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Promoting Sustainable Kidney Health: The Asia-Pacific and Beyond

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Association between the number of parity and the prevalence of chronic kidney disease

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Objectives : Pregnancy is associated with abrupt changes in glomerular filtration rate, renal plasma flow, renin-angiotensin-aldosterone system and size of kidneys. It is plausible that these physiologic and anatomic changes could potentially have a long-term impact on kidney. Therefore, this study aims to determine whether the number of parity affects the prevalence of chronic kidney disease (CKD).
Methods : We analyzed the health examinee data from the Korean Genome and Epidemiology Study (KoGES-HEXA), which comprises participants from Korea between 2004 and 2013. From 113,937 female subjects, we excluded individuals with histories of gestational diabetes, eclampsia, and pre-existing CKD, as well as participants with incomplete records. Consequentially, 95,608 participants were included in this study. CKD was defined as an estimated glomerular filtration rate below 60 mL/min/1.73 m^2, calculated using the 2009 CKD-EPI (Epidemiology Collaboration) formula, or the presence of proteinuria. We compared the prevalence of CKD across four groups, categorized by the number of parity; 0, 1, 2, and ≥3.
Results : Women with 3 or more parities, compared to those with no parity, were older with more co-morbidities, less likely to smoke or drink, and had higher body mass index, elevated fasting blood sugar and low density lipoprotein cholesterol. Notably, CKD prevalence was higher in women with three or more parities than in no parity group (Table 1). In the univariate logistic regression model, a higher risk of CKD was observed in the ≥3 parity group compared to the 0 parity group (odds ratio: 1.777, 95% confidence interval: 1.271 – 2.486). However, this association was not significant after adjusting for risk factors in the multivariable analyses (Table 2).
Conclusions : Despite higher CKD prevalence in women with 3 or more parities, this association disappeared after adjusting for established CKD risk factors, indicating parity may not independently affect CKD risk in Korean women.

Table 1. Baseline characteristics and the prevalence of CKD stratified by number of parity.jpg

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	Number of parity				*P*-value
	0 (N=1,186)	1 (N=9,628)	2 (N=53,850)	≥3 (N=30,944)	
Age (years)	49.9 ± 7.6	49.6 ± 7.1	50.4 ± 6.8	58.0 ± 7.9*	<0.001
Past history (n, %)					
Diabetes	48 (4.0%)	327 (3.4%)	1,863 (3.5%)	2,726 (8.8%)*	<0.001
Hypertension	151 (12.7%)	1,221 (12.7%)	7,133 (13.2%)	8,292 (26.8%)*	<0.001
Dyslipidemia	110 (9.3%)	753 (7.8%)	4,249 (7.9%)	3,529 (11.4%)*	<0.001
CVA	9 (0.8%)	53 (0.6%)	315 (0.6%)	481 (1.6%)*	<0.001
Angina or MI	13 (1.1%)	124 (1.3%)	631 (1.2%)	1,025 (3.3%)*	<0.001
Lifestyle factors					
Smoking status (n, %)					<0.001
Never-smoker	924 (77.9%)	8,819 (91.6%)*	51,931 (96.4%)*	30,070 (97.2%)*	
Ex-smoker	77 (6.5%)	279 (2.9%)*	587 (1.1%)*	253 (0.8%)*	
Current smoker	180 (15.2%)	487 (5.1%)*	1,019 (1.9%)*	474 (1.5%)*	
Drinking status (n, %)					<0.001
Never-drinker	612 (51.6%)	5,828 (60.5%)*	34,180 (63.5%)*	22,764 (73.6%)*	
Past drinker	41 (3.5%)	270 (2.8%)*	1,055 (2.0%)*	605 (2.0%)*	
Current drinker	527 (44.4%)	3,504 (36.4%)*	18,369 (34.1%)*	7,424 (24.0%)*	
Physical activity					<0.001
High	366 (30.9%)	2,951 (30.7%)	17,963 (33.4%)*	9,178 (29.7%)	
Moderate	161 (13.6%)	1,307 (13.6%)	7,742 (14.4%)*	3,839 (12.4%)	
Low	629 (53.0%)	5,117 (53.1%)	26,424 (49.1%)*	17,034 (55.0%)	
High school or higher education (n, %)	857 (72.3%)	7,149 (74.3%)	37,284 (69.2%)*	10,984 (35.5%)*	<0.001
Physical measurements					
BMI (kg/m²)	23.0 ± 3.1	23.1 ± 3.0	23.4 ± 2.8*	24.4 ± 2.9*	<0.001
WHR	0.82 (0.78 – 0.87)	0.82 (0.78 – 0.87)	0.83 (0.79 – 0.87)*	0.86 (0.80 – 0.88)*	<0.001
Blood tests					
Fasting blood sugar (mg/dL)	91.2 ± 16.1	91.5 ± 18.6	91.8 ± 17.6	95.7 ± 21.5*	<0.001
Albumin (g/dL)	4.61 ± 0.26	4.61 ± 0.26	4.61 ± 0.26	4.60 ± 0.27	<0.001
Total cholesterol (mg/dL)	199 ± 37.7	199 ± 35.8	199 ± 35.4	202 ± 36.4	<0.001
HDL-C (mg/dL)	58.8 ± 13.6	58.2 ± 13.3	57.1 ± 12.9*	54.1 ± 12.3*	<0.001
LDL-C (mg/dL)	119 ± 33.0	119 ± 31.9	120 ± 31.5	123 ± 32.8*	<0.001
TG (mg/dL)	108 ± 76.9	108 ± 70.4	109 ± 70.9	126 ± 81.6*	<0.001
hsCRP (mg/dL)	0.135 ± 0.385	0.123 ± 0.351	0.120 ± 0.372	0.152 ± 0.364	<0.001
Menopause (n, %)	595 (50.2%)	4,606 (47.8%)	27,114 (50.4%)	25,120 (81.2%)*	<0.001
Prevalence of CKD (n, %)	12 (1.0%)	100 (1.0%)	440 (0.8%)	967 (3.1%)*	<0.001

Continuous variables are presented as mean ± standard deviation or median with interquartile range. Categorical variables are shown as number (proportion). *P*-values are derived from the results of ANOVA or Chi-square tests. Abbreviation: BMI, body mass index; CVA, cerebrovascular accident; DBP, diastolic blood pressure; HDL, high density lipoprotein; hsCRP, high sensitivity C-reactive protein; LDL, low density lipoprotein; MI, myocardial infarction; SBP, systolic blood pressure; TG, triglycerides; WHR, waist hip ratio. * *P*-value<0.05 compared with parity=0 group (Games-Howell test or Bonferroni test for continuous variables and Fisher's exact test for categorical variables).

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Table 2. Multivariable logistic regression

	Number of parity			
	0	1	2	≥3
CKD				
Model 1	1	0.999 (0.703 – 1.420)	0.981 (0.702 – 1.372)	1.777 (1.271 – 2.486)
Model 2	1	1.156 (0.628 – 2.127)	0.878 (0.490 – 1.575)	1.135 (0.635 – 2.030)
Model 3	1	1.036 (0.720 – 1.490)	0.990 (0.700 – 1.402)	1.094 (0.771 – 1.553)
Model 4	1	1.015 (0.705 – 1.461)	0.968 (0.684 – 1.371)	1.062 (0.748 – 1.508)

Model 1 is unadjusted; Model 2 is adjusted for age; Model 3 is adjusted for Model 2 plus DM, HTN, angina or MI, WHR, FBS, TG, menopause; Model 4 is adjusted for Model 3 plus BMI, HDL-C, LDL-C. Abbreviations: BMI, body mass index; DM, diabetes; FBS, fasting blood sugar; HDL-C, high density lipoprotein cholesterol; HTN, hypertension; LDL-C, low density lipoprotein cholesterol; MI, myocardial infarction; TG, triglyceride; WHR, waist to hip ratio.