

MELBOURNE CHINESE HEALTH STUDY : DIETARY HABITS AND CARDIOVASCULAR RISKS. 24-HOUR URINARY SODIUM AND POTASSIUM EXCRETION IN RELATION TO BLOOD PRESSURE

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Positive relationships between sodium intake and blood pressure have been found in cross-population comparisons but many epidemiological studies fail to support intrapopulation relationships observations. A few studies examine potassium per se and report inverse relationships with blood pressure in industrialised populations. The possible interactions and intercorrelation of dietary electrolytes present difficulties in epidemiological studies where single electrolytes are often examined to identify independent relationships with blood pressure.

The Melbourne Chinese Health Study, a cross-sectional study of dietary habits and cardiovascular risks, enrolled a representative sample of 547 ethnic Chinese in Melbourne. Eighty seven (48 men and 39 women) subjects aged 25 to 64 were randomly selected. They collected 24 hour urine specimens using a cylinder sampler which extracts one fiftieth portion of the void urine. Sodium and potassium excretion values are the products of urinary concentrations and volume estimated for 24 hours. Blood pressure (BP) is the mean of two readings. Subjects taking tablets for BP were examined separately so that factors associated with BP and medication were removed. Analyses were performed within each gender.

Of the 87 subjects, seven (14.6%) men and 12 (30.8%) women were being treated for hypertension (THT). There were no untreated hypertensives (SBP>160 mm Hg and DBP > 95 mm Hg). Three borderline hypertensives (140 mm Hg<SBP<160 mm Hg or 90 mm Hg < DBP < 95 mm Hg) were not being treated; all had DBP less than 90 mm Hg and were included in the non-hypertensive (NHT) group. The THT were older and had higher BP. No differences were found between the THT and the NHT groups for urinary N and K excretion and urinary creatinine (C). Means (\pm SEM) for age, SBP, DBP, urinary Na, K, and C excretion are shown in the table. There is no difference between the urine collectors and non collectors for these variables. Among the THT, there were positive relationships between SBP and urinary Na excretion and urinary Na/C ratio in both men and women; urinary Na excretion, $r=0.90$ in men and 0.83 in women; urinary Na/C ratio, $r=0.89$ in men and 0.78 in women. Diastolic BP was positively related to urinary Na/C ratio ($r=0.86$) and urinary K/C ratio ($r=0.88$) in men yet no statistically significant relationship was found in women; presumably the urinary K loss in question is related to therapy such as diuretics and K supplements. Among the NHT group, there was a negative relationship between SBP and urinary C ($r=-0.49$) and a negative relationship between DBP and urinary K excretion ($r=-0.41$) in women; no relationship was found in men.

	Males		Females	
	THT (n=7)	NHT (n=41)	THT (n=12)	NHT (n=27)
Age	52 \pm 2.5	40 \pm 1.5	49 \pm 2.5	39 \pm 1.5
Systolic BP (mm Hg)	141.1 \pm 5.2	116.2 \pm 2.9	134.17 \pm 8.3	110.2 \pm 3.7
Diastolic BP (mm Hg)	89.1 \pm 4.2	73.6 \pm 1.9	73.17 \pm 3.4	68.6 \pm 2.1
Na excretion (mmol/d)	173.7 \pm 26.5	180.0 \pm 14.5	170.8 \pm 24.6	145.8 \pm 13.7
K excretion (mmol/d)	52.0 \pm 5.6	63.7 \pm 4.2	66.1 \pm 5.3	49.1 \pm 3.4
Urinary creatinine (mmol/d)	9.1 \pm 1.3	9.8 \pm 0.5	7.1 \pm 0.7	6.8 \pm 0.4

There was no difference for urinary electrolyte excretion examined here between the THT and NHT groups. The positive relationship between urinary Na excretion and SBP among the THT, yet not among the NHT group, may suggest that either hypertension or its treatment is responsible for the relationship. Though less potent and negative, the relationship between urinary K and DBP among the NHT restates the relative importance of dietary potassium in BP control in women, although not in men. The gender difference is intriguing and may suggest that women achieve lower BP through potassium responsiveness.