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SLOPE OF WAIST-HIP RATIO IS ASSOCIATED WITH RISK OF INCIDENT CHRONIC KIDNEY DISEASE

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Objectives: Obesity and chronic kidney disease (CKD) are both major global health problem and obesity is a risk factor for CKD.[1] Especially, abdominal obesity is an important predictor of CKD and among indices of obesity, waist-hip ratio (WHR) is known to predict CKD better than other indices such as body mass index or body weight.[2,3] However, whether reduction of abdominal obesity can decrease risk of CKD is not yet revealed. Therefore, whether slope of WHR is associated with risk of CKD was investigated in general population.

Methods: Data were retrieved from 10,030 participants in Korean Genome and Epidemiology Study_Ansung-Ansan cohort. After exclusion, a total of 3,746 participants with abdominal obesity based on WHR were included in final analysis. The participants were divided into tertiles according to annualized slope of WHR derived from linear regression and those with estimated glomerular filtration rate (eGFR) less than 60 mL/min/1.73m^2 at least two consecutive tests were regarded to have CKD.

Results: During mean follow-up of 11.8 years, incident CKD occurred in 208 (7.6%) participants. There were 75 (6.0%), 69 (5.5%) and 64 (5.1%) incident CKD in T1, T2 and T3 and the corresponding age and sex-adjusted incident rate were 5.1, 6.2 and 5.6 per 1,000 person-years, respectively. In multivariable Cox model after adjustment of confounding factors, participants in groups with lowest slope had lower risk of incident CKD than those in groups with highest slope [hazard ratio (HR) 0.62, 95% confidence interval (CI) 0.44-0.88, p=0.027]. When CKD was defined considering both eGFR and proteinuria, the results were consistent (HR 0.68, 95% CI 0.52-0.91).

Conclusions: Slope of WHR was associated with risk of incident CKD in general population. Reduction of abdominal obesity may reduce occurrence of CKD.

Table 1. Cox proportional hazard models of the association between annualized slope of WHR and incident CKD development (n=3,746)

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	Model 1	*P value*	Model 2	*P value*	Model 3	*P value*	Model 4	*P value*
	HR (95% CI)		HR (95% CI)		HR (95% CI)		HR (95% CI)	
CKD based on eGFR only								
Linear[a]	0.99 (0.82-1.19)	.908	1.24 (1.05-1.46)	.011	1.27 (1.08-1.49)	.003	1.31 (1.11-1.54)	.002
Q1	1.08 (0.78-1.51)	.637	0.70 (0.50-0.98)	.036	0.66 (0.47-0.92)	.015	0.62 (0.44-0.88)	.007
Q2	0.96 (0.69-1.36)	.836	1.00 (0.71-1.41)	.990	1.01 (0.71-1.42)	.973	0.91 (0.64-1.30)	.615
Q3	Reference		Reference		Reference		Reference	
CKD based on eGFR and proteinuria								
Linear[a]	0.92 (0.80-1.07)	.291	1.13 (0.99-1.30)	.067	1.17 (1.02-1.33)	.020	1.21 (1.06-1.39)	.006
Q1	1.17 (0.90-1.54)	.245	0.80 (0.61-1.05)	.108	0.75 (0.57-0.98)	.037	0.68 (0.52-0.91)	.009
Q2	0.99 (0.75-1.31)	.964	1.04 (0.79-1.37)	.794	1.04 (0.79-1.38)	.767	0.96 (0.72-1.27)	.755
Q3	Reference		Reference		Reference		Reference	

Note: *Model 1:* Unadjusted
Model 2: Adjusted for age, sex and baseline eGFR
Model 3: *Model 2* + Baseline WHR, history of hypertension and history of diabetes mellitus
Model 4: *Model 3* + BMI, HDL-C level, triglyceride level, log-transformed CRP level, levels of income, levels of education and history of smoking
[a]HRs for linear variable is per 1-SD change in annualized slope of WHR
Abbreviations: WHR, waist-hip ratio; CKD, chronic kidney disease; HR, hazard ratio; CI, confidence interval; eGFR, estimated glomerular filtration rate; BMI, body mass index; BMI, body mass index; HDL-C, high-density lipoprotein-C; CRP, C-reactive protein