

# THE ASSOCIATION BETWEEN SERUM URIC ACID AND MORTALITY IN THE CKD POPULATION : A LONGITUDINAL SURVEY OF A NATIONWIDE COHORT IN JAPAN

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## Background & Aim

Hyperuricemia is a risk factor for cardiovascular disease and is often observed in subjects with chronic kidney disease (CKD).

However, the association between uric acid levels and mortality in CKD subjects is still undetermined.

To clarify this point we conducted a prospective longitudinal study in community-based subjects with CKD.

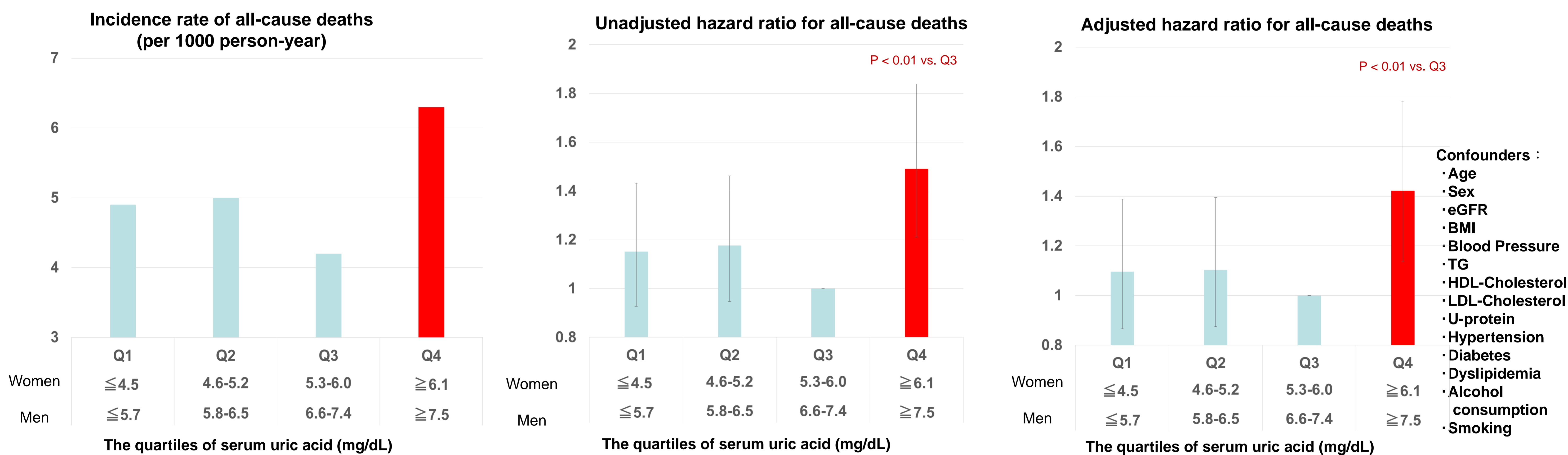
## Methods

We used a national database of 40,832 subjects with CKD (dipstick proteinuria (≥1+) or estimated glomerular filtration rate (eGFR) < 60 mL/min/1.73 m<sup>2</sup> (aged 40–75; men, 52%), who participated in an annual health checkup, "The Specific Health Check and Guidance in Japan" in 2008, and examined the relationship between the gender-specific quartiles of serum uric acid levels at baseline and the 5-year mortality.

## Results

- ◆ During the follow-up period, 720 all-cause deaths, including 153 cardiovascular deaths were documented.
- ◆ The incidence rate of all-cause deaths showed a J-shape curve with the increase in uric acid levels at baseline (the lowest [4.2 per 1,000 person-year] in the 3rd quartile of uric acid [Q3: men, 6.6–7.4 mg/dL; women, 5.3–6.0 mg/dL] and the highest [6.3] in the 4th quartile [Q4: men, ≥7.5 mg/dL; women, ≥6.1 mg/dL] (P for trend <0.01).
- ◆ In the Cox proportional hazard analysis, the adjusted hazard ratio (HR) for the incidence of all-cause deaths was significantly increased in Q4, compared with Q3 (HR 1.42, 95% confidence interval 1.14–1.78, P < 0.01). No significant interaction was observed between uric acid and all confounders.
- ◆ In subgroup analyses, a high HR in Q4 for mortality was observed, especially in young subjects (<65 years), and subjects with diabetes, proteinuria, and eGFR <45 (HR 1.70–1.92).
- ◆ The association of serum uric acid levels with cardiovascular mortality showed a similar trend to that with all-cause mortality, however it did not reach a statistical significance.

	Total subjects	Gender-specific quartiles of serum uric acid (mg/dL)				p-value
		Q1 (M ≤ 5.7, W ≤ 4.5)	Q2 (M 5.8-6.5, W 4.6-5.2)	Q3 (M 6.6-7.4, W 5.3-6.0)	Q4 (M ≥ 7.5, W ≥ 6.1)	
Number	40832	10498	10307	10276	9751	
Men (%)	51.8	50.3	53.6	52.1	51.1	
Age (year)	66.1 ± 6.9	65.7 ± 7.2	66.3 ± 6.8	66.3 ± 6.7	66.1 ± 6.9	<0.01
Smoker (%)	12	12.3	11.9	11.6	12	0.48
Alcohol (%)	44.1	40.7	43.6	46.2	46.0	<0.01
Obesity (%)	35.2	26.1	31.4	37.5	35.2	<0.01
eGFR (mL/min/1.73 m <sup>2</sup> )	57.3 ± 13.8	61.4 ± 16.3	57.8 ± 12.5	56.4 ± 12.5	53.2 ± 12.2	<0.01
Proteinuria (%)	28.6	36.1	26.6	24.9	26.6	<0.01
Body mass index (kg/m <sup>2</sup> )	24.0 ± 3.5	23.2 ± 3.3	23.7 ± 3.3	24.3 ± 3.6	25.0 ± 3.6	<0.01
Systolic BP (mmHg)	131.9 ± 18.0	129.9 ± 18.2	131.1 ± 17.9	132.5 ± 17.7	134.2 ± 17.9	<0.01
Diastolic BP (mmHg)	77.5 ± 10.9	76.2 ± 10.8	77.2 ± 10.8	78.0 ± 10.7	78.8 ± 11.1	<0.01
HbA1c (%)	5.4 ± 0.8	5.5 ± 1.1	5.4 ± 0.8	5.4 ± 0.7	5.4 ± 0.7	<0.01
Triglyceride (mg/dL)	130.6 ± 86.9	114.9 ± 75.1	124.2 ± 77.2	132.7 ± 83.8	151.9 ± 105.4	<0.01
LDL-cholesterol (mg/dL)	126.1 ± 31.0	123.8 ± 30.1	125.5 ± 30.1	127.3 ± 30.8	127.7 ± 32.3	<0.01
HDL-cholesterol (mg/dL)	58.9 ± 15.8	61.3 ± 16.3	59.7 ± 16.0	58.3 ± 15.3	56.3 ± 15.0	<0.01
Hypertension (%)	56.6	48.3	54.3	58.5	66.1	<0.01
Diabetes (%)	16.2	20.0	15.2	14.1	15.4	<0.01
Dyslipidemia (%)	60.1	53.3	57.6	61.8	68.3	<0.01



## Conclusions

This study showed that serum uric acid level is significantly associated with the mortality in the community-based population with CKD, and that this association was partially modulated by the characteristics of subjects such as proteinuria and comorbidities.

\* Disclosures:  
All the authors have declared no competing of interest.

