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**Association between dietary vitamin intake and chronic kidney disease:
results from Korean National Health and Nutrition Examination Survey**

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Objectives:

Few studies have explored the association between vitamin intake and chronic kidney disease (CKD). We investigated the association between vitamin intake (vitamin A, thiamine (vitamin B1), riboflavin (vitamin B2), niacin (vitamin B3) and ascorbic acid (vitamin C)) and CKD.

Methods:

Using Korean National Health and Nutritional Examination Survey from 2010 to 2017, 40 to 69 year olds were selected. For 24,852 participants, the food intake of them was collected by the 24-hour recall method, and vitamin intake was calculated. CKD was defined as an estimated glomerular filtration rate (eGFR) of less than 60mL/min/1.73m². Dietary intake of each vitamin was divided into three groups and the group including recommended dietary allowance (RDA) was used as a reference. We assessed the association between the group of vitamin intakes and CKD using binary logistic regression models.

Results:

The lower groups of riboflavin (<0.92 mg/ day, odds ratio [OR] = 1.26, 95% confidence interval [CI]: 1.01-1.57) and niacin (<11.55 mg /day, OR = 1.35, 95% CI: 1.08-1.68) were associated with higher odds for CKD compared with the reference. The higher groups of Vitamin A (≥746.56 ugRE/ day, OR = 0.74, 95% CI: 0.58-0.96) and ascorbic acid (≥117.85 mg/ day, OR=0.75, 95% CI: 0.59-0.95) were associated with lower odds for CKD than reference.

Conclusions:

The present study suggests that an adequate vitamin ingestion may reduce the CKD progression and vitamin deficiency will make kidney function worse. Due to the limitation of this cross-sectional study design, further longitudinal prospective studies are needed in order to prove the results.

table1

Table 1. General characteristics of the study population (40-69 years old) stratified by chronic kidney disease (CKD) status in the Korean National Health and Nutrition Examination Survey(KNHANES), 2010-2017

	CKD (N= 562)	Non-CKD (N=24,290)	P-Value
	N (%)	N (%)	
Sex			<0.001
Male	290 (51.6)	10,618 (43.7)	
Female	272 (48.4)	13,672 (56.3)	
Regular exercise			0.250
No	298 (53.0)	12,370 (50.9)	
Yes	232 (41.3)	10,659 (43.9)	
Drinking			<0.001
No	340 (60.5)	10,959 (45.1)	
Yes	203 (36.1)	12,581 (51.7)	
Smoking			0.044
No	307 (54.6)	14,374 (59.2)	
Yes	235 (41.8)	9,194 (37.9)	
Passive smoking			0.065
No	359 (63.9)	13,979 (57.6)	
Yes	196 (34.9)	10,031 (41.3)	
Hypertension			<0.001
No	165 (29.4)	15,358 (63.2)	
Yes	378 (67.3)	8,052 (33.1)	
Diabetes			<0.001
No	312 (55.6)	20,150 (83.0)	
Yes	212 (37.7)	2,822 (11.6)	
	Mean(SD)	Mean(SD)	
Age (year)	60.84 (6.92)	54.02 (8.49)	<0.001
Height (cm)	161.4 (8.75)	162.0 (8.54)	0.081
Weight (kg)	65.42 (11.74)	63.50 (10.86)	<0.001
Body Mass Index (BMI) (kg/m ²)	25.04 (3.51)	24.12 (3.18)	<0.001
Protein intake (g/day)	59.04 (30.35)	70.18 (40.10)	<0.001
Creatinine (mg/dL)	1.63 (1.50)	0.81 (0.16)	<0.001
Total cholesterol (mg/dL)	184.87 (41.75)	195.54 (36.82)	<0.001

table2

Table 2. Association between dietary vitamin intake and CKD in the study population (age 40-69 years old) of Korean National Health and Nutrition Examination Survey (KNHANES).

Vitamin	Non-CKD (n=24,290)	CKD (n=562)	OR (95% CI)
	N (%)	N (%)	
Vitamin A (ugRE/ day)			
<363.3	7057 (29.4)	224 (39.9)	1.06 (0.85-1.33)
363.3-746.55	7137 (29.1)	167 (29.7)	Reference
≥746.56	7163 (29.5)	119 (21.2)	0.74 (0.58-0.96)
Thiamine (mg/ day)			
<1.18	7045 (29.0)	191 (34.0)	1.02 (0.81-1.29)
1.18-1.86	7168 (29.5)	164 (29.2)	Reference
≥1.87	7144 (29.4)	155 (27.6)	1.03(0.81-1.30)
Riboflavin (mg/ day)			
<0.92	6928 (28.5)	239 (42.5)	1.26 (1.01-1.57)
0.92-1.47	7177 (29.5)	158 (28.1)	Reference
≥1.48	7252 (29.9)	113 (20.1)	0.79 (0.61-1.02)
Niacin (mg/ day)			
<11.55	7033 (29.0)	240 (42.7)	1.35 (1.08-1.68)
11.55-17.88	7148 (29.4)	159 (28.3)	Reference
≥17.89	7176 (29.5)	111 (19.8)	0.78 (0.596-1.01)
Ascorbic acid (mg/ day)			
<51.85	7095 (29.2)	186 (33.1)	0.85 (0.68-1.07)
51.85-117.84	7122 (29.3)	181 (32.2)	Reference
≥117.85	7140 (29.4)	143 (25.4)	0.75 (0.59-0.95)