

# Determinants and burden of chronic kidney disease in a high-risk population in Korea: results from a cross-sectional study

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## OBJECTIVES

- This study aimed to investigate the prevalence of chronic kidney disease (CKD) and associated risk factors in a high-risk population in Korea.

## RESULTS

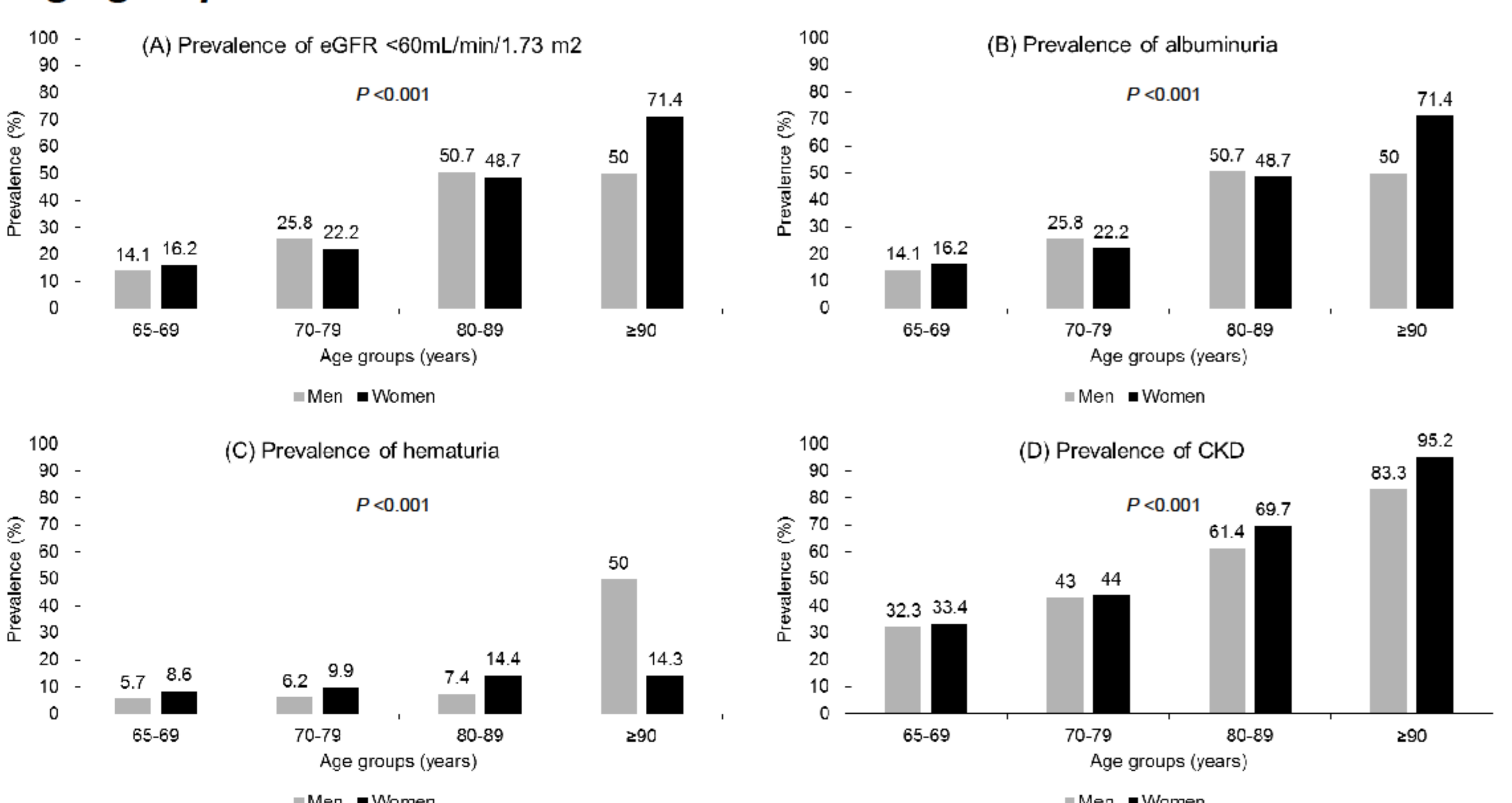
**Table 1. Clinical characteristics of the participants**

	Overall	Women	Men	P
Number of subjects	6,066	3,756 (61.9)	2,310 (38.1)	0.005
Age (year)	73.1 ± 5.5	73.5 ± 5.6	72.3 ± 5.2	< 0.001
Age groups				< 0.001
65-69 (%)	1,800 (29.7)	1,011 (26.9)	789 (34.2)	
70-79 (%)	3,453 (56.9)	2,153 (57.3)	1,300 (56.3)	
80-89 (%)	786 (13.0)	571 (15.2)	215 (9.3)	
≥ 90 (%)	27 (0.4)	21 (0.6)	6 (0.3)	
Hypertension (%)	5,504 (90.7)	3,446 (91.7)	2,058 (89.1)	< 0.001
Diabetes (%)	2,812 (46.4)	1,656 (44.1)	1,156 (50.0)	< 0.001
Current smoker (%)	423 (7.0)	44 (1.2)	379 (16.4)	< 0.001
BMI (kg/m <sup>2</sup> )	24.7 ± 3.3	24.9 ± 3.3	24.3 ± 3.1	< 0.001
SBP (mm Hg)	127 ± 13	127 ± 13	127 ± 13	0.111
DBP (mm Hg)	77 ± 9	77 ± 8	77 ± 9	< 0.001
Hemoglobin A1c (%)	7.0 ± 1.3	7.1 ± 1.3	7.0 ± 1.3	0.566
Creatinine (mg/dl)	0.9 ± 0.4	0.8 ± 0.4	1.1 ± 0.4	< 0.001
uACR (mg/g)	49.6 ± 360.8	49.0 ± 429.4	50.7 ± 203.3	0.604
eGFR mL/min/1.73 m <sup>2</sup>	78.0 ± 51.6	78.0 ± 37.2	78.0 ± 68.9	0.895
Albuminuria				0.006
Normal	4,631 (77.4)	2,876 (77.4)	1,755 (77.4)	
Micro	1,211 (20.2)	770 (20.7)	441 (19.4)	
Macro	144 (2.4)	72 (1.9)	72 (3.2)	
eGFR categories				0.075
≥ 90	1,450 (23.9)	931 (24.8)	519 (22.5)	
60-89	3,122 (51.5)	1,890 (50.3)	1,232 (53.3)	
30-59	1,417 (23.4)	893 (23.8)	524 (22.7)	
15-29	57 (0.9)	32 (0.9)	25 (1.1)	
< 15	20 (0.3)	10 (0.3)	10 (0.4)	
Hematuria	530 (8.7)	386 (10.3)	144 (6.2)	< 0.001
Chronic kidney disease	2,654 (43.8)	1,703 (45.3)	951 (41.2)	0.001

**Table 2. Participants' distribution based on kidney function, hematuria, albuminuria and prevalence of CKD, by stage**

Kidney function	Hematuria and albuminuria within each level of eGFR (%)						Chronic kidney disease		
	eGFR	No.	%	Hematuria	Normal	Micro	Macro	Stage	No.
≥ 90	1,450	23.9	9.2	82.2	16.4	1.5	1	356	5.9
60-89	3,122	51.5	8.3	80.0	18.3	1.7	2	804	13.3
30-59	1,417	23.4	9.3	67.8	28.0	4.2	3	1,417	23.4
15-29	57	0.9	5.3	40.0	36.0	24.0	4	57	0.9
< 15	20	0.3	20.0	58.8	29.4	11.8	5	20	0.3
Total	6,066	100	8.7	77.4	20.2	2.4	All	2,773	43.8

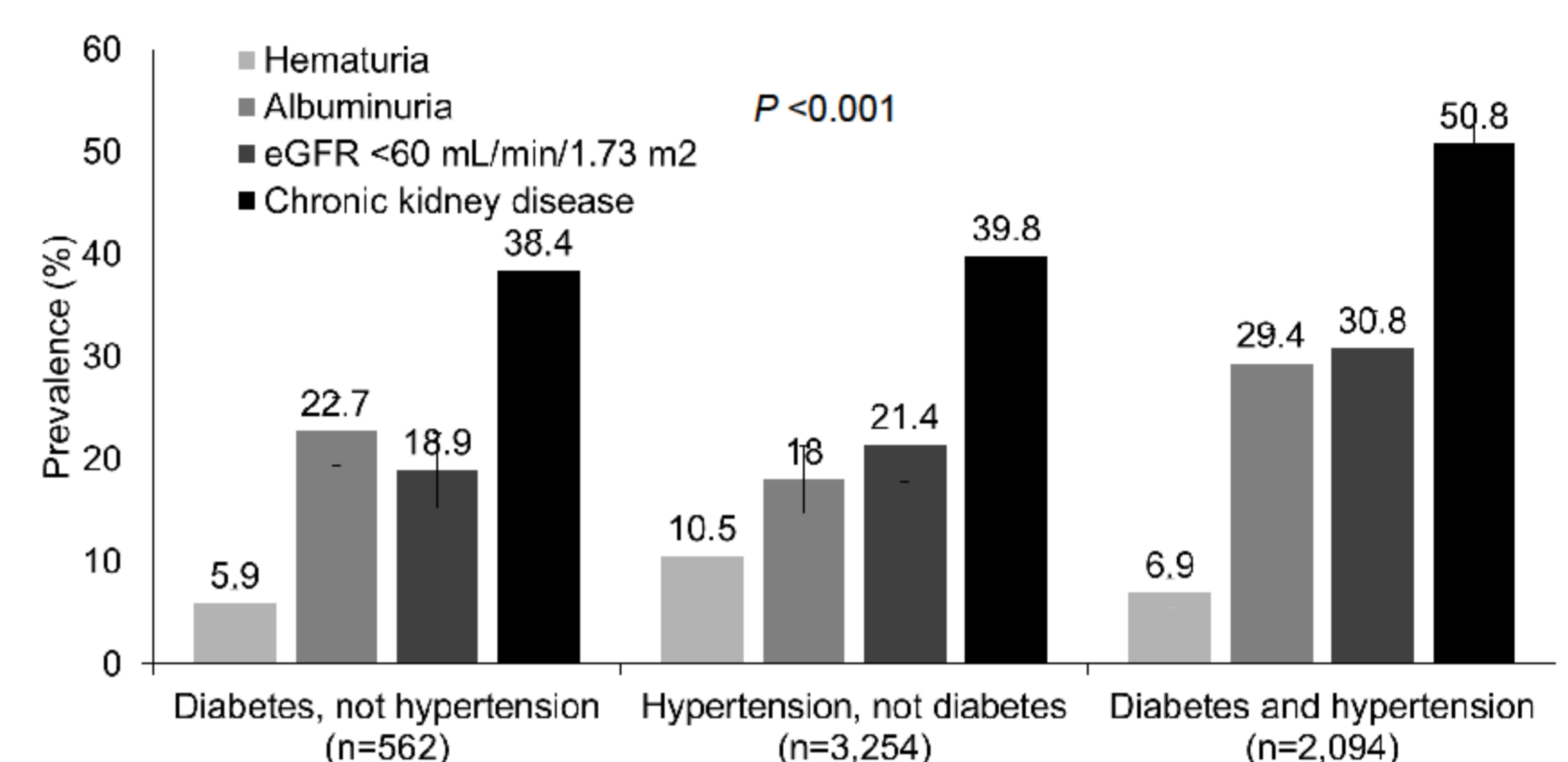
**Figure 1. Prevalence of kidney damage markers and CKD according to age groups.**



## METHODS

- A total of 6,066 participants aged ≥65 years (mean age, 73.1 ± 5.5 years) with diabetes or hypertension.
- CKD was defined as the presence of hematuria (≥1+ blood on spot urine dipstick test), albuminuria (urine albumin-to-creatinine ratio [uACR] ≥30 mg/g) or an estimated glomerular filtration rate (eGFR) <60 mL/min/1.73 m<sup>2</sup>.

**Figure 2. Prevalence of kidney damage markers and CKD according to diabetes and hypertension status in the current study.**



**Table 3. Factors associated with kidney damage markers and CKD**

Variable	Odds ratio (95 % confidence interval)			
	eGFR <60 mL/min/1.73 m <sup>2</sup>	Albuminuria	Hematuria	Chronic kidney disease
Age groups (years)				
65-69	1	1	1	1
70-79	1.690 (1.452-1.968)***	1.351 (1.167-1.564)***	1.139 (0.918-1.413)	1.542 (1.367-1.739)***
80-89	5.607 (4.615-6.812)***	1.926 (1.574-2.356)***	1.605 (1.212-2.125)**	4.222 (3.519-5.065)***
≥ 90	12.422 (5.482-28.148)***	6.426 (2.860-14.440)***	2.980 (1.170-7.591)*	26.843 (6.319-114.028)***
HT, not DM	1	1	1	1
DM, not HT	1.024 (0.809-1.295)	1.442 (1.156-1.798)***	0.578 (0.398-0.839)**	1.101 (0.910-1.331)
DM and HT	1.672 (1.472-1.899)***	1.909 (1.677-2.172)***	0.650 (0.532-0.792)***	1.598 (1.428-1.787)***
Men	1	1	1	1
Women	0.880 (0.771-1.004)	0.961 (0.841-1.099)	1.603 (1.299-1.979)***	1.055 (0.941-1.182)
No smoker	1	1	1	1
Current smoker	0.833 (0.642-1.082)	0.937 (0.726-1.211)	0.931 (0.607-1.427)	0.833 (0.669-1.038)
BMI (kg/m <sup>2</sup> )				
Q1	1.037 (0.871-1.234)	1.112 (0.933-1.326)	1.436 (1.111-1.857)**	1.165 (1.002-1.354)*
Q2	1	1	1	1
Q3	1.024 (0.859-1.220)	1.150 (0.966-1.370)	1.186 (0.910-1.545)	1.193 (1.027-1.385)*
Q4	1.248 (1.050-1.483)*	1.090 (0.913-1.301)	1.121 (0.857-1.466)	1.239 (1.066-1.439)**
SBP (mm Hg)				
< 120	1	1	1	1
120-139	0.750 (0.636-0.885)**	1.329 (1.107-1.597)**	1.005 (0.781-1.294)	0.921 (0.796-1.066)
140-159	0.970 (0.784-1.201)	1.747 (1.392-2.192)***	1.214 (0.882-1.670)	1.206 (0.996-1.461)
≥ 160	1.060 (0.721-1.558)	2.122 (1.444-3.117)***	0.705 (0.356-1.399)	1.368 (0.960-1.948)
DBP (mm Hg)				
< 80	1	1	1	1
80-89	0.815 (0.716-0.928)**	1.155 (1.012-1.318)*	1.056 (0.872-1.278)	1.013 (0.906-1.133)
90-99	1.326 (1.067-1.647)**	1.262 (1.005-1.584)*	0.975 (0.685-1.388)	1.311 (1.077-1.596)**
≥ 100	1.356 (0.799-2.303)	1.761 (1.037-2.989)*	0.928 (0.395-2.183)	1.612 (0.990-2.624)
Hemoglobin A1c (%)				
< 6	1	1	1	1
6-6.9	0.959 (0.740-1.243)	1.327 (1.002-1.758)*	0.691 (0.458-1.043)	1.120 (0.885-1.417)
7-7.9	1.603 (0.800-1.412)	1.815 (1.344-2.451)***	0.758 (0.480-1.196)	1.380 (1.067-1.786)*
8-8.9	0.968 (0.675-1.387)	2.585 (1.814-3.684)***	0.503 (0.260-0.973)*	1.591 (1.156-2.191)**
≥ 9	1.631 (1.271-2.045)**	2.765 (1.917-3.988)***	0.992 (0.560-1.755)	2.133 (1.527-2.980)***

Adjusted with age, gender, BMI, hypertension, diabetes, and smoking.  
\*P < 0.05.  
\*\*P < 0.01.  
\*\*\*P < 0.001.

## CONCLUSIONS

- The prevalence of CKD in a high-risk population was higher than that in the general population.
- Older age, concomitant diabetes and hypertension, uncontrolled underlying diseases, and lower or higher BMI were identified as significant risk factors.

