 cases: 29.9 (incidence), total: NR, Q2 cases: 31.3 (incidence), total: NR, Q3 cases: 23.9 (incidence), total: NR, Q4 cases: 32.0 (incidence), total: NR, Q5 cases: 28.4 (incidence), total: NR Adjustment: Age No association was found between an index of sodium intake and the incidence of stroke. The determination of sodium intake was based on the 24-hour diet recall method and did not include salt or soy sauce added at the table, so a relation could be obscured by the crudeness of this measure. |
| Khaw, 1987211  Location: US  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults N: 859  % Male: NR Mean Age/Range/Age at Baseline: range 50-79 years Race: NR Systolic BP: No stroke associated death (men) mean 141.5 mmHg, stroke-associated death (men) mean 143.2 mmHg; No stroke-associated death (women) mean 136.4 mmHg, stroke-associated death (women) 147.2 mmHg Diastolic BP: No stroke-associated death (men) mean 84.3 mmHg, stroke-associated death (men) mean 83.2; No stroke-associated death (women) mean 81.3 mmHg, stroke-associated death (women) mean 86.3 mmHg Magnesium: No stroke-associated death (men) mean 11.6, stroke-associated death (men) mean 9.9; No stroke-associated death (women) mean 9.1 mmHg, stroke-associated death (women) mean 8.0 mmol Calcium: No stroke-associated death (men) mean 20.2, stroke-associated death (men) mean 16.1; No stroke-associated death (women) mean 15.1 mmHg, stroke-associated death (women) mean 14.9 mmol 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: Men and Women who were 50 to 79 years old and who had no personal history of heart attack, heart failure, or stroke at the base-line examination were included in the study. Exclusion: NR | Exposure Type: Dietary Potassium Intake Exposure Unit: mmol/d  Duration(in months): 144 (12 years) Exposure to Follow Up Time: NR  Dose format: NR per 10 mmol, Dose: mean 64 (range 17-154) mmol/d | Sodium, Method of Validation: 24-hour "diet recall" Best potassium measure recorded: Once (at baseline) Potassium, Method of Validation: A 24-hour recall of dietary intake was obtained by a certified Lipid Research Clinic dietician. The data were coded for nutrient intake by the Nutrition Coordinating Center, University of Minnesota, with use of their data base.  How was blood pressure measured? BP was measured by trained observers who used a standard mercury sphygmomanometer after the subject had been seared at rest for at least five minutes. BP was only measured once at baseline. Mortality Outcomes-Method of Ascertainment: Interview, tracing, national death index searches, deaths confirmed from death certificates CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Death certificate reports | Stroke-associated All-cause mortality (ICDA 430 to 438) (mmol/d/Outcome): 12 y FU per 10 mmol cases: 24, total: 859 Adjustment: Calories, protein, fat, fiber, calcium, magnesium, and alcohol, age and sex Dietary potassium remained a significant predictor of stroke-associated mortality, and the relative risk was not changed. |
| Kieneker, 2014212  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: 5511  % Male: 45.3 Mean Age/Range/Age at Baseline: by potassium turtles t1 mean 45.9 (SD 11.6) t2 mean 45.7 (SD 10.8) t3 mean 44.2 (SD 10.1) Race: by potassium turtles t1 white 90.7 t2 white 96.6 t3 white 98.4 Systolic BP: by potassium turtles t1 mean 118 (SD 11) t2 mean 119 (SD 11) t3 mean 119 (SD 11) Diastolic BP: by potassium turtles t1 mean 70 (SD 7) t2 mean 70 (SD 7) t3 mean 70 (SD 7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by potassium turtles t1 mean 24.7 (SD 3.8) t2 mean 25.2 (SD 3.8) t3 mean 25.4 (SD 3.9) % with Hypertension: by potassium turtles t1 27.2 t2 29.1 t3 30.8 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included PREVEND cohort participants who completed examinations in 1997 and 1998. Exclusion: Excluded those with hypertension, undergoing dialysis, and those with missing urinary data. | Exposure Type: Na-K excretion ratio Exposure Unit: NR  Exposure Type: Urinary Potassium Excretion Exposure Unit: mmol/24 h  Duration: NR Exposure to Follow Up Time: up to 10 years  Dose format: range T1, Dose: male <68; female <58 T1, Dose: male<1.7; female <1.6 T2, Dose: male 68-86; female 58-74 T2, Dose: male 1.7-2.3; female 1.6-2.2 T2+T3, Dose: Male >=68; female >=58 T3, Dose: male>86; female >74 T3, Dose: male >2.3; female >2.2 | Potassium measure: two 24-hr urine analysis without reported validation Best potassium measure recorded: Two 24-hr urine analysis at baseline and second examination, for each analysis participants collected 2 consecutive 24-hr specimens.  How was blood pressure measured? Blood pressure was measured as the mean of last 2 readings from each examinations. The study conducted 4 examinations in 1997-1998, 2001-2003, 2003-2006, and 2006-2008. | Hypertension (Systolic BP of ≥140 mm Hg, a diastolic BP of ≥90 mmHg, or the use of antihypertensive drugs, in concordance with recommendations from the Seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of H) (NR/Outcome): Median 7.6 years FU T1 cases: 372, total: NR, person-years: 10847, T2 cases: 412, total: NR, person-years: 10751, T3 cases: 388, total: NR, person-years: 10213 Adjustment: Age, sex, body mass index, smoking status, alcohol consumption, parental history of hypertension, and urinary sodium excretion, education and urinary magnesium and calcium excretion, plasma aldosterone Null association between Na-K excretion ratio and risk of hypertension.  Hypertension (Systolic BP of ≥140 mm Hg, a diastolic BP of ≥90 mmHg, or the use of antihypertensive drugs, in concordance with recommendations from the Seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of H) (mmol/24 h/Outcome): Median 7.6 years FU T1 cases: 401, total: 1836, person-years: 9738, T2 cases: 400, total: 1838, person-years: 10919, T2+T3 cases: 771, total: 3675, person-years: 22071, T3 cases: 371, total: 1837, person-years: 11152 Adjustment: Age, sex, body mass index, smoking status, alcohol consumption, parental history of hypertension, and urinary sodium excretion, education and urinary magnesium and calcium excretion In multivariable analysis, the lowest tertile of potassium intake was associated with an increased risk of hypertension. Found a non-linear inverse association between urinary potassium excretion and risk of hypertension. |
| Kieneker, 2016213; Hillege, 2001214; Joosten, 2013215  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: 7795  % Male: Q1: 48.7; Q2: 48.6; Q3 48.7; Q4 48.6; Q5 48.7 Mean Age/Range/Age at Baseline: Q1: mean 50.6 (SD 13.3); Q2 mean 50.3 (SD 12.6); Q3 mean 49.5 (SD 12.2); Q4 mean 48.4 (SD 12.2); Q5 46.7 (11.2) years Race: NR Systolic BP: Q1: mean 130 (SD 22); Q2: mean 129 (SD 20); Q3: mean 128 (SD 20); Q4: mean 128 (SD 19); Q5: mean 127 (SD 18) mmHg Diastolic BP: Q1: mean 75 (SD 10); Q2: mean 74 (SD 10); Q3: mean 74 (SD 10); Q4: mean 73 (SD 9); Q5: mean 73 (SD 9) mmHg Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Q1: mean 25.8 (SD 4.3); Q2 mean 25.9 (SD 4.1); Q3 mean 26.0 (SD 4.0); Q4: mean 26.0 (SD 4.2); Q5: mean 26.5 (SD 4.5) kg/ m^2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 28-75 years with a urinary albumin concentration of >=10 mg/L and or a urinary albumin concentration <10 mg/ L were included. Exclusion: People with a history of cardiovascular events, or renal disease requiring dialysis or with missing values of urinary analyses at baseline were excluded. | Exposure Type: 24-h urinary potassium excretion Exposure Unit: mmol/24 h  Exposure Type: 24-h urinary sodium excretion Exposure Unit: mmol/24 h  Exposure Type: Sodium to potassium excretion ratio Exposure Unit: NR  Exposure Type: Sodium to potassium excretion ratio Exposure Unit: mmol/mmol  Duration(in months): 129.6 (10.5 years) Exposure to Follow Up Time: NR  Composite outcome (Cardiovascular disease (including ischemic heart disease and stroke), heart failure, and all-cause mortality) Dose format: median Q1, Dose: 46 Q1, Dose: <1.6 for men and, <1.4 for women Q1, Dose: <115 for men and, <89 for women Q2, Dose: 60 Q2, Dose: 1.6-1.9 for men and 1.4-1.7 for women Q2, Dose: 115-141 for men and 89-110 for women Q3, Dose: 69 Q3, Dose: 142–167 for men and 111-132 for women Q3, Dose: 2.0-2.2 for men and 1.8-2.0 for women Q4, Dose: 81 Q4, Dose: 168-201 for men and 133-160 for women Q4, Dose: 2.3-2.7 for men and 2.1-2.6 for women Q5, Dose: 100 Q5, Dose: >2.7 for men and >2.6 for women Q5, Dose: >201 for men and >160 for women per 1-unit increase, Dose: NR for overall per 26-mmol/24-h increase, Dose: Median 70mmol/24h (IQR: 56–84 mmol/24 h) per 50-mmol/24-h increase, Dose: NR  All-cause mortality (Linking the number of the death certificate to the primary cause of death as coded by the Dutch Central Bureau of Statistics) Dose format: median Q1, Dose: 46 Q1, Dose: <1.6 for men and, <1.4 for women Q1, Dose: <115 for men and, <89 for women Q2, Dose: 60 Q2, Dose: 1.6-1.9 for men and 1.4-1.7 for women Q2, Dose: 115-141 for men and 89-110 for women Q3, Dose: 69 Q3, Dose: 142–167 for men and 111-132 for women Q3, Dose: 2.0-2.2 for men and 1.8-2.0 for women Q4, Dose: 81 Q4, Dose: 168-201 for men and 133-160 for women Q4, Dose: 2.3-2.7 for men and 2.1-2.6 for women Q5, Dose: 100 Q5, Dose: >2.7 for men and >2.6 for women Q5, Dose: >201 for men and >160 for women per 1-unit increase, Dose: NR for overall per 26-mmol/24-h increase, Dose: Median 70mmol/24h (IQR: 56–84 mmol/24 h) per 50-mmol/24-h increase, Dose: NR for overall  Risk of Cardiovascular disease (The combined incidence of fatal and nonfatal events of IHD, stroke, and vascular interventions such as percutaneous transluminal angioplasty or bypass grafting of aorta and peripheral vessels), Risk of IHD (Acute myocardial infarction (code 410), acute and subacute ischemic heart disease (code 411), coronary artery bypass grafting (code 414), or percutaneous transluminal coronary angioplasty (code 36.0)), Risk of stroke (Subarachnoid hemorrhage (code 430), intrace Dose format: median Q1, Dose: 46 Q1, Dose: <1.6 for men and, <1.4 for women Q2, Dose: 60 Q2, Dose: 1.6-1.9 for men and 1.4-1.7 for women Q3, Dose: 69 Q3, Dose: 2.0-2.2 for men and 1.8-2.0 for women Q4, Dose: 81 Q4, Dose: 2.3-2.7 for men and 2.1-2.6 for women Q5, Dose: 100 Q5, Dose: >2.7 for men and >2.6 for women per 1-unit increase, Dose: NR for overall per 26-mmol/24-h increase, Dose: Median 70mmol/24h (IQR: 56–84 mmol/24 h)  Risk of Composite cardiovascular (Cardiovascular disease (including ischemic heart disease and stroke), and heart failure) Dose format: median Q1, Dose: 46 Q1, Dose: <115 for men and, <89 for women Q2, Dose: 60 Q2, Dose: 115-141 for men and 89-110 for women Q3, Dose: 69 Q3, Dose: 142–167 for men and 111-132 for women Q4, Dose: 81 Q4, Dose: 168-201 for men and 133-160 for women Q5, Dose: 100 Q5, Dose: >201 for men and >160 for women per 26-mmol/24-h increase, Dose: Median 70mmol/24h (IQR: 56–84 mmol/24 h) per 50-mmol/24-h increase, Dose: NR  Risk of New-onset heart failure (Criteria described in the Heart Failure Guidelines of the European Society of Cardiology, and an endpoint adjudication committee ascertained the diagnosis of HF as described elsewhere (23)) Dose format: median Q1, Dose: 46 Q2, Dose: 60 Q3, Dose: 69 Q4, Dose: 81 Q5, Dose: 100 per 26-mmol/24-h increase, Dose: Median 70mmol/24h (IQR: 56–84 mmol/24 h)  Risk of New-onset heart failure (Criteria described in the Heart Failure Guidelines of the European Society of Cardiology, and an endpoint adjudication committee ascertained the diagnosis of HF as described elsewhere (23)), Risk of Composite cardiovascular outcome (Cardiovascular disease (including ischemic heart disease and stroke), and heart failure) Dose format: range Q1, Dose: <1.6 for men and, <1.4 for women Q2, Dose: 1.6-1.9 for men and 1.4-1.7 for women Q3, Dose: 2.0-2.2 for men and 1.8-2.0 for women Q4, Dose: 2.3-2.7 for men and 2.1-2.6 for women Q5, Dose: >2.7 for men and >2.6 for women per 1-unit increase, Dose: NR for overall | Sodium measure: Discussion,, Didn't say anything in the method part but in the results part, the authors conducted analysis between sodium and CVD, IHD, stroke and HF. Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice, first: between 1997 and 1998 (baseline); second: between 2001 and 2003. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports | All-cause mortality (Linking the number of the death certificate to the primary cause of death as coded by the Dutch Central Bureau of Statistics) (mmol/24 h/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 122, total: NR, person-years: 14966, Q1 cases: 93, total: NR, person-years: 15143, per 1-unit increase cases: 493, total: 7795, person-years: 75725, per 50-mmol/24-h increase cases: 493, total: 7795, person-years: 75725, Q2 cases: 129, total: NR, person-years: 15074, Q2 cases: 91, total: NR, person-years: 15077, Q3 cases: 104, total: NR, person-years: 15142, Q3 cases: 89, total: NR, person-years: 15206, Q4 cases: 118, total: NR, person-years: 15101, Q4 cases: 84, total: NR, person-years: 15195, Q5 cases: 69, total: NR, person-years: 15284, Q5 cases: 87, total: NR, person-years: 15262 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of all-cause mortality. No statistically significant association was observed.  Q1 cases: 204, total: NR, person-years: 14626, Q1 cases: 265, total: NR, person-years: 14278, per 1-unit increase cases: 1099, total: 7795, person-years: 72803, per 50-mmol/24-h increase cases: 1099, total: 7795, person-years: 72803, Q2 cases: 214, total: NR, person-years: 14466, Q2 cases: 246, total: NR, person-years: 14535, Q3 cases: 210, total: NR, person-years: 14619, Q3 cases: 219, total: NR, person-years: 14541, Q4 cases: 190, total: NR, person-years: 14689, Q4 cases: 259, total: NR, person-years: 14419, Q5 cases: 179, total: NR, person-years: 14760, Q5 cases: 212, total: NR, person-years: 14673 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of composit outcome. No statistically significant association was observed.  Risk of New-onset heart failure (Criteria described in the Heart Failure Guidelines of the European Society of Cardiology, and an endpoint adjudication committee ascertained the diagnosis of HF as described elsewhere (23)) (NR/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 70, total: NR, person-years: 15040, per 1-unit increase cases: 265, total: 7795, person-years: 75180, Q2 cases: 64, total: NR, person-years: 14953, Q3 cases: 44, total: NR, person-years: 15073, Q4 cases: 42, total: NR, person-years: 15002, Q5 cases: 45, total: NR, person-years: 15112 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of new on-set heart failure. The sodium to potassium excretion ratio was not statistically significantly associated with risk of CVD, IHD, stroke, and HF, with maHRs (95% CIs) per 1-unit increment in the ratio of 0.99 (0.90, 1.09), 1.04 (0.95, 1.15), 0.82 (0.65, 1.03), and 1.05 (0.94, 1.16), respectively  Risk of Cardiovascular disease (The combined incidence of fatal and nonfatal events of IHD, stroke, and vascular interventions such as percutaneous transluminal angioplasty or bypass grafting of aorta and peripheral vessels) (NR/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 165, total: NR, person-years: 14685, per 1-unit increase cases: 641, total: 7795, person-years: 73187, Q2 cases: 146, total: NR, person-years: 14558, Q3 cases: 116, total: NR, person-years: 14670, Q4 cases: 122, total: NR, person-years: 14487, Q5 cases: 92, total: NR, person-years: 14787 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of CVD. The sodium to potassium excretion ratio was not statistically significantly associated with risk of CVD, IHD, stroke, and HF, with maHRs (95% CIs) per 1-unit increment in the ratio of 0.99 (0.90, 1.09), 1.04 (0.95, 1.15), 0.82 (0.65, 1.03), and 1.05 (0.94, 1.16), respectively  Risk of Composite cardiovascular (Cardiovascular disease (including ischemic heart disease and stroke), and heart failure) (mmol/24 h/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 186, total: NR, person-years: 14278, per 50-mmol/24-h increase cases: 785, total: 7795, person-years: 72803, Q2 cases: 158, total: NR, person-years: 14535, Q3 cases: 165, total: NR, person-years: 14541, Q4 cases: 140, total: NR, person-years: 14689, Q5 cases: 136, total: NR, person-years: 14760 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No statistically significant association was observed.  Risk of Composite cardiovascular outcome (Cardiovascular disease (including ischemic heart disease and stroke), and heart failure) (NR/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 141, total: NR, person-years: 14626, per 1-unit increase cases: 785, total: 7795, person-years: 72803, Q2 cases: 154, total: NR, person-years: 14466, Q3 cases: 147, total: NR, person-years: 14619, Q4 cases: 181, total: NR, person-years: 14419, Q5 cases: 162, total: NR, person-years: 14673 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of composite CVD outcomes.  Risk of IHD (Acute myocardial infarction (code 410), acute and subacute ischemic heart disease (code 411), coronary artery bypass grafting (code 414), or percutaneous transluminal coronary angioplasty (code 36.0)) (NR/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 117, total: NR, person-years: 14829, per 1-unit increase cases: 465, total: 7795, person-years: 73824, Q2 cases: 103, total: NR, person-years: 14787, Q3 cases: 88, total: NR, person-years: 14649, Q4 cases: 88, total: NR, person-years: 14649, Q5 cases: 69, total: NR, person-years: 14867 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of IHD. The sodium to potassium excretion ratio was not statistically significantly associated with risk of CVD, IHD, stroke, and HF, with maHRs (95% CIs) per 1-unit increment in the ratio of 0.99 (0.90, 1.09), 1.04 (0.95, 1.15), 0.82 (0.65, 1.03), and 1.05 (0.94, 1.16), respectively  Risk of stroke (Subarachnoid hemorrhage (code 430), intracerebral hemorrhage (code 431), other intracranial hemorrhage (code 432), or occlusion or stenosis of the precerebral (code 433) or cerebral (code 434) arteries) (NR/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 48, total: NR, person-years: 14990, per 1-unit increase cases: 172, total: 7795, person-years: 75140, Q2 cases: 39, total: NR, person-years: 14965, Q3 cases: 31, total: NR, person-years: 15058, Q4 cases: 32, total: NR, person-years: 14933, Q5 cases: 22, total: NR, person-years: 15194 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No association between sodium to potassium excretion ration and risk of stroke. The sodium to potassium excretion ratio was not statistically significantly associated with risk of CVD, IHD, stroke, and HF, with maHRs (95% CIs) per 1-unit increment in the ratio of 0.99 (0.90, 1.09), 1.04 (0.95, 1.15), 0.82 (0.65, 1.03), and 1.05 (0.94, 1.16), respectively  All-cause mortality (Linking the number of the death certificate to the primary cause of death as coded by the Dutch Central Bureau of Statistics) (mmol/24 h/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 139, total: 1558, person-years: 14991, per 26-mmol/24-h increase cases: 493, total: 7795, person-years: 75725, Q2 cases: 107, total: 1561, person-years: 15209, Q3 cases: 97, total: 1558, person-years: 15150, Q4 cases: 82, total: 1561, person-years: 15209, Q5 cases: 68, total: 1557, person-years: 15165 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No significant association between potassium excretion and all-cause mortality.  Composite outcome (Cardiovascular disease (including ischemic heart disease and stroke), heart failure, and all-cause mortality) (mmol/24 h/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 295, total: 1558, person-years: 14220, per 26-mmol/24-h increase cases: 1099, total: 7795, person-years: 72803, Q2 cases: 237, total: 1561, person-years: 14594, Q3 cases: 210, total: 1558, person-years: 14615, Q4 cases: 194, total: 1561, person-years: 14668, Q5 cases: 163, total: 1557, person-years: 14706 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. No significant association between potassium excretion and composite outcome.  Risk of Cardiovascular disease (The combined incidence of fatal and nonfatal events of IHD, stroke, and vascular interventions such as percutaneous transluminal angioplasty or bypass grafting of aorta and peripheral vessels) (mmol/24 h/Outcome): Median 10.5y (IQR 9.9 - 10.8y) FU Q1 cases: 165, total: 1558, person-years: 14345, per 26-mmol/24-h increase cases: 641, total: 7795, person-years: 73187, Q2 cases: 146, total: 1561, person-years: 14690, Q3 cases: 116, total: 1558, person-years: 14667, Q4 cases: 122, total: 1561, person-years: 14734, Q5 cases: 92, total: 1557, person-years: 14751 Adjustment: Age, sex, lifestyle and dietary factors, including BMI, smoking status, alcohol consumption, education, and 24-h urinary sodium and magnesium excretion, and additional cardiovascular disease risk factors, including parental history of cardiovascular disease, use of lipid-lowering drugs, presence of type 2 diabetes, total: HDL cholesterol ratio, and urinary creatinine excretion. After adjustment for age and sex, each 1-g/ d increment in urinary potassium excretion was associated with a 13% lower risk of CVD. However, these associations lost significance after multivariable adjustment for age, sex, BMI, smoking status, alcohol consumption, education, and urinary sodium and magnesium ex |
| Kieneker, 2016216  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: 5315  % Male: Q1 47.4 Q2 47.5 Q3 47.5 Q4 47.5 Q5 47.5 Mean Age/Range/Age at Baseline: mean (SD) Q1 49.7 (12.4) Q2 49.3 (11.9) Q3 48.4 (11.6) Q4 47.9 (11.7) Q5 46.3 (10.7) Race: Whites (%) Q1 89.4 Q2 86.5 Q3 96.6 Q4 98.3 Q5 99.2 Systolic BP: mean (SD) Q1 127 (20) Q2 126 (18) Q3 125 (17) Q4 125 (18) Q5 125 (17) Diastolic BP: mean (SD) Q1 73 (10)Q2 73 (9) Q3 72 (9) Q4 72 (9) Q5 73 (9) Magnesium: NR Calcium: median (IQR) Q1 3.1 (2.1-4.3) Q2 3.6 (2.9-5.0) Q3 4.0 (2.8-5.2) Q4 4.1 (2.8-5.4) Q5 4.3 (3.1-5.7) Other Minerals: NR Mean BMI: NR % with Hypertension: antihypertensive drugs Q1 15.2 Q2 12.4 Q3 12.3 Q4 9.4 Q5 9.7 % with history of CVD: NR % with Type 2 diabetes: Q1 1.7 Q2 1.7 Q3 1.2 Q4 1.2 Q5 1.3 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 28 to 75 were included Exclusion: Pregnant women and subjects with type I diabetes mellitus were excluded. People with CKD at baseline or unknown CKD status, or with renal disease requiring dialysis, or with missing values of urinary analytes, or with no follow-up data available for CKD, or with missing values of body measurements at baseline were also excluded. | Exposure Type: Urinary potassium excretion Exposure Unit: mmol/24h  Exposure Type: Urinary sodium excretion Exposure Unit: mmol/24h  Duration: 10.3 year Exposure to Follow Up Time: NR  Dose format: range Q1, Dose: M <114 F<90 Q1, Dose: M <60 F<51 Q2, Dose: M 114-140 F 90-110 Q2, Dose: M 60-71 F 51-60 Q3, Dose: M 141-165 F 111-131 Q3, Dose: M 72-82 F 61-69 Q4, Dose: M 166-199 F 132-159 Q4, Dose: M 83-95 F 70-81 Q5, Dose: M >199 F >159 Q5, Dose: M >95 F >81 | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: twice, (baseline and the second examination Potassium measure: More than one 24-hour urinary analysis without reported quality control measure\_1 Best potassium measure recorded: twice, (baseline and the second examination CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: CKD was defined as a combination of reaching an eGFR of 30 mg/ 24 h de novo, or both | EGFR < 60 ml/min per 173 m^2 (mmol/24h/Outcome): Median 10.3 years FU Q1 cases: 83, total: NR, person-years: 9642, Q2 cases: 62, total: NR, person-years: 9940, Q3 cases: 64, total: NR, person-years: 10126, Q4 cases: 47, total: NR, person-years: 10187, Q5 cases: 35, total: NR, person-years: 10464 Adjustment: Age, sex, height, weight, smoking status, alcohol consumption, parental history of CKD, race, diabetes, and urinary potassium, calcium, urea, and creatinine excretion, baseline eGFR and UAE No association between urinary sodium excretion and risk of developing CKD.  EGFR < 60 ml/min per 173 m^2 (mmol/24h/Outcome): Median 10.3 years FU Q1 cases: 87, total: NR, person-years: 9585, Q2 cases: 73, total: NR, person-years: 9896, Q3 cases: 46, total: NR, person-years: 10099, Q4 cases: 49, total: NR, person-years: 10201, Q5 cases: 36, total: NR, person-years: 10578 Adjustment: Age, sex, height, weight, smoking status, alcohol consumption, parental history of CKD, race, diabetes, and urinary potassium, calcium, urea, and creatinine excretion, baseline eGFR and UAE Significant association between 1 SD (21 mmol/24hr) increase in urinary potassium excretion and a 16% higher risk of developing CKD. |
| Krupp, 2015217; Shi, 2014218; Kruppe, 2014219; Kroke, 2004220  Location: Germany  Setting: Community  Design: Prospective Cohort study  Study Name: Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) Study  . | Study of: Children  % Male: 52.4% Mean Age/Range/Age at Baseline: 3 months Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by gender boys mean 18.9 (SD 2.3) girls mean 18.7 (SD 2.7) % 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 Germans recruited at 3 months of age and who competed three repeated urinary, dietary and blood pressure measurements in adolescence and one additional blood pressure measurement in young adulthood. Exclusion: Excluded those who were born before 36 weeks gestation and those with missing data. | Duration: NR Exposure to Follow Up Time: an average of 12 years | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 3 repeated 24-hour urine analysis with validation Sodium, Method of Validation: Minimized errors with creatinine excretion cutoff., Multiple 24-hour urine analysis with validation Best potassium measure recorded: 3 repeated 24-hour urine analysis with validation Potassium, Method of Validation: Minimized errors with creatinine excretion cutoff.  How was blood pressure measured? Two blood pressure readings for each BP measurement was assessed by trained nurses with first a random zero sphygmomanometer and with a standard mercury sphygmomanometer. BP values measured with a standard zero sphygmomanometers were multiplied with an internally validated conversion factor (e.g., 1.056 for systolic BP). | See subgroup table for results |
| Lamelas, 2016221  Location: South America (Argentina, Brazil, Chile, and Colombia)  Setting: Community  Design: Prospective Cohort study  Study Name: The Prospective Urban and Rural Epidemiology (PURE) study  . | Study of: Adults N: 16549  % Male: 40.3 Mean Age/Range/Age at Baseline: mean 51.4 (SD 9.6 )years Race: NR Systolic BP: mean 132.0 (SD 21.5) Diastolic BP: mean 82.4 (SD 12.5) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 28,1 (SD 5.5) % with Hypertension: NR % with history of CVD: 9.1 % with Type 2 diabetes: 7.2 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 35-70 years from urban and rural communities located in 18 countries around the world were included. Exclusion: N/A | Exposure Type: 24 h urinary sodium excretion (estimated) Exposure Unit: g/day  Duration(in months): 56.4 (4.7 years) Exposure to Follow Up Time: NR  Dose format: range G1, Dose: <3 G2, Dose: 3-3.99 G3, Dose: 4-4.99 G4, Dose: 5-5.99 G5, Dose: 6-6.99 G6, Dose: >7 | Sodium measure: Partial or spot urine with validated prediction equation Best sodium measure recorded: once spot urine (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).  How was blood pressure measured? The mean of duplicate sitting BP was measured by trained research assistants after at least 3 minutes rest at all centers, following a standardized procedure using an Omron digital BP measuring device (Omron HEM-757) provided for all sites. Mortality Outcomes-Method of Ascertainment: Standardized case-report forms (adjudicated by trained physicians using standardized definitions CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Standardized case-report forms (adjudicated by trained physicians using standardized definitions) | All-cause mortality (g/day/Outcome): Median 4.7 y FU G1 cases: 32, total: 1638, G2 cases: 87, total: 3885, G3 cases: 115, total: 4758, G4 cases: 80, total: 3457, G5 cases: 54, total: 1748, G6 cases: 46, total: 1063 Adjustment: Age, sex, body mass index, smoking status, diabetes, educational level, alcohol consumption, past CV events, and country Non-significant positive association between sodium excretion of less than 3 g/day and increase in all-cause mortality.  All-cause mortality or major CVD (g/day/Outcome): Median 4.7 y FU G1 cases: 50, total: 1638, G2 cases: 115, total: 3885, G3 cases: 161, total: 4758, G4 cases: 110, total: 3457, G5 cases: 73, total: 1748, G6 cases: 59, total: 1063 Adjustment: Age, sex, body mass index, smoking status, diabetes, educational level, alcohol consumption, past CV events, and country There is a possible J-shaped association between sodium excretion and CVD events and mortality. And a non-significant positive association between sodium excretion of less than 3 g/day and increase in primary composite outcome.  Major CVD (g/day/Outcome): Median 4.7 y FU G1 cases: 27, total: 1638, G2 cases: 62, total: 3885, G3 cases: 80, total: 4758, G4 cases: 48, total: 3457, G5 cases: 41, total: 1748, G6 cases: 29, total: 1063 Adjustment: Age, sex, body mass index, smoking status, diabetes, educational level, alcohol consumption, past CV events, and country Signifiant positive association between sodium excretion of less than 3 g/day and increase in major CVD disease. |
| Larsson, 2008222  Location: Finland  Setting: Community  Design: Prospective Cohort study  Study Name: The Alpha-Tocopherol, Beta- Carotene Cancer Prevention (ATBC) Study  . | Study of: Adults N: 26556  % Male: 100 Mean Age/Range/Age at Baseline: by potassium quintiles q1 mean 57.8 q5 mean 57.3 Race: NR Systolic BP: by potassium quintiles q1 mean 143.7 q5 mean 141 Diastolic BP: by potassium quintiles q1 mean 88 q5 mean 86.8 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by potassium quintiles q1 mean 26 q5 mean 26.7 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: by potassium quintiles q1 3.8 q5 9.4 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included Finnish men between ages 50-69, who smoked 5 or more cigarettes per day. Exclusion: Excluded those with a history of cancer or other serious disease, or those received anticoagulant therapy, or used excess doses or vitamin E, vitamin A, or beta carotene supplements. | Exposure Type: Potassium intake Exposure Unit: mg/d  Duration: NR Exposure to Follow Up Time: mean 13.6 years  Dose format: Median Q1, Dose: 3912 Q2, Dose: 4451 Q3, Dose: 4837 Q4, Dose: 5237 Q5, Dose: 5859 | Sodium measure: Food frequency questionnaire Sodium, Method of Validation: Use of a published food frequency questionnaire Best potassium measure recorded: completed one 276-item food frequency questionnaire at baseline. Potassium, Method of Validation: questionnaire validated in Pietinen P, Hartman AM, Haapa E, et al. Reproducibility and validity of dietary assessment instruments, I: a self-administered food use questionnaire with a portion size picture booklet. Am J Epidemiol. 1988;128(3):655-666. Mortality Outcomes-Method of Ascertainment: National register of causes of death CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital Discharge Registry | Cerebral infarction (Definition for stroke but reported by subtype: ICD-8 codes 430 through 434 and 436; ICD-9 codes 430, 431, 433, 434, and 436; and ICD-10 codes I60, I61, I63, and I64, excluding ICD-8 codes 431.01 and 431.91 denoting subdural hemorrhage and ICD-9 codes 4330) (mg/d/Outcome): Mean 13.6 years (360187 person-years) FU Q1 cases: 566, total: NR, Q2 cases: 594, total: NR, Q3 cases: 518, total: NR, Q4 cases: 519, total: NR, Q5 cases: 505, total: NR Adjustment: Age, supplementation group, number of cigarettes smoked daily, body mass index, systolic and diastolic blood pressures, serum total cholesterol, serum high-density lipoprotein cholesterol, histories of diabetes and coronary heart disease, leisure-time physical activity, and intake of alcohol and total energy. Statistically significant inverse association between potassium intake and the risk of cerebral infarction after adjustment for age and supplementation group only; and this association was still significant but attenuated after further adjustment for cardiovascular risk factors.  Intracerebral hemorrhage (Definition for stroke but reported by subtype: ICD-8 codes 430 through 434 and 436; ICD-9 codes 430, 431, 433, 434, and 436; and ICD-10 codes I60, I61, I63, and I64, excluding ICD-8 codes 431.01 and 431.91 denoting subdural hemorrhage and ICD-9 codes 4330) (mg/d/Outcome): Mean 13.6 years (360187 person-years) FU Q1 cases: 85, total: NR, Q2 cases: 79, total: NR, Q3 cases: 74, total: NR, Q4 cases: 78, total: NR, Q5 cases: 67, total: NR Adjustment: Age, supplementation group, number of cigarettes smoked daily, body mass index, systolic and diastolic blood pressures, serum total cholesterol, serum high-density lipoprotein cholesterol, histories of diabetes and coronary heart disease, leisure-time physical activity, and intake of alcohol and total energy. No significant association between potassium intake and risk of stroke (intracerebral hemorrhage).  Subarachnoid hemorrhage (Definition for stroke but reported by subtype: ICD-8 codes 430 through 434 and 436; ICD-9 codes 430, 431, 433, 434, and 436; and ICD-10 codes I60, I61, I63, and I64, excluding ICD-8 codes 431.01 and 431.91 denoting subdural hemorrhage and ICD-9 codes 4330) (mg/d/Outcome): Mean 13.6 years (360187 person-years) FU Q1 cases: 37, total: NR, Q2 cases: 36, total: NR, Q3 cases: 35, total: NR, Q4 cases: 39, total: NR, Q5 cases: 49, total: NR Adjustment: Age, supplementation group, number of cigarettes smoked daily, body mass index, systolic and diastolic blood pressures, serum total cholesterol, serum high-density lipoprotein cholesterol, histories of diabetes and coronary heart disease, leisure-time physical activity, and intake of alcohol and total energy. No significant association between potassium intake and risk of stroke (subarachnoid hemorrhage). |
| Larsson, 2011223  Location: Sweden  Setting: Community  Design: Prospective Cohort study  Study Name: The Swedish Mammography Cohort  . | Study of: Adults N: 34670  % Male: 0 Mean Age/Range/Age at Baseline: by potassium quintiles q1 mean 61.6 q5 mean 60.7 Race: NR Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: by potassium quintiles q1 mean 24.8 q5 mean 25.3 % with Hypertension: by potassium quintiles q1 18.6% q5 20.4% % with history of CVD: NR % with Type 2 diabetes: by potassium quintiles q1 2.2% q5 4.5% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included women born between 1914-1948 and living in central Sweden. Included those who completed both diet questionnaires at baseline and in 1997. Exclusion: Excluded women with incorrect national identification number, with a history of stroke, coronary heart disease, or cancer, or with extreme energy intake. | Exposure Type: Potassium intake Exposure Unit: mg/d  Duration: NR Exposure to Follow Up Time: a mean of 10.4 years  Dose format: Median Q1, Dose: 2419 Q2, Dose: 2767 Q3, Dose: 3021 Q4, Dose: 3296 Q5, Dose: 3744 | Potassium measure: food frequency questionnaire with reported validation Best potassium measure recorded: One 96-item food frequency questionnaire completed in 1997 Potassium, Method of Validation: The food frequency questionnaire has been validated in Messerer M, Johansson SE, Wolk A. The validity of questionnaire-based micronutrient intake estimates is increased by including dietary supplement use in Swedish men. J Nutr. 2004;134(7):1800–1805. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital Discharge Registry | Total stroke (Strokes were classified as cerebral infarction (code I63), intracerebral hemorrhage (code I61), subarachnoid hemorrhage (code I60), and unspecified stroke (code I64).) (mg/d/Outcome): Mean 10.4 years FU Q1 cases: 373, total: NR, person-years: 70668, Q2 cases: 340, total: NR, person-years: 71751, Q3 cases: 348, total: NR, person-years: 72067, Q4 cases: 311, total: NR, person-years: 72312, Q5 cases: 308, total: NR, person-years: 72215 Adjustment: Age, smoking status, pack-years of smoking, educational level, body mass index, total physical activity level, history of diabetes, history of hypertension, aspirin use, family history of myocardial infarction, and intakes of total energy, alcohol, protein, cholesterol, total fiber, and folate No overall association between dietary intakes of potassium, and risk of total stroke or cerebral infarction after adjustment for other risk factors |
| Leonberg-Yoo, 2016224; Klahr, 1994225  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The MDRD (Modification of Diet in Renal Disease) Study  . | Study of: Adults  % Male: 60.1 Mean Age/Range/Age at Baseline: mean 51.8 (SD 12.4) years Race: white 85.1 black 8 other 6.9 Systolic BP: mean 131.9 ( SD 17.6) Diastolic BP: mean 81 (SD 10.1) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 27.1 (SD 4.5) % with Hypertension: NR % with history of CVD: 13.3 % with Type 2 diabetes: 5.2 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included patients with CKD (serum creatinine levels in men, 1.4-7 mg/dL; in women, 1.2- 7 mg/dL) and between ages 18-70. Exclusion: Excluded those who were pregnant, those with type 1 or 2 diabetes, those with urine protein excretion >10 g/d, or had previous kidney transplantation. | Duration: NR Exposure to Follow Up Time: NR | Potassium measure: multiple 24-hr urine analysis without reported validation Best potassium measure recorded: One 24-hr urine analysis at baseline and additional 24-hr urine collections completed every month. Mortality Outcomes-Method of Ascertainment: National death index CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: renal data system | See subgroup table for results |
| Lijie Shi, 2014218; Kruppe, 2014219; Kroke, 2004220; Krupp, 2015217  Location: Germany  Setting: Community  Design: Prospective Cohort study  Study Name: Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) Study  . | Study of: Children  % Male: 51 Mean Age/Range/Age at Baseline: boys median 6 (IQR 4.0-8.0) girls median 6.0 (IQR 4.0- 7.0) Race: NR Systolic BP: boys median 97.1 (IQR 90.8 -1.04) girls median 97.0 (IQR 90.0- 102) Diastolic BP: boys median 57.0 (IQR 50-0 - 65.0) girls median 55.0 (IQR 49.6 -64.1) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: boys median 15.7 (IQR 15.0 - 16.8) girls median15.3 (IQR 14.7 -16.4) % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Children aged 4 -18 year old were included. Exclusion: Children who had taken BP-influencing drugs, regularly or on the day of BP measurements, or whose SBP or DBP data were implausible were excluded. | Duration: NR Exposure to Follow Up Time: no data (approximately 10 years) | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 3 yearly repeated 24-hour urine analysis  How was blood pressure measured? SBP and DBP had been measured according to standard procedures with a random zero sphygmomanometer until 1994 and with a standard mercury sphygmomanometer (Mercuro 300, WelchAllyn) thereafter. Appropriate cuff sizes were used according to arm circumferences. BP was measured in the right arm of the subjects after 5 min of rest. Two consecutive BP measurements were recorded on each measurement occasion, and the arithmetic mean of both readings was used in the analysis. | See subgroup table for results |
| Mente, 2016226; Ontarget Investigators, 2008227; Telmisartan Randomised AssessmeNt Study in ACEiswcDI,, 2008228  Location: Turkey: China: India  Setting: Community  Design: Prospective Cohort study  Study Name: The Prospective Urban and Rural Epidemiology (PURE) study  . | Study of: Adults N: 133118   Inclusion: Included PURE participants who reported baseline blood pressure measurements and submitted their morning fasting urine samples. | Exposure Type: 24-h urinary excretion of sodium Exposure Unit: Estimated Sodium Excretion (Kawasaki equation)  Duration: NR Exposure to Follow Up Time: NR  Dose format: range group 1, Dose: <3 g/day group 2, Dose: 3-3.99 g/day group 3, Dose: 4-4.99 g/day group 4, Dose: 5-5.99 g/day group 5, Dose: 6-6.99 g/day group 6, Dose: >=7 g/day | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: morning fasting urine sample collected at baseline Sodium, Method of Validation: validated the method with a study of 1083 participants | All-cause mortality (Death) (Estimated Sodium Excretion (Kawasaki equation)/Outcome): NR FU group 1 cases: 812, total: 14533, group 2 cases: 1177, total: 27463, group 3 cases: 1377, total: 34208, group 4 cases: 1102, total: 27670, group 5 cases: 644, total: 15893, group 6 cases: 573, total: 13331 Adjustment: Age, sex, ancestry (Asian vs non-Asian), educational level, alcohol intake, body-mass index, current smoking, physical activity, status with respect to diabetes mellitus and a history of cardiovascular events, treatment allocation (ramipril, telmisartan, or both, and treatment with statins, beta-blockers, diuretic therapy, calcium antagonist, and antidiabetes medication) Among those with hypertension, there is a U-shaped association between sodium excretion and risk of cardiovascular events and mortality.  All-cause mortality or CVD event (Death or major cardiovascular events included death from cardiovascular causes, myocardial infarction, stroke, and heart failure) (Estimated Sodium Excretion (Kawasaki equation)/Outcome): NR FU group 1 cases: 1323, total: 14533, group 2 cases: 1996, total: 27463, group 3 cases: 2487, total: 34208, group 4 cases: 1965, total: 27670, group 5 cases: 1148, total: 15893, group 6 cases: 937, total: 13331 Adjustment: Age, sex, ancestry (Asian vs non-Asian), educational level, alcohol intake, body-mass index, current smoking, physical activity, status with respect to diabetes mellitus and a history of cardiovascular events, treatment allocation (ramipril, telmisartan, or both, and treatment with statins, beta-blockers, diuretic therapy, calcium antagonist, and antidiabetes medication) There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality.  Major CVD events (Major cardiovascular events included death from cardiovascular causes, myocardial infarction, stroke, and heart failure) (Estimated Sodium Excretion (Kawasaki equation)/Outcome): NR FU group 1 cases: 1001, total: 14533, group 2 cases: 1472, total: 27463, group 3 cases: 1852, total: 34208, group 4 cases: 1461, total: 27670, group 5 cases: 857, total: 15893, group 6 cases: 725, total: 13331 Adjustment: Age, sex, ancestry (Asian vs non-Asian), educational level, alcohol intake, body-mass index, current smoking, physical activity, status with respect to diabetes mellitus and a history of cardiovascular events, treatment allocation (ramipril, telmisartan, or both, and treatment with statins, beta-blockers, diuretic therapy, calcium antagonist, and antidiabetes medication) Among those with hypertension, there is a U-shaped association between sodium excretion and risk of cardiovascular events and mortality. |
| Mills, 2016229; He, 2016202; Yang, 2014203; Lash, 2009204  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Chronic Renal Insufficiency Cohort (CRIC) Study  . | Study of: Adults N: 3757  % Male: Q1 35.0, Q2 49.9, Q3 61.3 Q4 76.0 Mean Age/Range/Age at Baseline: Q1 mean 57.2 (SD 10.9) Q2 mean 57.6 (SD 11.3) Q3 mean 58.2 (SD 10.8) Q4 mean 58.0 (SD 10.6) years Race: Q1: White 38.6% Black 51.4% Other 10.0 %; Q2: White 45.6% Black 44.0% Other 10.3%; Q3 White 50.6% Black 37.4% Other 12.0%; Q4 White 54.3% Black 32.9% Other 12.8% Systolic BP: Q1: mean 125.6 (SD 21.7); Q2 mean 126.3 (SD 20.9); Q3 mean 128.1 (SD 21.7); Q4 mean 132.3 (SD 22.4) mmHg Diastolic BP: Q1: mean 70.7 ( SD 12.7); Q2 mean 71.0 (SD 12.8); Q3: mean 71.4 (SD 12.3); Q4: mean 72.7 (SD 13.0) mmHg Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Q1: mean 31.7 (SD 8.0); Q2 mean 32.1 (SD 7.5); Q3 mean 31.9 (SD 7.3); Q4 mean 31.8 (SD 7.5) kg/m^2 % with Hypertension: Q1 80.2; Q2 86.5; Q3 86.7; Q4 90.8 % with history of CVD: Q1 27.3; Q2 30.0; Q3 34.9; Q4; 39.7 % with Type 2 diabetes: Q1 37.7; Q2 43.8; Q3 49.3; Q4 60.3 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participant aged 21 to 74 years with mild to moderate CKD designed to identify and examine risk factors for CKD progression and development of CVD in those with CKD, who met age-specific estimated glomerular filtration rate (eGFR) criteria of 20 to 70 mL/min/1.73 m^2 were included. Exclusion: People with a history of kidney transplant, dialysis for at least 1 month, glomerulonephritis requiring immunosuppression, advanced heart failure, cirrhosis, or polycystic kidney disease were excluded. | Exposure Type: 24 h urinary sodium excretion calibrated to mean urinary creatinine excretion of 1569 mg/24 hours in Exposure Unit: mg/24 h  Exposure Type: 24 h urinary sodium excretion calibrated to mean urinary creatinine excretion of 1569 mg/24 hours in Exposure Unit: per 1000 mg/24 h  Exposure Type: Calibrated 24-Hour Urinary Potassium Excretion quartile; a Calibrated to mean urinary creatinine exc Exposure Unit: mg/24 h  Exposure Type: Calibrated 24-Hour Urinary Sodium Excretion Calibrated to mean urinary creatinine excretion of 1,569 Exposure Unit: 1,000 mg difference  Exposure Type: Quartile of 24-Hour Urinary Sodium Excretion not calibrated Exposure Unit: mg/24 h  Duration(in months): 163.2 (6.8 years) Exposure to Follow Up Time: NR  Dose format: NR NR, Dose: NR for overall NR, Dose: mean 3701 (SD 1443) mg Q1, Dose: <1608 mg/24h Q1, Dose: <2686 mg/24h Q1, Dose: <2894 mg/24h Q2, Dose: 1608-2107 mg/24h Q2, Dose: 2687-3532 mg/24h Q2, Dose: 2894-3649 mg/24h Q3, Dose: 2108-2750 mg/24h Q3, Dose: 3533-4473 mg/24h Q3, Dose: 3650-4547 mg/24h Q4, Dose: >=2751 mg/24h Q4, Dose: >=4474 mg/24h Q4, Dose: >=4548 mg/24h | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 3 times, 1 year apart CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Interview with participant or proxy, followup visit | NR cases: NR, total: 1946, NR cases: NR, total: 3528, Q1 cases: 174, total: 939, person-years: 5804, Q1 cases: 198, total: 940, person-years: 5484, Q2 cases: 159, total: 940, person-years: 5972, Q2 cases: 180, total: 939, person-years: 5659, Q3 cases: 198, total: 939, person-years: 5739, Q3 cases: 218, total: 939, person-years: 5676, Q4 cases: 208, total: 939, person-years: 5707, Q4 cases: 273, total: 939, person-years: 5012 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Among all participants, greater sodium excretion was associated with an increased risk of compostive CVD. Those in the highest quartile of urinary sodium excretion had an increased risk for composite CVD (Sensitivity analysis without calibrating exposure). Those in the highest quartile of urinary sodium excretion had an increased risk for composite CVD. Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for caloric intake). Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for systolic blood pressure).  NR cases: NR, total: 1949, NR cases: NR, total: 3533, Q1 cases: 125, total: 939, person-years: 5938, Q1 cases: 147, total: 940, person-years: 5659, Q2 cases: 117, total: 940, person-years: 6216, Q2 cases: 124, total: 939, person-years: 5855, Q3 cases: 127, total: 939, person-years: 5998, Q3 cases: 153, total: 939, person-years: 5954, Q4 cases: 151, total: 939, person-years: 5920, Q4 cases: 206, total: 939, person-years: 5235 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Among all participants, greater sodium excretion was associated with an increased risk of compostive CVD. Those in the highest quartile of urinary sodium excretion had an increased risk for CHF (Sensitivity analysis without calibrating exposure). Those in the highest quartile of urinary sodium excretion had an increased risk for CHF. Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for caloric intake). Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for systolic blood pressure).  NR cases: NR, total: 1951, NR cases: NR, total: 3540, Q1 cases: 69, total: 939, person-years: 6195, Q1 cases: 76, total: 940, person-years: 5949, Q2 cases: 54, total: 940, person-years: 6336, Q2 cases: 70, total: 939, person-years: 6015, Q3 cases: 77, total: 939, person-years: 6109, Q3 cases: 83, total: 939, person-years: 6175, Q4 cases: 82, total: 939, person-years: 6202, Q4 cases: 99, total: 939, person-years: 5569 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Among all participants, greater sodium excretion was associated with an increased risk of compostive CVD. No significant association between the highest quartile of urinary sodium excretion and risk for MI. Those in the highest quartile of urinary sodium excretion had an increased risk for MI (Sensitivity analysis without calibrating exposure). Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for caloric intake). Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for systolic blood pressure).  NR cases: NR, total: 1950, NR cases: NR, total: 3542, Q1 cases: 28, total: 939, person-years: 6293, Q1 cases: 36, total: 940, person-years: 6045, Q2 cases: 28, total: 940, person-years: 6479, Q2 cases: 39, total: 939, person-years: 6202, Q3 cases: 39, total: 939, person-years: 6262, Q3 cases: 39, total: 939, person-years: 6337, Q4 cases: 34, total: 939, person-years: 6320, Q4 cases: 53, total: 939, person-years: 5719 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Among all participants, greater sodium excretion was associated with an increased risk of compostive CVD. Those in the highest quartile of urinary sodium excretion had an increased risk for stroke (Sensitivity analysis without calibrating exposure). Those in the highest quartile of urinary sodium excretion had an increased risk for stroke. Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for caloric intake). Greater amount of urinary sodium excretion was associated with increased risk of composite CVD, CHF, MI, and stroke (Sensitivity analysis Basic Model plus adjustment for systolic blood pressure).  Composite CVD (Defined as congestive heart failure, stroke, and myocardial infarction) (mg/24 h/Outcome): Median 6.8 years FU Q1 cases: 185, total: 940, person-years: 5833, Q2 cases: 203, total: 939, person-years: 5628, Q3 cases: 177, total: 938, person-years: 5654, Q4 cases: 239, total: 940, person-years: 5410 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Sensitivity analysis with potassium as exposure  Congestive Heart Failure (Congestive heart failure was identified by hospital admission for new or worsening CHF signs and symptoms, in addition to diminished cardiac output) (mg/24 h/Outcome): Median 6.8 years FU Q1 cases: 134, total: 940, person-years: 6025, Q2 cases: 141, total: 939, person-years: 5844, Q3 cases: 131, total: 938, person-years: 5879, Q4 cases: 169, total: 940, person-years: 5640 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Sensitivity analysis with potassium as exposure  Myocardial Infarction (Myocardial infarction was defined by characteristic changes in troponin and creatinekinase–MB levels, symptoms of myocardial ischemia, electrocardiogram changes, or new fixed profusion abnormalities.) (mg/24 h/Outcome): Median 6.8 years FU Q1 cases: 66, total: 940, person-years: 6279, Q2 cases: 77, total: 939, person-years: 6067, Q3 cases: 72, total: 938, person-years: 6072, Q4 cases: 90, total: 940, person-years: 5857 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Sensitivity analysis with potassium as exposure  Stroke (Stroke was defined as rapid onset of neurologic deficit, headache, or other nonvascular cause and clinically relevant lesion on brain imaging for longer than 24 hours or deathwithin24 hours.) (mg/24 h/Outcome): Median 6.8 years FU Q1 cases: 38, total: 940, person-years: 6354, Q2 cases: 39, total: 939, person-years: 6233, Q3 cases: 30, total: 938, person-years: 6218, Q4 cases: 41, total: 940, person-years: 6024 Adjustment: Age, sex, race, clinic site, education, waist circumference, lean body mass index, body mass index, cigarette smoking, alcohol drinking, physical activity, LDL-cholesterol, glucose, history of CVD, antidiabetic medications, lipid-lowering medications, diuretics, renin-angiotensin system blocking agents, and other antihypertensive medications, urinary creatinine excretion, baseline eGFR Sensitivity analysis with potassium as exposure |
| Nerbass, 2015230; McIntyre, 2011231  Location: NR  Setting: Clinical research center based  Design: Prospective Cohort study  Study Name: The Renal Risk in Derby (RRID)  . | Study of: Adults N: 1607  % Male: 39.4 Mean Age/Range/Age at Baseline: mean 72.6 (SD 9.0) Race: Caucasian 97.6% Systolic BP: mean 134 (SD 18) Diastolic BP: mean 73 (SD 11) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 29.1 (SD 15.5) % with Hypertension: 88 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 18 years or over, who met the Kidney Disease Outcomes Quality Initiative criteria for CKD stage 3, and could attend their general practitioner (GP) surgery for assessments were included. Exclusion: People with previously a solid organ transplant or people who were terminally ill were excluded. | Exposure Type: Sodium intake Exposure Unit: mmol/d  Duration(in months): 12 Exposure to Follow Up Time: NR  Dose format: Na mean (SD) Decreased, Dose: 111 (10) Increased, Dose: 92 (6) Unchanged, Dose: 114 (36) | Sodium measure: a medical and dietary questionnaire Best sodium measure recorded: twice, 1-year  How was blood pressure measured? BP was measured after a minimum of 5 min rest in the sitting position, using a validated oscillometric device, which was recommended by the British Hypertension Society (Digital Blood Pressure Monitor Model UA-767; A&D Instruments Ltd). BP was calculated as the mean of three readings from the same device that differed by <10 %. The MAP was calculated as 1/3 the average systolic BP (SBP) plus 2/3 the average diastolic BP (DBP). | Diastolic blood pressure (Validated oscillometric device) (mmol/d/Outcome): 1 year FU Unchanged cases: NR, total: 1416, Decreased cases: NR, total: 105, Increased cases: NR, total: 86 Adjustment: NR Those who decreased in sodium intake also experienced decreases in diastolic blood pressure.  Systolic blood pressure (Validated oscillometric device) (mmol/d/Outcome): 1 year FU Unchanged cases: NR, total: 1416, Decreased cases: NR, total: 105, Increased cases: NR, total: 86 Adjustment: NR Those who decreased in sodium intake also experienced decreases in systolic blood pressure. |
| O'Donnell, 2011232; Ontarget Investigators, 2008227; Telmisartan Randomised AssessmeNt Study in ACEiswcDI,, 2008228; Kawasaki, 1993185  Location: 40 countries  Setting: Clinical research center based  Design: Prospective Cohort study  Study Name: Cohorts from ONTARGET and TRANSCEND  . | Study of: Adults  % Male: 70.6 Mean Age/Range/Age at Baseline: mean 66.52 (SD 7.22) Race: NR Systolic BP: mean 141. 72 (SD 17.29) mmHg Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean 28.10 (SD 4.55) % with Hypertension: 69.9 % with history of CVD: strok 21.2% MI 48.4% % with Type 2 diabetes: 37.1 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged >=55 years with established CV disease or high-risk diabetes mellitus, who had heart failure, low ejection fraction, significant valvular disease, serum creatinine greater than 3.0 mg/dL (265 mol/l), renal artery stenosis, nephrotic range proteinuria, or blood pressure higher than 160/100 mmHg were included. Exclusion: NA | Duration(in months): 56 Exposure to Follow Up Time: NR | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: once, before the run-in period of the trial Sodium, Method of Validation: The Kawasaki formula was used to estimate 24-hour sodium urinary excretion from a fasting morning urine sample and the approach was valid by previous studies in healthy control participants (ref 18) and patients taking antihypertensive therapy (ref 19). Additional assessment of validity was conduct in subsample at 2- year follow-up and final visit., Single 24-hour urine analysis with validation Best potassium measure recorded: once, before the run-in period of the trial Potassium, Method of Validation: The Kawasaki formula was used to estimate 24-hour potassium urinary excretion from a fasting morning urine sample. Additional assessment of validity was conduct in subsample at 2- year follow-up and final visit. Mortality Outcomes-Method of Ascertainment: Hospital records CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records | See subgroup table for results |
| O'Donnell, 2014233  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 Q1, Dose: <1.50 Q1, Dose: <3.00 Q2, Dose: 1.50-1.99 Q2, Dose: 3.00-3.99 Q3, Dose: 2.00-2.49 Q3, Dose: 4.00-5.99 Q4, Dose: 2.50-3.00 Q4, Dose: 6.00-6.99 Q5, Dose: >3.00 Q5, Dose: >=7.00 | 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 (g/day/Outcome): Mean 3.7 y FU Q1 cases: 293, total: 10810, Q2 cases: 417, total: 21131, Q3 cases: 826, total: 46663, Q4 cases: 216, total: 12324, Q5 cases: 224, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  All-cause mortality and Major Cardiovascular Event (g/day/Outcome): Mean 3.7 y FU Q1 cases: 462, total: 10810, Q2 cases: 622, total: 21131, Q3 cases: 1437, total: 46663, Q4 cases: 391, total: 12324, Q5 cases: 365, total: 11017 Adjustment: Analysis including dietary factors and blood pressure (Analysis including dietary 1.19 (1.05–1.36) 1.01 (0.93–1.10) 1.00 1.03 (0.92–1.15) 1.08 (0.96–1.22) factors and blood pressure) Compared to those with an estimated sodium excretion of 4.00 to 5.99 g per day, a higher estimated sodium excretion (≥7.00 g per day) was associated with an increased risk of the composite outcome and increased risks of death and major cardiovascular events. Compared to those with an estimated sodium excretion of 4.00 to 5.99 g per day, a higher estimated sodium excretion (≥7.00 g per day) was associated with an increased risk of the composite outcome and increased risks of death and major cardiovascular events.  Cardiovascular All-cause mortality (g/day/Outcome): Mean 3.7 y FU Q1 cases: 109, total: 10810, Q2 cases: 136, total: 21131, Q3 cases: 258, total: 46663, Q4 cases: 66, total: 12324, Q5 cases: 81, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  Heart Failure (g/day/Outcome): Mean 3.7 y FU Q1 cases: 38, total: 10810, Q2 cases: 57, total: 21131, Q3 cases: 117, total: 46663, Q4 cases: 22, total: 12324, Q5 cases: 27, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  Major Cardiovascular Events (g/day/Outcome): Mean 3.7 y FU Q1 cases: 278, total: 10810, Q2 cases: 381, total: 21131, Q3 cases: 869, total: 46663, Q4 cases: 241, total: 12324, Q5 cases: 222, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  Myocardial Infarction (g/day/Outcome): Mean 3.7 y FU Q1 cases: 111, total: 10810, Q2 cases: 185, total: 21131, Q3 cases: 370, total: 46663, Q4 cases: 105, total: 12324, Q5 cases: 86, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  Stroke (All) (g/day/Outcome): Mean 3.7 y FU Q1 cases: 126, total: 10810, Q2 cases: 139, total: 21131, Q3 cases: 388, total: 46663, Q4 cases: 114, total: 12324, Q5 cases: 105, total: 11017 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). There is a U-shaped association between 24-hour urinary sodium excretion (estimated by Kawasaki equation) and total mortality. After adjusting for blood pressure, the association between having an estimated sodium excretion ≥7.00 g per day and the primary composite outcome, major cardiovascular events, and stroke was attenuated and became no longer significant.  All-cause mortality (g/day/Outcome): Mean 3.7 y FU Q1 cases: 437, total: 14262, Q2 cases: 641, total: 31466, Q3 cases: 537, total: 30956, Q4 cases: 261, total: 17171, Q5 cases: 99, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). As compared with an estimated potassium excretion of less than 1.50 g per day, a higher estimated excretion of potassium was associated with a reduction in the risks of death and cardiovascular events on multivariable analysis (Fig. 2 and Table 3); this association was largely related to a reduction in the risk of death (Table S3 in the Supplementary Appendix). No significant association between potassium intake and risk of all-cause mortality.  All-cause mortality and Major Cardiovascular Event (g/day/Outcome): Mean 3.7 y FU Q1 cases: 573, total: 14262, Q2 cases: 1.5, total: 31466, Q3 cases: 942, total: 30956, Q4 cases: 522, total: 17171, Q5 cases: 227, total: 8032 Adjustment: Analysis including dietary factors and blood pressure (Analysis including dietary 1.19 (1.05–1.36) 1.01 (0.93–1.10) 1.00 1.03 (0.92–1.15) 1.08 (0.96–1.22) factors and blood pressure) No significant association between potassium intake and risk of death and major CVD events. Compared to those with an estimated potassium excretion < 1.50 g per day, higher potassium excretion was associated w ≥h a reduced risk of the composite outcome.  Cardiovascular All-cause mortality (g/day/Outcome): Mean 3.7 y FU Q1 cases: 146, total: 14262, Q2 cases: 214, total: 31466, Q3 cases: 181, total: 30956, Q4 cases: 73, total: 17171, Q5 cases: 335, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). No significant association between potassium intake and risk of CVD death.  Heart Failure (g/day/Outcome): Mean 3.7 y FU Q1 cases: 33, total: 14262, Q2 cases: 71, total: 31466, Q3 cases: 81, total: 30956, Q4 cases: 57, total: 17171, Q5 cases: 19, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). No significant association between potassium intake and risk of heart failure.  Major Cardiovascular Events (g/day/Outcome): Mean 3.7 y FU Q1 cases: 282, total: 14262, Q2 cases: 623, total: 31466, Q3 cases: 586, total: 30956, Q4 cases: 334, total: 17171, Q5 cases: 163, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). No significant association between potassium intake and major CVD events. No significant association between potassium intake and risk of major CVD events.  Myocardial Infarction (g/day/Outcome): Mean 3.7 y FU Q1 cases: 110, total: 14262, Q2 cases: 278, total: 31466, Q3 cases: 238, total: 30956, Q4 cases: 152, total: 17171, Q5 cases: 77, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). No significant association between potassium intake and risk of MI.  Stroke (All) (g/day/Outcome): Mean 3.7 y FU Q1 cases: 133, total: 14262, Q2 cases: 267, total: 31466, Q3 cases: 272, total: 30956, Q4 cases: 131, total: 17171, Q5 cases: 69, total: 8032 Adjustment: The primary model included age, sex, educational level, ancestry (Asian vs. non-Asian), alcohol intake, body-mass index, and status with respect to diabetes mellitus, a history of cardiovascular events, and current smoking. Additional sensitivity analyses with physical activity (measured in metabolic equivalents per week) included in the model did not materially alter estimates of association (in the cohort with physical-activity data available). No significant association between potassium intake and risk of stroke. |
| Ohta, 2013234  Location: Japan  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults  % 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 | Duration: NR Exposure to Follow Up Time: 126 (10.5 y) | 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 | See subgroup table for results |
| Okayama, 2016235; Lida, 2003236  Location: Japan  Setting: Community  Design: Prospective Cohort study  Study Name: NIPPON DATA80, National Integrated Project for Prospective Observation of Non-communicable Disease And its Trends in the Aged  . | Study of: Adults N: 8283  % Male: Q1 44.2; Q2 44.55;Q3 44.45; Q4 44.66;Q5 44.56 Mean Age/Range/Age at Baseline: mean (SD) Q1: 49.9 (12.2); Q2 48.6 (12.0); Q3 48.3 (12.1) Q4 48.1 (12.2); Q5 49.1 (12.08) year Race: NR Systolic BP: mean (SD) Q1 132.9 (19.5) Q2 132.7 (19.5 Q3 131.9 (19.4) Q4 132.7 (18.7) Q5 134.8 (20.2) Diastolic BP: mean (SD) Q1 80.2 (11.6) Q2 80.2 (12.0) Q3 79.8 (11.5) Q4 80.2 (11.5) Q5 80.7 (11.7) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean SD Q1 22.6 (3.2) Q2 22.6 (3.1) Q3 22.6 (3.0) Q4 22.6 (3.0) Q5 23.8 (33.8) % with Hypertension: Q1 40.4 Q2 37.9 Q3 39.2 Q4 40.0 Q5 43.0 % with history of CVD: NR % with Type 2 diabetes: Q1 11.3 Q2 10.7 Q3 9.4 Q4 9.3 Q5 11.8 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 30 years and over were included. Exclusion: People with a history of myocardial infarction or stroke; or aged 80 years or older; or who reported use of antihypertensive medication were excluded. | Exposure Type: Quintiles of dietary sodium-to-potassium ratio Exposure Unit: mol/mol  Duration(in months): 288 (24 years) Exposure to Follow Up Time: NR  CVD mortality (ICD-9 (390-459); ICD-10 (100-199)), Stroke mortality (ICD-9 (430-438); ICD-10 (160-169)) Dose format: mean (SD) Q1, Dose: 1.25 (0.17) Q2, Dose: 1.59 (0.09) Q3, Dose: 1.84 (0.09) Q4, Dose: 2.13 (0.11) Q5, Dose: 2.72 (0.47)  All-cause mortality Dose format: mean (SD) Q1, Dose: 1.25 (0.17) Q2, Dose: 1.59 (0.09) Q3, Dose: 1.84 (0.09) Q4, Dose: 2.13 (0.11) Q5, Dose: 2.72 (0.47) Q5 vs. Q1, Dose: 2.72 (0.47) vs. 1.25(0.17) | Sodium measure: the National Nutrition Survey (NNS), in which a 3-day weighing dietary records Best sodium measure recorded: once Potassium measure: the National Nutrition Survey (NNS), in which a 3-day weighing dietary records Best potassium measure recorded: once Mortality Outcomes-Method of Ascertainment: Death certificate | All-cause mortality (mol/mol/Outcome): 24 years (176926 person-years) FU Q1 cases: 381, total: 1581, person-years: 33581, Q5 vs. Q1, Q2 cases: 365, total: 1652, person-years: 35983, Q3 cases: 368, total: 1685, person-years: 35949, Q4 cases: 388, total: 1684, person-years: 36122, Q5 cases: 436, total: 1681, person-years: 35291 Adjustment: Age Significantly higher relative risk was observed for deaths from all stroke, CVD and all causes in the highest quintile in total participants for both regression models. HR estimate quadratic non-linear multivariate analysis; p values obtained by quadratic non-linear regression tended to be lower than those for linear regression.  CVD mortality (ICD-9 (390-459); ICD-10 (100-199)) (mol/mol/Outcome): 24 years (176926 person-years) FU Q1 cases: 110, total: 1581, person-years: 33581, Q5 cases: 142, total: 1681, person-years: 35291, Q2 cases: 114, total: 1652, person-years: 35983, Q3 cases: 100, total: 1685, person-years: 35949, Q4 cases: 113, total: 1684, person-years: 36122 Adjustment: Age Significantly higher relative risk was observed for deaths from all stroke, CVD and all causes in the highest quintile in total participants for both regression models. HR estimate quadratic non-linear multivariate analysis; p values obtained by quadratic non-linear regression tended to be lower than those for linear regression.  Stroke mortality (ICD-9 (430-438); ICD-10 (160-169)) (mol/mol/Outcome): 24 years (176926 person-years) FU Q1 cases: 45, total: 1581, person-years: 33581, Q5 cases: 74, total: 1681, person-years: 35291, Q2 cases: 46, total: 1652, person-years: 35983, Q3 cases: 55, total: 1685, person-years: 35949, Q4 cases: 53, total: 1684, person-years: 36122 Adjustment: Age Significantly higher relative risk was observed for deaths from all stroke, CVD and all causes in the highest quintile in total participants for both regression models. HR estimate quadratic non-linear multivariate analysis; p values obtained by quadratic non-linear regression tended to be lower than those for linear regression. |
| Pfister, 2014237  Location: UK  Setting: Community  Design: Prospective Cohort study  Study Name: The EPIC-Norfolk study  . | Study of: Adults N: 19857  % Male: 45.4 Mean Age/Range/Age at Baseline: mean 58.0 (SD 9.2) years Race: NR Systolic BP: reported by quintiles of sodium excretion q1 135 (17) q2 135 (17) q3 136 (17) q4 138 (17) q5 141 (19) Diastolic BP: reported by quintiles of sodium excretion q1 83.1 (10.9) q2 83.1 (10.9) q3 83.9 (10.6) q4 85.2 (10.6) q5 86.8 (11.5) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: reported by quintiles of sodium excretion q1 25.9 (SD 3.1) q2 26.1 (SD 3) q3 26.4 (SD 3.2) q4 26.7 (SD 3.2) q5 27.1 (SD 3.5) % 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 Norfolk residents between 39-79 years old. Exclusion: Excluded participants with a history of heart attack, stroke, or any cancer. Also excluded those using medical heart failure treatment and those failed to provide data on estimated 24 h urinary sodium excretion. | Exposure Type: Urinary sodium excretion Exposure Unit: mmol/day  Duration: NR Exposure to Follow Up Time: 3.5 years  Dose format: range Q1, Dose: <=127 Q2, Dose: 128 to <=148 Q3, Dose: 149 to <=167 Q4, Dose: 168 to <=190 Q5, Dose: >=191 | Sodium measure: Multiple 24-hour urine analysis with validation Best sodium measure recorded: 24-hr urine analysis at baseline and second health check. Sodium, Method of Validation: Obtained spot urine samples in a random sample of 1551 women. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports, National Death Index | Incident heart failure (Heart failure death was defined as ICD-10 I50 anywhere on the death certificate. Incident heart failure was defined as heart failure death or hospital discharge code ICD-10 I50, which proved to be specific in a recent validation study) (mmol/day/Outcome): Mean 12.9 y 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: Age, body mass index, known diabetes, cholesterol, social class, educational level, smoking, physical activity, alcohol consumption, and sex where appropriate No statistically significant association was observed. When further adjusting the analysis for systolic blood pressure and baseline blood pressure medication, the HR for the highest quintile of estimated urinary sodium excretion was strongly attenuated whereas the HR for the lowest quintile was materially unchanged (Tables 2 and 4). |
| Seth, 2014238; Anderson, 2003239  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 (mg/d/Outcome): Average 11 years FU Q1 cases: 3096, total: 22534, Q2 cases: 2921, total: 22534, Q3 cases: 2685, total: 22535, Q4 cases: 2894, total: 22534 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 There was a statistically significant linear trend for mortality (P=0.0002), The HR in the fully adjusted model comparing highest quartile (Q4) with the lowest quartile (Q1) of potassium intake was 0.90 (95% CI, 0.85–0.95) for all-cause mortality. There was a statistically significant linear trend for mortality (P=0.0002), The HR in the fully adjusted model comparing highest quartile (Q4) with the lowest quartile (Q1) of potassium intake was 0.90 (95% CI, 0.85–0.95) for all-cause mortality.  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: 793, total: 22534, Q2 cases: 769, total: 22534, Q3 cases: 719, total: 22535, Q4 cases: 765, total: 22534 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 A statistically significant lower risk in all quartiles of potassium intake compared with lowest quartile, for all stroke, and ischemic stroke; The HR in the fully adjusted model comparing highest quartile (Q4) with the lowest quartile (Q1) of potassium intake was 0.88 (95% CI, 0.79–0.98) for all stroke. |
| Singer, 2015240  Location: US  Setting: a union- sponsored, worksite hypertension program  Design: Prospective Cohort study  . | Study of: Adults N: 3505  % Male: 64 Mean Age/Range/Age at Baseline: mean 52 (SD 10) Race: Q1 black 30.2% white 31.7% Hispanic 33.7% other 4.4%; Q2 black 30.5% white 33.7% Hispanic 34.8% other 2.1%; Q4 black 30.5% white 31.7% Hispanic 35.7% other 2.1%; Q4 black 28.6% white 29.3% Hispanic 38.3% other 3.8% Systolic BP: mean (SD) Q1 146.4 (18.5) Q2 145.3 (17.7) Q3 145.2 (16.5) Q4 145.8 (16.3) Diastolic BP: mean (SD) Q1 93.6 (10.0) Q2 93.9 (9.7) Q3 94.1 (9.4) Q5 (95.1 (9.6) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean (SD) Q1 27.4 (4.1) Q2 27.8 (4.1) Q3 28.9 (4.5) Q4 30.0 (4.9) % with Hypertension: drug use Q1 37.0% Q2 39.9% Q3 40.2% Q4 35.2% % with history of CVD: MI Q1 1.1% Q2 0.5% Q3 1.0% Q4 1.5%; Stroke Q1 0.9% Q2 0.6% Q3 0.9% Q4 0.7% % with Type 2 diabetes: Q1 4%; Q2 6.3% Q3 5.6% Q4 6.0% % with Kidney disease: Q1 1.5%; Q2 1.4%; Q3 1.2%; Q4 2.2% % with history of Kidney stones: NR  Inclusion: Participants with an SBP >= 140 mm Hg (>= 160mm Hg before Joint National Committee 5), DBP >= 90 mmHg (>= 95 Hg before Joint National Committee 5), or being on antihypertensive medication at the time of screening were included. Exclusion: not report | Exposure Type: Urinary sodium quartiles Exposure Unit: mmol/24 h  Duration: NR Exposure to Follow Up Time: in-pregram 6.5 years, follow-up from initial intake to death or last known alive 18.6 years  Dose format: mean (SD) Q1, Dose: 55 (20) Q2, Dose: 102 (17) Q3, Dose: 143 (20) Q4, Dose: 221 (56) | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: once at baseline  How was blood pressure measured? not reported Mortality Outcomes-Method of Ascertainment: National Death Index Plus and the Social Security Administration Death Master File | Diastolic blood pressure level (Only MI, ischemic or hypertensive heart disease, and heart failure) (mmol/24 h/Outcome): 6.5 (4.4) years FU Q1 cases: NR, total: 890, Q2 cases: NR, total: 876, Q3 cases: NR, total: 865, Q4 cases: NR, total: 874 Adjustment: NR During study period, mean BP decreased in all sodium quartiles. No significant difference in diastolic blood pressure between different quintiles of urinary sodium excretion.  Systolic blood pressure (Only MI, ischemic or hypertensive heart disease, and heart failure) (mmol/24 h/Outcome): 6.5 (4.4) years FU Q1 cases: NR, total: 890, Q2 cases: NR, total: 876, Q3 cases: NR, total: 865, Q4 cases: NR, total: 874 Adjustment: NR During study period, mean BP decreased in all sodium quartiles. Those in the lowest quintile of urinary sodium excretion had highest systolic blood pressure. |
| Sluijs, 2014241; Beulens, 2010242  Location: Netherlands  Setting: Community  Design: Prospective Cohort study  Study Name: EPIC-NL study  . | Study of: N: 36094  % Male: 25% Mean Age/Range/Age at Baseline: mean 49 (SD 12) Race: NR Systolic BP: mean 126 (SD 19) mmHg 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 Dutch participants who signed consents to the EPIC study. Exclusion: NR | Exposure Type: Potassium, dietary Intake Exposure Unit: mg/d  Duration: NR Exposure to Follow Up Time: NR  Dose format: NR Per 1 g/d for dietary potassium, Dose: mean 3672 (SD 903) mg/d Q1, Dose: <=3059 Q2, Dose: 3060-3587 Q3, Dose: 3588-4186 Q4, Dose: >=4187 | Sodium measure: food frequency questionnaire Potassium measure: food frequency questionnaire Best potassium measure recorded: Filled out one food frequency questionnaire. Potassium, Method of Validation: Calculated relative validity for each food item. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, National database | Stroke Risk (ICD-9 Clinical Modi cation codes 430 to 434 and 436) (mg/d/Outcome): 12 years FU Per 1 g/d for dietary potassium cases: 631, total: 36094, Q1 cases: 197, total: NR, person-years: 108467, Q2 cases: 147, total: NR, person-years: 109297, Q3 cases: 161, total: NR, person-years: 109117, Q4 cases: 126, total: NR, person-years: 109387 Adjustment: Age, sex, body mass index, education, physical activity, smoking status, total energy, calcium Potassium intakes were not associated with stroke |
| Smyth, 2016243  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: U.S. National Institutes of Health–American Association of Retired Persons Diet and Health Study  . | Study of: Adults N: 370423  % Male: 59.1 Mean Age/Range/Age at Baseline: mean 62.2 (SD 5.4) years Race: White 92.7% Systolic BP: NR Diastolic BP: NR Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: NR % with Hypertension: 43.5% % with history of CVD: NR % with Type 2 diabetes: 9.2% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included 567,169 US adults, between ages 50 to 71 years old, and who have completed both a baseline and a follow-up questionnaire. Exclusion: Excluded those with duplicate questionnaires and incomplete records, excluded those who moved away, who had dialysis at baseline, and who had extreme high an slow total energy intakes | Exposure Type: Daily potassium intake Exposure Unit: g/d  Duration: NR Exposure to Follow Up Time: a mean of 14.3-year follow-up  Dose format: range Q1, Dose: <2.3 Q2, Dose: 2.3-2.9 Q3, Dose: 2.9-3.5 Q4, Dose: 3.5-4.3 Q5, Dose: >4.3 | Sodium measure: FoodFrequency questionnaire Best sodium measure recorded: Participants completed 1 validated food frequency questionnaire at baseline Sodium, Method of Validation: FFQ validated in Thompson FE, Kipnis V, Midthune D, et al. Performance of a food- frequency questionnaire in the US NIH-AARP (National Institutes of Health-American Association of Retired Persons) Diet and Health Study. Public Health Nutr. 2008;11:183-195. Potassium measure: Food Frequency Questionnaire Best potassium measure recorded: Participants completed 1 validated food frequency questionnaire at baseline Potassium, Method of Validation: FFQ validated in Thompson FE, Kipnis V, Midthune D, et al. Performance of a food- frequency questionnaire in the US NIH-AARP (National Institutes of Health-American Association of Retired Persons) Diet and Health Study. Public Health Nutr. 2008;11:183-195. Mortality Outcomes-Method of Ascertainment: National Death Index Plus and the Social Security Administration Death Master File CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Followup questionnaire | Renal death (ICD 9th(codes 585 and 586) and 10th (codes N180, N183, N185,N188, N189, N19), censored 31st December 2011) (g/d/Outcome): Median 14.3 +/-3.6 years 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: Age, gender, body mass index, smoking, education, ethnicity, physical activity, diabetes, heart disease, and stroke, and sodium intake. Significant association between being in the highest quintile of potassium intake and a decreased risk of renal death.  Self-reported dialysis (Answering a question on followup-questionnaire) (g/d/Outcome): Mean 14.3 years 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: Age, gender, body mass index, smoking, education, ethnicity, physical activity, diabetes, heart disease, and stroke, and sodium intake. Significant association between higher potassium intake and increased risk of dialysis. |
| Stolarz-Skrzypek, 2011244; Aleksandrova, 2011245; Staessen, 2001246; Li, 2007247  Location: Belgium  Setting: Community  Design: Prospective Cohort study  Study Name: The Flemish Study on Environment, Genes, and Health Outcomes (FLEMENGHO)  . | Study of: Adults N: 3681  % Male: outcome: 47.3; Hypertension 45.9; BP 47.6 Mean Age/Range/Age at Baseline: mean (SD) outcome: 40.9 (16.3)l Hypertension: 38.6 (14.6); BP: 38.3 (14.2) y Race: NR Systolic BP: mean (SD) outcome 124.7 (10.6); Hypertension 118.7 (10.4); BP 120.9 (12.8) Diastolic BP: mean (SD) outcome 76.3 (10.6); Hypertension 73.3 (8.0); BP 74.6 (8.9) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: mean (SD)outcome 25.2 (4.6); Hypertension 24.5 (4.0); BP 24.6 (4.0) % with Hypertension: outcome 25.8 % with history of CVD: NR % with Type 2 diabetes: outcome 4.1; hypertension 1.9; BP 1.9 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 20 years or older were included. Exclusion: People whose baseline 24-hour urine collection was wither missing or unreliable, and people who had a history of CVD, or took antihypertensive drug treatment at baseline or at follow-up, or had developed CVD at follow-up, and people who during follow-up died, seriously ill or moved out of the study areas were excluded. | Exposure Type: Tertiles of the 24-Hour Urinary Sodium Excretion at Baseline Exposure Unit: mmol/d  Exposure Type: Tertiles of the 24-Hour Urinary Sodium-to- Potassium Ratio at Baseline Exposure Unit: NR  Exposure Type: Tertiles of the 24-Hour Urinary Sodium-to- Potassium Ratio at Baseline Exposure Unit: mmol  Duration(in months): 94.8 (= median 7.9 years) for outcomes cohort;73.2 (=median 6.1 years) for BP; 78 (= median 6.5 years) for hypertension Exposure to Follow Up Time: NR  Dose format: Mean (SD ,range) High, Dose: women 290.5 (56.2, 222-400); 231.7 (50.9, 178-400) High, Dose: women 4.15 (0.86, 3.2-6.0); men 4.37 (0.84, 3.4-6.0) Low, Dose: women 1.64 (0.36, 0.8-2.1); men 1.75 (0.41, 0.8-2.3) Low, Dose: women 95.1 (22.0, 50-126); men 120.1 (28.4, 50-158) Medium, Dose: women 150.2 (15.0, 127-177); men 188.8 (17.6, 159-221) Medium, Dose: women 2.59 (0.27, 2.2-3.1); men 2.80 (0.28, 2.4-3.3) | Sodium measure: More than one 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: once, at baseline  How was blood pressure measured? Each participant’s blood pressure at baseline and follow-up was measured by experienced observers by auscultation of the Korotkoff sounds. After the participants had rested for 5 minutes in the sitting position, they obtained 5 consecutive blood pressure readings (phase V diastolic pressure) to the nearest 2 mm Hg, using mercury sphygmomano meters. The 5 blood pressure readings obtained at baseline or at follow-up were averaged for analysis. Digit preference was checked at 6-month intervals. Mortality Outcomes-Method of Ascertainment: Hospital records, Death certificate CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports | Hypertension (ICD code without details) (mmol/d/Outcome): Median (IQR) 7.93 (6.35-17.30) years FU Low cases: 118, total: 1220, Low cases: 41, total: 1241, High cases: 15, total: 1208, High cases: 37, total: 1221, Medium cases: 28, total: 1232, Medium cases: 64, total: 1250 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality.  All cardiovascular Fatal and nonfatal events (ICD code without details) (mmol/d/Outcome): Median (IQR) 7.93 (6.35-17.30) years FU Low cases: 100, total: 1220, Low cases: 93, total: 1241, High cases: 50, total: 1208, High cases: 53, total: 1221, Medium cases: 79, total: 1250, Medium cases: 89, total: 1232 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality.  All-cause mortality (ICD code without details) (mmol/d/Outcome): Median (IQR) 7.93 (6.35-17.30) years FU Low cases: 118, total: 1220, Low cases: 94, total: 1241, High cases: 37, total: 1221, High cases: 47, total: 1208, Medium cases: 64, total: 1250, Medium cases: 78, total: 1232 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality.  Low cases: 41, total: 1241, Low cases: 50, total: 1220, High cases: 10, total: 1221, High cases: 15, total: 1208, Medium cases: 24, total: 1250, Medium cases: 28, total: 1232 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality.  Low cases: 42, total: 1241, Low cases: 45, total: 1220, High cases: 19, total: 1221, High cases: 23, total: 1208, Medium cases: 33, total: 1232, Medium cases: 34, total: 1250 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality.  Stroke Fatal and nonfatal events (ICD code without details) (mmol/d/Outcome): Median (IQR) 7.93 (6.35-17.30) years FU Low cases: 13, total: 1220, Low cases: 15, total: 1241, High cases: 6, total: 1208, High cases: 7, total: 1221, Medium cases: 12, total: 1232, Medium cases: 13, total: 1250 Adjustment: Note: Comparing the risk in each tertile with the overall risk in the whole study population using multiple Cox regression and deviation from mean coding. This allows computation of Cis for the HR in each tertile without definition of an arbitrary reference group. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. Adjustment for diastolic blood pressure or mean arterial pressure instead of systolic blood pressure did not materially alter the findings. Baseline sodium excretion was not associated with total mortality. |
| The Trials of Hypertension Prevention Collaborative Research Group, 1992126; Erratum, 1992127; Satterfield, 1991128; Whelton, 1992129; Whelton, 1997130; He, 1999131; Kumanyika, 1993132; Whelton, 1994133; Cook, 200757; Cook, 1998134; Yamamoto, 1995135; Cook, 201662  Location: US  Setting: Community  Design: Randomized, parallel  Study Name: The Trials of Hypertension Prevention, phase 1 (TOHP-1)  . | Study of: Adults N: 328 N: 744  Intervention 1: % Male: 70.9 Mean Age/Range/Age at Baseline: mean 43.4 (SD 6.6) Race: 78 Systolic BP: 124.8 Diastolic BP: 83.7 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 82.7 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 2: % Male: 69.7 Mean Age/Range/Age at Baseline: mean 43.1 (SD 6.6) Race: 84 Systolic BP: 122.6 Diastolic BP: 81.1 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 83.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Intervention 3: % Male: 74.7 Mean Age/Range/Age at Baseline: mean 42.8 (SD 6.5) Race: white 88.8% Systolic BP: 120.7 Diastolic BP: 80.8 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 81.6 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Comparator: % Male: 71.7 Mean Age/Range/Age at Baseline: mean 42.6 (SD 6.5) Race: white 76.5% Systolic BP: 125.1 Diastolic BP: 83.9 Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: weight, kg mean 82.8 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Healthy adults, ages 30-54 with high normal DBP, not taking antihypertensive drugs for the prior 2 months Exclusion: Clinical or lab evidence of cardiovascular or other disabling or life threatening diseases. Conditions that would contraindicate or require any of the interventions. Unwillingness or inability to comply with data collection or intervention procedures. | Exposure Type: Sodium to potassium ratio Exposure Unit: mmol/mmol  Exposure Type: Urinary potassium excretion Exposure Unit: mmol/24h  Exposure Type: Urinary sodium excretion Exposure Unit: mmol/24h  Duration(in months): Lifestyle intervention 18 months; Nutritional supplement 6 months Exposure to Follow Up Time: NR  Diastolic blood pressure (Random-zerosphygmomanometers (Hawksley)), Systolic blood pressure (Random-zerosphygmomanometers (Hawksley)) Dose format: range Q1, Dose: < 20.0 Q1, Dose: < = -1.64 Q2, Dose: -1.64 to -1.04 Q2, Dose: 20.0 to 38.2 Q3, Dose: -1.04 to -0.38 Q3, Dose: 38.2 to 59.7 Q4, Dose: > 59.7 Q4, Dose: > = -0.38  Diastolic blood pressure (Random-zero sphygmomanometer), Systolic blood pressure (Random-zero sphygmomanometer) Dose format: range Q1, Dose: <65 mmol/24h Q2, Dose: 65-98 mmol/24h Q3, Dose: 99-130 mmol/24h Q4, Dose: 131-178 mmol/24h Q5, Dose: >178 mmol/24h | Sodium measure: Multiple 24-hour urine analysis with validation, 24-hour diet recall Best sodium measure recorded: 0, 3, 6, months, 12 and 18 months for lifestyle groups Sodium, Method of Validation: Multiple 24-hour urine analysis with validation, 24-hour "diet recall" Sodium Status Arm 2: 99.4 mmol/24 h Sodium Status Arm 3: NR Sodium Status Arm 4: NR Best potassium measure recorded: 0, 3, 6, months, 12 and 18 months for lifestyle groups Potassium Status Arm 2: NR Potassium Status Arm 3: Change from baseline -2.4 mmol/24 h Potassium Status Arm 4: Change from baseline 37.4 mmol/24h  How was blood pressure measured? Collected at 0, 3, 6, months, 12 and 18 months for lifestyle groups. BP was measured with a Hawksley random-zero sphygmomanometer, after sitting at rest for 5 minutes . The average of three readings (first and fifth Korotkoffs sounds) were recorded at each visit. | Diastolic blood pressure (Random-zero sphygmomanometer) (mmol/24h/Outcome): 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: Age, sex, race, baseline blood pressure (BP), and baseline sodium excretion No significant association between reduced sodium excretion and DBP (P=.09 for DBP)  Diastolic blood pressure (Random-zerosphygmomanometers (Hawksley)) (mmol/mmol/Outcome): 6 months FU Q1 cases: NR, total: 53, Q2 cases: NR, total: 57, Q3 cases: NR, total: 73, Q4 cases: NR, total: 145 Adjustment: Age, race, sex, baseline blood pressure (diastolic or systolic), 24-hour urinary potassium and sodium excretion, and postrandomization z, changes in body weight and 24-hour urinary sodium excretion. Compared to those in the lowest quartile, being in the highest quartile of sodium to potassium ratio change was associated with a 2.00-mm Hg larger reduction in DBP. There is a p coefficient of 0.494 (P = 0.001) of change in DBP for each unit change in 24hr urinary potassium excretion  Systolic blood pressure (Random-zero sphygmomanometer) (mmol/24h/Outcome): 18 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: Age, sex, race, baseline blood pressure (BP), and baseline sodium excretion Significant association between reduced sodium excretion and reduction in SBP (P=0.0s for SBP).  Systolic blood pressure (Random-zerosphygmomanometers (Hawksley)) (mmol/mmol/Outcome): 6 months FU Q1 cases: NR, total: 53, Q2 cases: NR, total: 57, Q3 cases: NR, total: 73, Q4 cases: NR, total: 145 Adjustment: Age, race, sex, baseline blood pressure (diastolic or systolic), 24-hour urinary potassium and sodium excretion, and postrandomization z, changes in body weight and 24-hour urinary sodium excretion. No significant association between sodium to potassium ratio and SBP.  Diastolic blood pressure (Random-zerosphygmomanometers (Hawksley)) (mmol/24h/Outcome): 6 months FU Q1 cases: NR, total: 177, Q2 cases: NR, total: 62, Q3 cases: NR, total: 47, Q4 cases: NR, total: 42 Adjustment: Age, race, sex, baseline blood pressure (diastolic or systolic), 24-hour urinary potassium and sodium excretion, and postrandomization z, changes in body weight and 24-hour urinary sodium excretion. Compared to those in the lowest quartile, being in the highest quartile urinary potassium excretion change was associated with a 1.49-mm Hg larger reduction in DBP. There is a p coefficient of -0.015 (P = 0.021) of change in DBP for each unit change in 24hr urinary potassium excretion  Systolic blood pressure (Random-zerosphygmomanometers (Hawksley)) (mmol/24h/Outcome): 6 months FU Q1 cases: NR, total: 177, Q2 cases: NR, total: 62, Q3 cases: NR, total: 47, Q4 cases: NR, total: 42 Adjustment: Age, race, sex, baseline blood pressure (diastolic or systolic), 24-hour urinary potassium and sodium excretion, and postrandomization z, changes in body weight and 24-hour urinary sodium excretion. No significant association between urinary potassium excretion and SBP. |
| Thomas, 2011248  Location: Finland  Setting: Community  Design: Prospective Cohort study  Study Name: The Finnish Diabetic Nephropathy Study  . | Study of: Adults  % Male: %male reported by Na quartiles q1 32.6 q2 49.2 q3 71.5 Mean Age/Range/Age at Baseline: age reported by Na quartile q1 mean 38 (SD 13) years q2 mean 39 (SD 12) years q3 mean 39 (SD 12) years Race: NR Systolic BP: reported by Na quartiles q1 132 (SD 18) q2 133 (SD 18) q3 135 (SD 18) Diastolic BP: reported by Na quartiles q1 78 (SD 9) q2 79 (SD 9) q3 81 (SD 10) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: BMI reported by Na quartiles q1 24.7 (SD 3.4) q2 25 (SD 3.5) q3 26.1 (SD 3.5) % with Hypertension: reported by Na quartiles q1 44.5 q2 50.2 q3 53.6 % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: All participants with type I diabetes enrolled between January 1998 and December 2002 in the FinnDiane prospective study without ESRD at baseline. Exclusion: Not specified | Duration: NR Exposure to Follow Up Time: median follow-up 10 years | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: single 24-h urine collection at baseline completed with an ion-selective electrode  How was blood pressure measured? In the sitting position after a 10-min rest, blood pressure was measured twice at baseline, and the analysis used the average of these two measurements. Mortality Outcomes-Method of Ascertainment: Death certificate, Search national death registry CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: National database, Medical files | See subgroup table for results |
| Tunstall-Pedoe, 1997249; Tunstall-Pedoe, 1999250; Smith, 1987251  Location: Scotland  Setting: Community  Design: Prospective Cohort study  Study Name: The Scottish Heart Health Study  . | Study of: Adults  % Male: 49.5 Mean Age/Range/Age at Baseline: ranged 40-59 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: 1.5% % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included randomly selected patients from general practitioners' offices in 23 local government districts. Participants aged between 40-59. Exclusion: Excluded those who failed to complete the study questionnaire, clinic appointment, or both. | Duration(in months): 3 years Exposure to Follow Up Time: 6 years | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: one 24 hour urine collection Sodium, Method of Validation: Urine was analyzed for electrolytes and creatinine. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, Death certificate reports | See subgroup table for results |
| Tuomilehto, 2001252  Location: Finland  Setting: Community  Design: Prospective Cohort study  . | Study of: Adults N: 2420  % Male: 48.2 Mean Age/Range/Age at Baseline: age reported by sodium quartile and gender: men q1 mean 45.4 (SD 11.6) years, men q2 mean 45.3 (SD 11.0) years, men q3 mean 46.2 (SD 10.4) years, men q4 mean 45.4 (SD 10.6) years; women q1 mean 45.7 (SD 11.6) years, women q2 mean 45.4 (SD 11.8) years, women q3 mean 44.8 (SD 11.1) years, women q4 mean 45.6 (SD 11.3) years. Race: NR Systolic BP: Systolic blood pressure reported by sodium quartile and gender: men q1 mean 144 (SD 22), men q2 mean 145 (SD 19), men q3 mean 148 (SD 20), men q4 mean 147 (SD 19); women q1 mean 141 (SD 22) years, women q2 mean 140 (SD 22), women q3 mean 141 (SD 22), women q4 mean 142 (SD 22). Diastolic BP: Diastolic blood pressure reported by sodium quartile and gender: men q1 mean 86 (SD 11), men q2 mean 86 (SD 12), men q3 mean 89 (SD 13), men q4 mean 90 (SD 13); women q1 mean 83 (SD 12) years, women q2 mean 83 (SD 12), women q3 mean 83 (SD 12), women q4 mean 85 (SD 12). Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: BMI reported by sodium quartile and gender: men q1 mean 25.5 (SD 2.4), men q2 mean 26.4 (SD 3.3), men q3 mean 26.9 (SD 3.3), men q4 mean 28.1 (SD 4.2); women q1 mean 24.6 (SD 4.2) years, women q2 mean 25.1 (SD 4.02), women q3 mean 26.3 (SD 4.6), women q4 mean 27.8 (SD 5.4). % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Finnish men and women between 25-64 years old. Analysis of this study included both the 1982 and 1987 cohorts. Exclusion: Excluded those with incomplete collection of urine, and those with incomplete data of risk factors. Also excluded those who had a non-fatal acute coronary event or cerebrovascular event before baseline survey. | Exposure Type: 24 h urinary sodium excretion Exposure Unit: mmol  Duration: NR Exposure to Follow Up Time: up to 14 years  Dose format: NR per 100 mmol increase, Dose: mean 216 mmol (SD 83) and 162 mmol (62) in men and in women, respectively | Sodium measure: Single 24-hour urinary analysis without reported quality control measure Best sodium measure recorded: single 24 hour urinary analysis without reported quality control measure  How was blood pressure measured? Blood pressure was measured once using a standard sphygmomanometer with a 13 cm wide and 42 cm long cuff bladder. CVD, CHD, stroke, kidney stones/disease Outcomes-Method of ascertainment: Hospital records, National database | All-cause mortality (Death) (mmol/Outcome): Up to 13 years FU per 100 mmol increase cases: 180, total: 2436 Adjustment: Age and study year, and sex when analyses included both sexes combined, and for the following cardiovascular risk factors: serum total cholesterol, serum HDL cholesterol, blood pressure, body mass index, and smoking Among all participants, no significant association was observed between urinary sodium excretion and risk of mortality, stroke, CVD mortality, and coronary heart disease and mortality.  Cardiovascular death (Death, ICD 390-448) (mmol/Outcome): Up to 13 years FU per 100 mmol increase cases: 87, total: 2436 Adjustment: Age and study year, and sex when analyses included both sexes combined, and for the following cardiovascular risk factors: serum total cholesterol, serum HDL cholesterol, blood pressure, body mass index, and smoking Among all participants, no significant association was observed between urinary sodium excretion and risk of mortality, stroke, CVD mortality, and coronary heart disease and mortality.  Coronary heart disease death (Death, ICD 410-411) (mmol/Outcome): Up to 13 years FU per 100 mmol increase cases: 61, total: 2436 Adjustment: Age, study year, smoking, serum total and HDL cholesterol, systolic blood pressure, BMI, and sex Among all participants, no significant association was observed between urinary sodium excretion and risk of mortality, stroke, CVD mortality, and coronary heart disease and mortality.  Coronary heart disease incident (Event, ICD 410-411) (mmol/Outcome): Up to 13 years FU per 100 mmol increase cases: 128, total: 2402 Adjustment: Age and study year, and sex when analyses included both sexes combined, and for the following cardiovascular risk factors: serum total cholesterol, serum HDL cholesterol, blood pressure, body mass index, and smoking Among all participants, no significant association was observed between urinary sodium excretion and risk of mortality, stroke, CVD mortality, and coronary heart disease and mortality.  Stroke incident (Event, ICD 430-438) (mmol/Outcome): Up to 13 years FU per 100 mmol increase cases: 84, total: 2420 Adjustment: Age and study year, and sex when analyses included both sexes combined, and for the following cardiovascular risk factors: serum total cholesterol, serum HDL cholesterol, blood pressure, body mass index, and smoking Among all participants, no significant association was observed between urinary sodium excretion and risk of mortality, stroke, CVD mortality, and coronary heart disease and mortality. |
| Umesawa, 2016253  Location: Japan  Setting: Community  Design: Prospective Cohort study  Study Name: The Circulatory Risk in the Community Study (CIRCS)  . | Study of: Adults N: 889  % Male: Q1 33; Q2 33; Q3 33; Q4 33 Mean Age/Range/Age at Baseline: Q1: mean 57.7 (range 40-75); Q2: 56.9 (range 40-75); Q3 58.3 (range 40-75); Q4: 56.3 (range 40-75) years Race: NR Systolic BP: Q1 mean 118.4 (SE 0.8); Q2 mean 117.8 (SE 0.8); Q3 118.7 (SE 0.8); Q4 mean 118.2 (SE 0.8) Diastolic BP: Q1 mean 72.7 (SE 0.5); Q2 mean 72.4 (SE 0.5); Q3 mean 74.0 (SE 0.5); Q4 mean 73.0 (SE 0.5) Magnesium: NR Calcium: NR Other Minerals: NR Mean BMI: Q1 mean 22.4 (SE 0.2); Q2 mean 22.6 ( SE 0.2); Q3 mean 22.9 (SD 0.2); Q4 mean 23.2 (SE 0.2) kg/m^2 % with Hypertension: NR % with history of CVD: NR % with Type 2 diabetes: Q1 8; Q2 5; Q3 3; Q4 5 % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Participants aged 40 to 75 years who were normotensive or hypertensive (systolic blood pressure of >=140mm Hg and /or diastolic bold pressure of >= 90 mmHg and/or under antihypertensive medication) were included. Exclusion: people who refused to take urinalysis pr refused to take bold samples, who had high serum creatinine concentrations (>= 1.4 mg/dl for men and >=1.2 mg/dl for women) or had a history of renal disease, or extremely high sodium to creatinine trio in spot urine (>= 15), or non-validated height due to scoliosis, who initiated antihypertensive medication at folio-up surveys or who measured their blood pressure only one at follow-up surveys were excluded. | Exposure Type: Sodium concentration quartiles in spot urine Exposure Unit: mmol/l  Duration(in months): 69.6 (5.8 years) Exposure to Follow Up Time: NR  Diastolic blood pressure level (Standard mercury sphygmomanometers), Systolic blood pressure level (Standard mercury sphygmomanometers) Dose format: continuous All, Dose: 1-SD increment (54 mol/L )  Diastolic blood pressure level (mmHg) (Standard mercury sphygmomanometers), Systolic blood pressure level (mmHg) (Standard mercury sphygmomanometers) Dose format: continuous All, Dose: 1-SD increment (54 mol/L ) Q1, Dose: 66 (19-94) Q2, Dose: 107 (82-137) Q3, Dose: 145 (119-176) Q4, Dose: 193 (163-307) | Sodium measure: Single 24-hour urine analysis with validation Best sodium measure recorded: once, at baseline Sodium, Method of Validation: Quality control was undergone three times per day by using normal and abnormal reagent (Consela “Nissui”, Nissui pharmaceutical Co., Tokyo, Japan).  How was blood pressure measured? Arterial systolic blood pressure and the fifth-phase of Korotkoff sounds diastolic blood pressure were measured by well-trained observers using standard mercury sphygmomanometers on the right arm at base line survey. All participants had their blood pressure levels measured twice. Participants had their blood pressure levels measured by automated sphygmomanometers (TM-2655P; A&D Company Ltd. Tokyo, Japan) on the right arm twice in the follow-up survey. | Diastolic blood pressure level (Standard mercury sphygmomanometers) (mmol/l/Outcome): Mean 5.8 years FU All cases: NR, total: 889 Adjustment: Age (years), sex, body mass index (kg/m2), drinking status (never, ex-drinkers, current drinkers of ethanol at 1 to 22 g/day and ≥23 g/day), current smoking (yes or no) and baseline eGFR value (ml/min/1.73 m2) Nonsignificant null association between sodium/ potassium ratio and blood pressure changes. For all categories, no significant changes were observed for diastolic blood pressure.  Diastolic blood pressure level (mmHg) (Standard mercury sphygmomanometers) (mmol/l/Outcome): Mean 5.8 years FU All cases: NR, total: 889, Q1 cases: NR, total: 220, Q2 cases: NR, total: 225, Q3 cases: NR, total: 220, Q4 cases: NR, total: 224 Adjustment: Age (years), sex, body mass index (kg/m2), drinking status (never, ex-drinkers, current drinkers of ethanol at 1 to 22 g/day and ≥23 g/day), current smoking (yes or no) and baseline eGFR value (ml/min/1.73 m2) For all categories, no significant changes were observed for diastolic blood pressure. For all categories, no significant changes were observed for diastolic blood pressure.  Systolic blood pressure level (Standard mercury sphygmomanometers) (mmol/l/Outcome): Mean 5.8 years FU All cases: NR, total: 889 Adjustment: Age (years), sex, body mass index (kg/m2), drinking status (never, ex-drinkers, current drinkers of ethanol at 1 to 22 g/day and ≥23 g/day), current smoking (yes or no) and baseline eGFR value (ml/min/1.73 m2) Nonsignificant null association between sodium/ potassium ratio and blood pressure changes.  Systolic blood pressure level (mmHg) (Standard mercury sphygmomanometers) (mmol/l/Outcome): Mean 5.8 years FU All cases: NR, total: 889, Q1 cases: NR, total: 220, Q2 cases: NR, total: 225, Q3 cases: NR, total: 220, Q4 cases: NR, total: 224 Adjustment: Age (years), sex, body mass index (kg/m2), drinking status (never, ex-drinkers, current drinkers of ethanol at 1 to 22 g/day and ≥23 g/day), current smoking (yes or no) and baseline eGFR value (ml/min/1.73 m2) A 1-SD increase in sodium concentrations is associated with a +0.9 mmHg (P = 0.060) increase in systolic blood pressure. Being in the highest quartile of sodium concentrations was associated with an increase in systolic blood pressure. Being in the highest quartile of sodium concentrations was associated with an increase in systolic blood pressure. |
| Vitolo, 2013254  Location: Brazil  Setting: Community  Design: Prospective Cohort study  . | Study of: Children N: 331  % Male: 56.8% 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: NR % with history of CVD: NR % with Type 2 diabetes: NR % with Kidney disease: NR % with history of Kidney stones: NR  Inclusion: Included mother-child pairs from low-income population. Included mothers who gave birth at full-term and infants with a normal birth-weight. Exclusion: Excluded HIV-positive mothers, and those with type I or gestational diabetes. Also excluded infants born with congenital malformations. | Exposure Type: Sodium intake Exposure Unit: mg/day  Duration: NR Exposure to Follow Up Time: On average 4 years  Dose format: categorical All, Dose: >1200 mg/day | Sodium measure: 24-hour diet recall Best sodium measure recorded: Two multiple-pass 24-h dietary recalls for each child 2-4 years old. Sodium, Method of Validation: Dietary recalls administered by trained fieldworkers  How was blood pressure measured? Two readings for each blood pressure measurement was assessed using a calibrated aneroid sphygmomanometer. | Systolic blood pressure (A calibrated aneroid sphygmomanometer) (mg/day/Outcome): 3-4 years FU All cases: NR, total: 331 Adjustment: Exclusive breastfeeding >= 4 months, child overweight, WHrR>0.5, change in BMIz >0.67 Consuming more than 1200 mg/day sodium significantly associated with high systolic blood pressure in children 3-4 years old. |
| Whelton, 1998142; Appel, 2001143; Espeland, 1999144; Banson, 1997145; Appel, 1995 146; Kostis, 1998147; Whelton, 1997148  Location: US  Setting: Community  Design: Randomized Factorial Design individual  Study Name: Trial of nonpharmacological interventions in the elderly (TONE)  . | Study of: Adults N: 975 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/24h  Duration: NR Exposure to Follow Up Time: NR  All, Dose: NR | 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 | Elevated blood pressure (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/24h/Outcome): Mean 27.6 months FU All cases: NR, total: NR Adjustment: NR Across follow-up, assigment to an active intervention (including sodium reduction intervention) was assocaited with a significantly lower incidence rate of elevated blood pressure. |
| Witteman, 1989255  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: The Nurses Health Study  . | Study of: Adults N: 58218   Inclusion: Included those who returned the NHS dietary questionnaire (1980). Exclusion: Excluded participants who left 10 or more blanks in the dietary questionnaire, and those who reported very high or low total food scores. Also excluded those who self-reported these diagnoses: high blood pressure, myocardial infarction, angina pectoris, diabetes mellitus, and all cancers, but did not exclude non melanoma skin cancer. Also excluded those on antihypertensive medication, keeping a special diet, or had been pregnant for 6 or more months since 1978. | Exposure Type: Potassium intake Exposure Unit: mg/day  Duration: NR Exposure to Follow Up Time: 4 years  Dose format: range Category 1, Dose: <2000 Category 2, Dose: 2000-2399 Category 3, Dose: 2400-2799 Category 4, Dose: 2800-3199 Category 5, Dose: >=3200 | Potassium measure: food frequency questionnaire Best potassium measure recorded: once in 1980 Potassium, Method of Validation: Authors cited other papers that reported on the reproducibility and validity of FFQ used, references 17-19.  How was blood pressure measured? Blood pressure status was self-reported via biennial questionnaires. The validity of this method was assessed using a random sample of 100 nurses. | Hypertension (Self reported) (mg/day/Outcome): 4 years FU Category 1 cases: 395, total: 6190, Category 2 cases: 704, total: 12672, Category 3 cases: 945, total: 16466, Category 4 cases: 705, total: 12624, Category 5 cases: 526, total: 10266 Adjustment: Age, quetelet's index, alcohol consumption, and intakes of calcium, magnesium, potassium and fiber Increase in potassium intake was associated with a slight increase in self-reported hypertension. |
| Yang, 2011256; Cohen, 2008257  Location: US  Setting: Community  Design: Prospective Cohort study  Study Name: NHANES III  . | Study of: Adults N: 12267  % Male: 48.1% Mean Age/Range/Age at Baseline: ranged 25-74 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 non pregnant adults ages 20 and older, those who completed a physical examination, and who had mortality follow-up information. Exclusion: Excluded survey participants with incomplete data on one or more 24-hour dietary recalls. Excluded those partaking a reduced salt diet for hypertension and those with a history of heart attack, stroke, or congestive heart failure. | Exposure Type: Sodium-Potassium Ratio Exposure Unit: mg/mg  Exposure Type: Usual Potassium Intakes Exposure Unit: mg/d  Exposure Type: Usual Sodium Intakes Exposure Unit: mg/d  Duration: NR Exposure to Follow Up Time: NR  CVD mortality (ICD-10 codes I00-I78), IHD All-cause mortality (ICD-10 codes I20-I25) Dose format: median Q1, Dose: 0.98 Q1, Dose: 1793 Q1, Dose: 2176 Q2, Dose: 1.17 Q2, Dose: 2476 Q2, Dose: 3040 Q3, Dose: 1.33 Q3, Dose: 3108 Q3, Dose: 3864 Q4, Dose: 1.57 Q4, Dose: 4069 Q4, Dose: 5135 per 1000 mg/d, Dose: NR per unit change, Dose: NR  All-cause mortality (ICD-10 codes I00-I78) Dose format: median Q1, Dose: 0.98 Q1, Dose: 1793 Q2, Dose: 1.17 Q2, Dose: 2476 Q3, Dose: 1.33 Q3, Dose: 3108 Q4, Dose: 1.57 Q4, Dose: 4069 per 1000 mg/d, Dose: median 2780 (IQR 2164-3502, range 609-8839) mg per unit change, Dose: median 1.25 (IQR 1.08-1.43, range 0.46-2.98)  All-cause mortality Dose format: median Q1, Dose: 2176 Q2, Dose: 3040 Q3, Dose: 3864 Q4, Dose: 5135 per 1000 mg/d, Dose: median 3434 (IQR 2641-4384, range 839-8555) mg | Sodium measure: 24-hour diet recall Best sodium measure recorded: single 24-hour dietary recall Sodium, Method of Validation: a subgroup of 8% adults provided a second 24-hour dietary recall, 24-hour "diet recall" Best potassium measure recorded: single 24-hour dietary recall Potassium, Method of Validation: a subgroup of 8% adults provided a second 24-hour dietary recall Mortality Outcomes-Method of Ascertainment: National death index | All-cause mortality (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 2270, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake In multivariable analysis, higher sodium intake was associated with increased all-cause mortality.  All-cause mortality (ICD-10 codes I00-I78) (mg/mg/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per unit change cases: 2270, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake The risk of all-cause mortality increased linearly with increasing sodium-potassium ratio, comparing the highest quartile with the lowest quartile.  CVD mortality (ICD-10 codes I00-I78) (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 825, total: 12267, person-years: 170110, per unit change cases: 825, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake Higher sodium potassium ratio is associated with increased risk for CVD mortality. In multivariable analysis, higher sodium intake was associated with increased all-cause mortality.  IHD All-cause mortality (ICD-10 codes I20-I25) (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 433, total: 12267, person-years: 170110, per unit change cases: 433, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake Higher sodium potassium ratio is associated with increased risk for IHD mortality. In multivariable analysis, higher sodium intake was associated with increased all-cause mortality.  All-cause mortality (ICD-10 codes I00-I78) (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 2270, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake In multivariable analysis, higher potassium intake was associated with lower mortality risk.  CVD mortality (ICD-10 codes I00-I78) (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 825, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake No significant association between potassium intake and risk of CVD mortality. Potassium intake was significantly inversely associated with risk of CVD or IHD death, CVD mortality, and IHD mortality comparing the highest quartile with the lowest quartile of potassium intake.  IHD All-cause mortality (ICD-10 codes I20-I25) (mg/d/Outcome): Median 14.8 y FU Q1 cases: NR, total: NR, per 1000 mg/d cases: 433, total: 12267, person-years: 170110, Q2 cases: NR, total: NR, Q3 cases: NR, total: NR, Q4 cases: NR, total: NR Adjustment: Sex, race/ethnicity, educational attainment, body mass index, smoking status, alcohol intake, total cholesterol, high-density lipoprotein cholesterol, physical activity, family history of cardiovascular disease, and total calorie intake No significant association between potassium intake and risk of IHD mortality. Potassium intake was significantly inversely associated with the incidence of CVD or IHD death: the adjusted HR, 0.39 (95% CI, 0.19-0.80), for CVD mortality and HR, 0.26 (95% CI, 0.10-0.71), for IHD mortality comparing the highest quartile with the lowest quartile of potassium intake. |