

Supplementary Appendix

Associations between dietary patterns and nephrolithiasis risk in a large Chinese cohort: Is a balanced or plant-based diet better?

Running Title: Dietary patterns and nephrolithiasis

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Supplementary Method

Factor analysis was used to determine the major posteriori dietary patterns in the study population using the 25 food and beverage groups' intake data. The varimax rotation procedure was applied to improve dietary pattern interpretability. Three major dietary patterns with high factor loadings were revealed by the evaluations of the scree test and eigenvalues (>1): fruit and sweet foods, balanced, and animal foods dietary patterns. Furthermore, according to previous studies [1, 2], six priori plant-based diets were determined: overall plant-based diet index (PDI), healthful plant-based diet index (hPDI), unhealthy plant-based diet index (uPDI), vegan diet, lacto-ovo-vegetarian diet, and fish-vegetarian diet. Briefly, to construct the PDI, hPDI, and uPDI, the 25 food groups were further categorized into 15 groups and classified as healthy plant foods, less-healthy plant foods, and animal foods, respectively (**Table S1**). Considering the dietary habits in Asia, we added pickled and salted vegetables to the classification of less-healthy plant foods according to literature [3]. Each of the 15 food groups was grouped into quintiles and assigned a score 1–5. For PDI, plant food groups were assigned positive scores, whereas animal food groups were assigned reverse scores. For hPDI, healthy plant foods were assigned positive scores, whereas less-healthy plant foods and animal food groups were assigned reverse scores. For uPDI, less-healthy plant foods were assigned positive scores, whereas healthy plant foods and animal food groups were assigned reverse scores. The theoretical scores of PDI, hPDI, and uPDI ranged from 15 to 75. The participants were classified into quartiles based on the distributions of the scores for further analyses. Vegan, lacto-ovo-vegetarian, and fish-

vegetarian diets were defined according to a previous study [2]. Participants were classified into two categories (adherence or not) for each diet. The participants were classified into two categories (adherence or non-adherence) for each diet. The vegan diet eliminated all types of animal food. The lacto-ovo-vegetarian diet eliminated animal foods, except dairy products, eggs, and egg products. The fish-vegetarian diet eliminated animal foods, except for fish and seafoods, egg, and egg products (**Table S2**).

References

[1] Satija A, Bhupathiraju SN, Rimm EB, Spiegelman D, Chiuve SE, Borgi L, Willett WC, Manson JE, Sun Q, Hu FB. Plant-Based Dietary Patterns and Incidence of Type 2 Diabetes in US Men and Women: Results from Three Prospective Cohort Studies. *PLoS Med.* 2016 Jun 14;13(6):e1002039. doi: 10.1371/journal.pmed.1002039. PMID: 27299701; PMCID: PMC4907448.

[2] Marrone G, Guerriero C, Palazzetti D, Lido P, Marolla A, Di Daniele F, Noce A. Vegan Diet Health Benefits in Metabolic Syndrome. *Nutrients.* 2021 Mar 2;13(3):817. doi: 10.3390/nu13030817. PMID: 33801269; PMCID: PMC7999488.

[3] Kim H, Lee K, Rebholz CM, Kim J. Plant-based diets and incident metabolic syndrome: Results from a South Korean prospective cohort study. *PLoS Med.* 2020 Nov 18;17(11):e1003371. doi: 10.1371/journal.pmed.1003371. PMID: 33206633; PMCID: PMC7673569.

Table S1. Food groups in PDI, hPDI, and uPDI.

Major food groups used for scoring		The 24 food groups ^a	Scoring		
			PDI	hPDI	uPDI
Healthy plant foods					
Whole grain	Whole grain		Positive	Positive	Reverse
Fruit	Fruit		Positive	Positive	Reverse
Vegetable	Vegetable, ginger, and garlic		Positive	Positive	Reverse
Legume and legume products	Legume and legume products		Positive	Positive	Reverse
Nut	Nut		Positive	Positive	Reverse
Tea and coffee	Tea and coffee		Positive	Positive	Reverse
Less-healthy plant foods					
Refined grain	Refined grain		Positive	Reverse	Positive
Tuber	Tuber		Positive	Reverse	Positive
Pickled and salted vegetables	Pickled and salted vegetables		Positive	Reverse	Positive
Sweets and desserts	Western-style cake, cookie, Chinese cake, ice cream, and candy		Positive	Reverse	Positive
Sugar-containing beverages	Sugar-sweetened beverages, fruits and vegetables juice		Positive	Reverse	Positive
Animal foods					
Dairy and dairy products	Dairy and dairy products		Reverse	Reverse	Reverse
Meat and meat products	Meat, meat products, animal blood, animal organ		Reverse	Reverse	Reverse
Fish and seafoods	Fish and seafoods		Reverse	Reverse	Reverse
Egg and egg products	Egg, preserved egg		Reverse	Reverse	Reverse

PDI, overall plant-based diet index; hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index.

^a Alcohol and alcoholic beverages was not included.

Table S2. Associations between major dietary patterns determined by factor analysis and incident nephrolithiasis according to sex.

Dietary patterns	Quartiles				<i>P</i> trend ^a	<i>P</i> for interaction ^b
	Q1	Q2	Q3	Q4		
Fruit and sweet foods pattern						0.19
Men						
Range of scores	-6.19, -0.46	-0.45, -0.18	-0.17, 0.21	0.22, 16.46		
No. of participants	3,588	3,587	3,587	3,588		
No. of incident nephrolithiasis	145	176	155	139		
Follow-up person-years	13,157	13,706	13,508	13,769		
Crude model	Reference	1.16 (0.93, 1.44) ^c	1.04 (0.83, 1.30)	0.91 (0.72, 1.15)	0.26	
Adjusted model 1 ^d	Reference	1.12 (0.90, 1.39)	1.00 (0.80, 1.26)	0.88 (0.70, 1.11)	0.16	
Adjusted model 2 ^e	Reference	1.09 (0.86, 1.37)	1.01 (0.80, 1.27)	0.95 (0.75, 1.20)	0.56	
Adjusted model 3 ^f	Reference	1.07 (0.84, 1.36)	0.98 (0.76, 1.27)	0.88 (0.66, 1.17)	0.29	
Women						
Range of scores	-5.41, -0.37	-0.36, -0.15	-0.14, 0.22	0.23, 12.60		
No. of participants	3,035	3,035	3,035	3,035		
No. of incident nephrolithiasis	41	55	52	43		
Follow-up person-years	11,774	11,610	11,642	11,929		
Crude model	Reference	1.36 (0.91, 2.04)	1.28 (0.85, 1.93)	1.04 (0.68, 1.56)	0.93	
Adjusted model 1 ^d	Reference	1.30 (0.87, 1.95)	1.22 (0.81, 1.84)	1.01 (0.66, 1.54)	0.84	
Adjusted model 2 ^e	Reference	1.34 (0.88, 2.05)	1.28 (0.85, 1.93)	1.05 (0.68, 1.63)	0.90	
Adjusted model 3 ^f	Reference	1.31 (0.84, 2.05)	1.23 (0.78, 1.94)	0.97 (0.57, 1.65)	0.72	
Balanced pattern						0.41
Men						
Range of scores	-3.31, -0.51	-0.50, 0.05	0.06, 0.65	0.66, 10.50		
No. of participants	3,588	3,587	3,587	3,588		
No. of incident nephrolithiasis	181	148	153	133		
Follow-up person-years	13,245	13,330	13,765	13,800		
Crude model	Reference	0.81 (0.65, 1.00)	0.80 (0.65, 0.99)	0.70 (0.56, 0.87)	< 0.01	
Adjusted model 1 ^d	Reference	0.81 (0.65, 1.00)	0.78 (0.63, 0.96)	0.66 (0.53, 0.83)	< 0.001	

Adjusted model 2 ^e	Reference	0.77 (0.61, 0.98)	0.76 (0.59, 0.99)	0.67 (0.50, 0.90)	0.01
Adjusted model 3 ^f	Reference	0.76 (0.59, 0.97)	0.74 (0.55, 0.98)	0.64 (0.46, 0.90)	0.01
Women					
Range of scores	-3.83, -0.62	-0.61, -0.14	-0.13, 0.41	0.42, 6.60	
No. of participants	3,035	3,035	3,035	3,035	
No. of incident nephrolithiasis	48	51	44	48	
Follow-up person-years	11,520	11,654	11,724	12,057	
Crude model	Reference	1.05 (0.71, 1.56)	0.90 (0.60, 1.35)	0.95 (0.64, 1.42)	0.65
Adjusted model 1 ^d	Reference	1.08 (0.73, 1.60)	0.85 (0.56, 1.28)	0.81 (0.54, 1.22)	0.20
Adjusted model 2 ^e	Reference	1.07 (0.69, 1.65)	0.84 (0.52, 1.37)	0.83 (0.48, 1.44)	0.36
Adjusted model 3 ^f	Reference	1.05 (0.67, 1.64)	0.81 (0.48, 1.38)	0.78 (0.41, 1.48)	0.34
Animal foods pattern					
Men					
Range of scores	-4.66, -0.34	-0.33, -0.09	-0.08, 0.33	0.34, 15.17	
No. of participants	3,588	3,587	3,587	3,588	
No. of incident nephrolithiasis	150	168	148	149	
Follow-up person-years	14,014	13,396	13,282	13,447	
Crude model	Reference	1.19 (0.95, 1.48)	1.05 (0.84, 1.32)	1.05 (0.83, 1.31)	0.95
Adjusted model 1 ^d	Reference	1.29 (1.03, 1.61)	1.20 (0.95, 1.52)	1.23 (0.97, 1.56)	0.19
Adjusted model 2 ^e	Reference	1.19 (0.93, 1.51)	1.15 (0.91, 1.46)	1.24 (0.97, 1.57)	0.12
Adjusted model 3 ^f	Reference	1.11 (0.86, 1.43)	1.04 (0.80, 1.36)	1.07 (0.81, 1.43)	0.78
Women					
Range of scores	-3.99, -0.44	-0.43, -0.21	-0.20, 0.11	0.12, 12.49	
No. of participants	3,035	3,035	3,035	3,035	
No. of incident nephrolithiasis	59	43	49	40	
Follow-up person-years	11,947	11,581	11,683	11,742	
Crude model	Reference	0.75 (0.51, 1.12)	0.85 (0.58, 1.24)	0.69 (0.46, 1.03)	0.10
Adjusted model 1 ^d	Reference	0.91 (0.61, 1.36)	1.15 (0.77, 1.70)	1.00 (0.66, 1.53)	0.78
Adjusted model 2 ^e	Reference	0.85 (0.55, 1.31)	1.09 (0.73, 1.64)	0.96 (0.63, 1.48)	0.93
Adjusted model 3 ^f	Reference	0.81 (0.51, 1.28)	1.02 (0.65, 1.62)	0.87 (0.52, 1.46)	0.76

0.26

^a The linear trend was tested using the median value of each quartile as a continuous variable based on Cox proportional hazard model.

^b The *P* for interaction was calculated using the cross-product terms of dietary pattern scores and sex in the fully adjusted model.

^c Hazard ratio (95% confidence interval) (all such values).

^d Adjusted for age and body mass index.

^e Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, and calcium intake per day based on model 1.

^f Additionally adjusted for the other two major dietary patterns based on model 2.

Table S3. Associations between PDI, hPDI, uPDI, and incident nephrolithiasis according to sex.

Dietary patterns	Quartiles (n = 26,490)				P trend ^a	P for interaction ^b
	Q1	Q2	Q3	Q4		
PDI						0.28
Men						
Range of scores	≤40	41, 45	46, 50	≥51		
No. of participants	3726	3164	3723	3737		
No. of incident nephrolithiasis	180	141	154	140		
Follow-up person-years	13548	11973	14304	14316		
Crude model	Reference	0.88 (0.70, 1.09) ^c	0.80 (0.65, 0.99)	0.73 (0.58, 0.91)	< 0.01	
Adjusted model 1 ^d	Reference	0.89 (0.71, 1.10)	0.81 (0.66, 1.01)	0.75 (0.60, 0.93)	< 0.01	
Adjusted model 2 ^e	Reference	0.91 (0.71, 1.16)	0.86 (0.67, 1.11)	0.81 (0.61, 1.08)	0.15	
Women						
Range of scores	≤39	40, 44	48, 49	≥50		
No. of participants	2993	2985	3222	2940		
No. of incident nephrolithiasis	39	58	54	40		
Follow-up person-years	11437	11522	12449	11545		
Crude model	Reference	1.48 (0.98, 2.21)	1.27 (0.84, 1.92)	1.01 (0.65, 1.58)	0.99	
Adjusted model 1 ^d	Reference	1.53 (1.02, 2.29)	1.32 (0.87, 1.99)	1.03 (0.66, 1.60)	0.89	
Adjusted model 2 ^e	Reference	1.75 (1.11, 2.78)	1.64 (0.99, 2.70)	1.37 (0.76, 2.44)	0.54	
hPDI						0.14
Men						
Range of scores	≤41	42, 45	46, 49	≥50		
No. of participants	3927	3676	3079	3668		
No. of incident nephrolithiasis	156	148	134	177		
Follow-up person-years	14691	13848	11712	13889		
Crude model	Reference	1.00 (0.80, 1.26)	1.07 (0.85, 1.35)	1.20 (0.96, 1.48)	0.08	
Adjusted model 1 ^d	Reference	0.94 (0.75, 1.18)	0.95 (0.75, 1.20)	1.02 (0.81, 1.28)	0.83	
Adjusted model 2 ^e	Reference	0.90 (0.72, 1.14)	0.89 (0.70, 1.13)	0.89 (0.69, 1.15)	0.37	
Women						

Range of scores	≤41	42, 45	46, 49	≥50		
No. of participants	2906	3107	2918	3209		
No. of incident nephrolithiasis	35	43	49	64		
Follow-up person-years	11338	12025	11189	12403		
Crude model	Reference	1.16 (0.74, 1.81)	1.42 (0.92, 2.19)	1.67 (1.11, 2.52)	< 0.01	
Adjusted model 1 ^d	Reference	1.04 (0.66, 1.63)	1.16 (0.75, 1.80)	1.17 (0.76, 1.80)	0.41	
Adjusted model 2 ^e	Reference	1.04 (0.66, 1.63)	1.18 (0.75, 1.84)	1.18 (0.74, 1.87)	0.41	
uPDI						0.18
Men						
Range of scores	≤39	40, 44	45, 49	≥50		
No. of participants	3397	4036	3624	3293		
No. of incident nephrolithiasis	133	163	150	169		
Follow-up person-years	13174	15427	13531	12008		
Crude model	Reference	1.05 (0.84, 1.32)	1.11 (0.88, 1.40)	1.42 (1.13, 1.78)	< 0.01	
Adjusted model 1 ^d	Reference	1.12 (0.89, 1.41)	1.22 (0.97, 1.55)	1.55 (1.23, 0.95)	< 0.001	
Adjusted model 2 ^e	Reference	1.10 (0.87, 1.39)	1.18 (0.91, 1.52)	1.57 (1.17, 2.12)	< 0.001	
Women						
Range of scores	≤40	41, 44	45, 49	≥50		
No. of participants	2979	3332	2623	3206		
No. of incident nephrolithiasis	45	59	32	55		
Follow-up person-years	11870	12847	10158	12078		
Crude model	Reference	1.21 (0.82, 1.79)	0.83 (0.53, 1.31)	1.21 (0.81, 1.78)	0.70	
Adjusted model 1 ^d	Reference	1.30 (0.88, 1.92)	0.95 (0.60, 1.49)	1.37 (0.92, 2.03)	0.30	
Adjusted model 2 ^e	Reference	1.32 (0.88, 1.98)	0.93 (0.57, 1.53)	1.37 (0.82, 2.27)	0.49	

PDI, overall plant-based diet index; hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index.

^a The linear trend was tested by coding the quartiles as a continuous variable based on Cox proportional hazard model.

^b The *P* for interaction was calculated using the cross-product terms of dietary pattern scores and sex in the fully adjusted model.

^c Hazard ratio (95% confidence interval) (all such values).

^d Adjusted for age and body mass index.

^e Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, calcium intake per day, and alcohol and alcoholic beverages intake based on model 1.

Table S4. Associations between vegan diet, lacto-ovo-vegetarian diet, fish-vegetarian diet, and incident nephrolithiasis according to sex.

Dietary patterns	Men (n = 14,350)		Women (n = 12,140)		P for interaction ^a
	No	Yes	No	Yes	
Vegan diet					0.03
No. of participants	12,982	1,368	11,220	920	
No. of incident nephrolithiasis	545	70	183	8	
Follow-up person-years	49,071	5,069	43,420	3,534	
Crude model	Reference	1.26 (0.98, 1.61) ^b	Reference	0.54 (0.27, 1.09)	
Adjusted model 1 ^c	Reference	1.22 (0.95, 1.57)	Reference	0.49 (0.24, 0.99)	
Adjusted model 2 ^d	Reference	1.11 (0.77, 1.60)	Reference	0.26 (0.11, 0.61)	
Adjusted model 3 ^e	Reference	1.08 (0.74, 1.59)	Reference	0.25 (0.10, 0.59)	
Lacto-ovo-vegetarian diet					0.18
No. of participants	12,868	1,482	11,100	1,040	
No. of incident nephrolithiasis	538	77	177	14	
Follow-up person-years	48,685	5,454	42,977	3,977	
Crude model	Reference	1.29 (1.02, 1.64)	Reference	0.86 (0.50, 1.48)	
Adjusted model 1 ^c	Reference	1.25 (0.99, 1.59)	Reference	0.77 (0.44, 1.32)	
Adjusted model 2 ^d	Reference	1.18 (0.84, 1.67)	Reference	0.55 (0.27, 1.11)	
Adjusted model 3 ^e	Reference	1.17 (0.82, 1.68)	Reference	0.54 (0.26, 1.10)	
Fish-vegetarian diet					0.57
No. of participants	12,776	1,574	10,928	1,212	
No. of incident nephrolithiasis	533	82	170	21	
Follow-up person-years	48,338	5,802	42,289	4,666	
Crude model	Reference	1.30 (1.03, 1.64)	Reference	1.12 (0.71, 1.76)	
Adjusted model 1 ^c	Reference	1.25 (0.99, 1.58)	Reference	0.97 (0.62, 1.53)	
Adjusted model 2 ^d	Reference	1.18 (0.85, 1.63)	Reference	0.86 (0.48, 1.53)	
Adjusted model 3 ^e	Reference	1.16 (0.83, 1.63)	Reference	0.86 (0.48, 1.55)	

^a The P for interaction was calculated using the cross-product terms of dietary pattern and sex in the fully adjusted model.

^b Hazard ratio (95% confidence interval) (all such values).

^c Adjusted for age and body mass index.

^d Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, and calcium intake per day based on model 1.

^e Additionally adjusted for intake of sweet foods (including western-style cake, cookie, Chinese cake, and ice cream and candy) and beverages (tea, coffee, sugar-containing beverages, fruits and vegetables juice, and alcohol and alcoholic beverages) based on model 2.

Table S5. Associations between major dietary patterns determined by factor analysis and incident nephrolithiasis according to age.

Dietary patterns	Quartiles				<i>P</i> trend ^a	<i>P</i> for interaction ^b
	Q1	Q2	Q3	Q4		
Fruit and sweet foods pattern						0.05
< 40						
Range of scores	-5.90, -0.43	-0.42, -0.17	-0.16, 0.23	0.24, 14.88		
No. of participants	3,438	3,438	3,438	3,438		
No. of incident nephrolithiasis	81	86	73	60		
Follow-up person-years	12,834	13,137	13,003	13,282		
Crude model	Reference	1.03 (0.76, 1.40) ^c	0.89 (0.65, 1.22)	0.71 (0.51, 0.99)	0.03	
Adjusted model 1 ^d	Reference	1.12 (0.83, 1.52)	0.97 (0.70, 1.33)	0.74 (0.53, 1.04)	0.06	
Adjusted model 2 ^e	Reference	1.11 (0.81, 1.52)	0.97 (0.70, 1.33)	0.76 (0.54, 1.07)	0.10	
Adjusted model 3 ^f	Reference	1.03 (0.74, 1.44)	0.87 (0.61, 1.24)	0.64 (0.42, 0.97)	0.02	
≥ 40						
Range of scores	-6.19, -0.40	-0.39, -0.17	-0.16, 0.20	0.21, 16.46		
No. of participants	3,185	3,184	3,184	3,185		
No. of incident nephrolithiasis	125	133	126	122		
Follow-up person-years	11,978	12,326	12,121	12,413		
Crude model	Reference	1.03 (0.81, 1.32)	0.99 (0.78, 1.28)	0.94 (0.73, 1.21)	0.94	
Adjusted model 1 ^d	Reference	1.06 (0.83, 1.35)	1.03 (0.80, 1.32)	0.97 (0.75, 1.24)	0.71	
Adjusted model 2 ^e	Reference	1.02 (0.79, 1.33)	1.03 (0.80, 1.32)	1.03 (0.79, 1.33)	0.84	
Adjusted model 3 ^f	Reference	1.05 (0.80, 1.38)	1.08 (0.82, 1.42)	1.07 (0.78, 1.47)	0.65	
Balanced pattern						0.13
< 40						
Range of scores	-3.25, -0.60	-0.59, -0.12	-0.11, 0.45	0.46, 8.89		
No. of participants	3,438	3,438	3,438	3,438		
No. of incident nephrolithiasis	82	73	71	74		
Follow-up person-years	12,846	12,951	13,191	13,268		
Crude model	Reference	0.88 (0.64, 1.21)	0.84 (0.61, 1.15)	0.87 (0.63, 1.18)	0.34	
Adjusted model 1 ^d	Reference	0.88 (0.64, 1.20)	0.77 (0.56, 1.06)	0.76 (0.55, 1.04)	0.06	

	Adjusted model 2 ^e	Reference	0.89 (0.64, 1.25)	0.84 (0.58, 1.20)	0.87 (0.58, 1.30)	0.46
	Adjusted model 3 ^f	Reference	0.81 (0.57, 1.15)	0.70 (0.47, 1.03)	0.70 (0.42, 1.07)	0.08
≥ 40	Range of scores	-3.83, -0.53	-0.52, 0.04	0.05, 0.63	0.64, 10.50	
	No. of participants	3,185	3,184	3,184	3,185	
	No. of incident nephrolithiasis	143	113	134	116	
	Follow-up person-years	11,956	12,032	12,329	12,520	
	Crude model	Reference	0.78 (0.61, 1.00)	0.90 (0.71, 1.14)	0.77 (0.60, 0.98)	0.07
	Adjusted model 1 ^d	Reference	0.78 (0.61, 1.00)	0.85 (0.67, 1.08)	0.69 (0.54, 0.88)	< 0.01
	Adjusted model 2 ^e	Reference	0.74 (0.56, 0.97)	0.80 (0.60, 1.07)	0.66 (0.47, 0.92)	< 0.01
	Adjusted model 3 ^f	Reference	0.72 (0.55, 0.98)	0.75 (0.56, 1.04)	0.61 (0.44, 0.89)	< 0.01
	Animal foods pattern					0.06
< 40	Range of scores	-4.52, -0.30	-0.29, -0.02	-0.01, 0.35	0.36, 14.80	
	No. of participants	3,639	3,237	3,438	3,438	
	No. of incident nephrolithiasis	75	63	79	83	
	Follow-up person-years	13,981	12,283	13,054	12,938	
	Crude model	Reference	0.96 (0.69, 1.34)	1.13 (0.82, 1.55)	1.20 (0.88, 1.64)	0.16
	Adjusted model 1 ^d	Reference	0.96 (0.69, 1.35)	1.08 (0.78, 1.48)	1.00 (0.73, 1.38)	0.86
	Adjusted model 2 ^e	Reference	0.94 (0.67, 1.32)	1.06 (0.77, 1.47)	1.01 (0.73, 1.42)	0.78
	Adjusted model 3 ^f	Reference	0.86 (0.61, 1.22)	0.91 (0.64, 1.29)	0.81 (0.55, 1.18)	0.35
≥ 40	Range of scores	-4.66, -0.55	-0.54, -0.30	-0.29, 0.05	0.06, 15.17	
	No. of participants	3,185	3,185	3,183	3,185	
	No. of incident nephrolithiasis	120	110	124	152	
	Follow-up person-years	12,487	12,324	11,979	12,047	
	Crude model	Reference	0.93 (0.72, 1.21)	1.08 (0.84, 1.39)	1.32 (1.04, 1.68)	0.01
	Adjusted model 1 ^d	Reference	0.93 (0.72, 1.21)	1.07 (0.83, 1.39)	1.20 (0.94, 1.54)	0.09
	Adjusted model 2 ^e	Reference	0.82 (0.61, 1.09)	1.00 (0.77, 1.30)	1.20 (0.94, 1.54)	0.08

Adjusted model 3 ^f	Reference	0.80 (0.59, 1.08)	0.98 (0.72, 1.31)	1.15 (0.84, 1.59)	0.22
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^a The linear trend was tested using the median value of each quartile as a continuous variable based on Cox proportional hazard model.

^b The *P* for interaction was calculated using the cross-product terms of dietary pattern scores and sex in the fully adjusted model.

^c Hazard ratio (95% confidence interval) (all such values).

^d Adjusted for age, sex, and body mass index.

^e Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, and calcium intake per day based on model 1.

^f Additionally adjusted for the other two major dietary patterns based on model 2.

Table S6. Associations between PDI, hPDI, uPDI, and incident nephrolithiasis according to age.

Dietary patterns	Quartiles (n = 26,490)				P trend ^a	P for interaction ^b
	Q1	Q2	Q3	Q4		
PDI						0.21
< 40						
Range of scores	≤40	41, 45	46, 50	≥51		
No. of participants	3,470	3,256	3,677	3,349		
No. of incident nephrolithiasis	80	72	79	69		
Follow-up person-years	12,900	12,338	14,081	12,937		
Crude model	Reference	0.94 (0.68, 1.29) ^c	0.90 (0.66, 1.22)	0.85 (0.62, 1.17)	0.31	
Adjusted model 1 ^d	Reference	0.94 (0.68, 1.29)	0.83 (0.60, 1.13)	0.73 (0.53, 1.01)	0.04	
Adjusted model 2 ^e	Reference	0.96 (0.68, 1.35)	0.87 (0.61, 1.24)	0.76 (0.51, 1.15)	0.16	
≥ 40						
Range of scores	≤39	40, 44	48, 49	≥50		
No. of participants	3,341	2,820	3,197	3,380		
No. of incident nephrolithiasis	138	108	133	127		
Follow-up person-years	12,435	10,892	12,400	13,110		
Crude model	Reference	0.89 (0.69, 1.14)	0.96 (0.76, 1.22)	0.87 (0.68, 1.10)	0.35	
Adjusted model 1 ^d	Reference	0.91 (0.71, 1.17)	0.96 (0.75, 1.21)	0.83 (0.65, 1.05)	0.17	
Adjusted model 2 ^e	Reference	0.94 (0.70, 1.24)	1.02 (0.76, 1.36)	0.92 (0.67, 1.27)	0.76	
hPDI						0.14
< 40						
Range of scores	≤40	41, 43	44, 47	≥48		
No. of participants	3,934	2,998	3,455	3,365		
No. of incident nephrolithiasis	81	62	76	81		
Follow-up person-years	14,933	11,597	12,997	12,730		
Crude model	Reference	0.98 (0.71, 1.37)	1.08 (0.79, 1.47)	1.17 (0.86, 1.60)	0.26	
Adjusted model 1 ^d	Reference	1.00 (0.72, 1.39)	1.16 (0.85, 1.59)	1.25 (0.92, 1.70)	0.11	
Adjusted model 2 ^e	Reference	0.99 (0.71, 1.39)	1.13 (0.82, 1.56)	1.19 (0.85, 1.67)	0.26	
≥ 40						

Range of scores	≤43	44, 47	48, 50	≥51		
No. of participants	3,259	3,213	2,277	3,989		
No. of incident nephrolithiasis	136	126	85	159		
Follow-up person-years	12,472	12,260	8,740	15,365		
Crude model	Reference	0.94 (0.74, 1.20)	0.89 (0.68, 1.17)	0.95 (0.75, 1.19)	0.62	
Adjusted model 1 ^d	Reference	0.94 (0.74, 1.20)	0.90 (0.68, 1.18)	0.96 (0.76, 1.21)	0.72	
Adjusted model 2 ^e	Reference	0.91 (0.71, 1.17)	0.86 (0.65, 1.13)	0.86 (0.67, 1.12)	0.25	
uPDI						0.06
< 40						
Range of scores						
No. of participants	3,756	3,249	3,723	3,024		
No. of incident nephrolithiasis	76	66	79	79		
Follow-up person-years	14,454	12,497	14,131	11,175		
Crude model	Reference	1.00 (0.72, 1.40)	1.07 (0.78, 1.47)	1.36 (0.99, 1.86)	0.06	
Adjusted model 1 ^d	Reference	1.02 (0.73, 1.41)	1.15 (0.84, 1.57)	1.50 (1.09, 2.05)	< 0.01	
Adjusted model 2 ^e	Reference	0.98 (0.70, 1.38)	1.06 (0.75, 1.51)	1.39 (0.92, 2.08)	0.14	
≥ 40						
Range of scores						
No. of participants	3,385	2,807	3,629	2,917		
No. of incident nephrolithiasis	126	108	142	130		
Follow-up person-years	13,365	10,856	13,760	10,856		
Crude model	Reference	1.06 (0.82, 1.37)	1.10 (0.87, 1.40)	1.28 (1.01, 1.64)	0.05	
Adjusted model 1 ^d	Reference	1.11 (0.86, 1.44)	1.19 (0.94, 1.52)	1.40 (1.09, 1.79)	< 0.01	
Adjusted model 2 ^e	Reference	1.10 (0.84, 1.43)	1.18 (0.91, 1.53)	1.46 (1.05, 2.02)	0.03	

PDI, overall plant-based diet index; hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index.

^a The linear trend was tested by coding the quartiles as a continuous variable based on Cox proportional hazard model.

^b The *P* for interaction was calculated using the cross-product terms of dietary pattern scores and sex in the fully adjusted model.

^c Hazard ratio (95% confidence interval) (all such values).

^d Adjusted for age and body mass index.

^e Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes,

hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, calcium intake per day, and alcohol and alcoholic beverages intake based on model 1.

Table S7. Associations between vegan diet, lacto-ovo-vegetarian diet, fish-vegetarian diet, and incident nephrolithiasis according to age.

Dietary patterns	< 40 (n = 13,752)		≥ 40 (n = 12,738)		<i>P</i> for interaction ^a
	No	Yes	No	Yes	
Vegan diet					0.94
No. of participants	12849	903	11353	1385	
No. of incident nephrolithiasis	279	21	449	57	
Follow-up person-years	48865	3392	43625	5212	
Crude model	Reference	1.10 (0.70, 1.71) ^b	Reference	1.07 (0.81, 1.41)	
Adjusted model 1 ^c	Reference	1.05 (0.67, 1.63)	Reference	1.03 (0.78, 1.36)	
Adjusted model 2 ^d	Reference	0.85 (0.47, 1.52)	Reference	0.84 (0.56, 1.25)	
Adjusted model 3 ^e	Reference	0.88 (0.48, 1.64)	Reference	0.77 (0.51, 1.17)	
Lacto-ovo-vegetarian diet					0.98
No. of participants	12785	967	11183	1555	
No. of incident nephrolithiasis	276	24	439	67	
Follow-up person-years	48642	3615	43020	5817	
Crude model	Reference	1.19 (0.78, 1.80)	Reference	1.13 (0.88, 1.47)	
Adjusted model 1 ^c	Reference	1.13 (0.74, 1.71)	Reference	1.12 (0.86, 1.45)	
Adjusted model 2 ^d	Reference	0.98 (0.56, 1.70)	Reference	1.01 (0.70, 1.46)	
Adjusted model 3 ^e	Reference	1.03 (0.58, 1.85)	Reference	0.96 (0.65, 1.40)	
Fish-vegetarian diet					0.94
No. of participants	12736	1016	10968	1770	
No. of incident nephrolithiasis	274	26	429	77	
Follow-up person-years	48458	3799	42168	6669	
Crude model	Reference	1.23 (0.82, 1.84)	Reference	1.14 (0.89, 1.45)	
Adjusted model 1 ^c	Reference	1.19 (0.80, 1.78)	Reference	1.15 (0.90, 1.47)	
Adjusted model 2 ^d	Reference	1.08 (0.63, 1.83)	Reference	1.09 (0.78, 1.51)	
Adjusted model 3 ^e	Reference	1.15 (0.65, 2.01)	Reference	1.04 (0.74, 1.47)	

^a The *P* for interaction was calculated using the cross-product terms of dietary pattern and sex in the fully adjusted model.

^b Hazard ratio (95% confidence interval) (all such values).

^c Adjusted for age and body mass index.

^d Additionally adjusted for education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), nutritional supplements intake, energy intake per day, water intake per day, and calcium intake per day based on model 1.

^e Additionally adjusted for intake of sweet foods (including western-style cake, cookie, Chinese cake, and ice cream and candy) and beverages (tea, coffee, sugar-containing beverages, fruits and vegetables juice, and alcohol and alcoholic beverages) based on model 2.

Table S8. Associations between major food groups, nutrients, and incident nephrolithiasis

Dietary patterns	Quartiles (n = 26,490)				P trend ^a
	Q1	Q2	Q3	Q4	
Vegetable					
Intake range (g/day)	0, 123	124, 191	192, 279	280, 1790	
No. of participants/cases	6624/213	6621/209	6622/174	6623/210	
Fully adjusted model ^c	Reference	0.99 (0.80, 1.22) ^b	0.78 (0.62, 0.99)	0.92 (0.71, 1.19)	0.31
Fruit					
Intake range	0, 142	143, 271	272, 446	447, 3440	
No. of participants/cases	6623/240	6625/197	6619/185	6623/184	
Fully adjusted model ^c	Reference	0.92 (0.75, 1.13)	0.91 (0.74, 1.14)	0.89 (0.70, 1.13)	0.38
Animal foods					
Intake range (g/day)	0, 89	90, 136	137, 196	197, 1500	
No. of participants/cases	6624/221	6621/193	6620/175	6625/217	
Fully adjusted model ^c	Reference	0.90 (0.73, 1.11)	0.77 (0.62, 0.97)	0.92 (0.72, 1.18)	0.49
Sugared beverages and snacks					
Intake range (g/day)	0, 6	7, 31	32, 78	79, 1664	
No. of participants/cases	6777/247	6474/200	6591/190	6648/169	
Fully adjusted model ^c	Reference	1.04 (0.85, 1.27)	1.03 (0.84, 1.27)	0.93 (0.73, 1.17)	0.77
Carbohydrate					
Intake range (g/day)	0, 247	248, 341	342, 452	453, 3659	
No. of participants/cases	6623/232	6622/185	6622/210	6623/179	
Fully adjusted model ^c	Reference	0.77 (0.61, 0.98)	0.88 (0.67, 1.15)	0.72 (0.52, 0.99)	0.12
Protein					
Intake range (g/day)	0, 60	61, 83	84, 110	111, 854	
No. of participants/cases	6623/227	6622/179	6622/205	6623/195	
Fully adjusted model ^c	Reference	0.72 (0.57, 0.91)	0.78 (0.59, 1.04)	0.71 (0.50, 1.01)	0.17
Fat					
Intake range (g/day)	0, 31	32, 44	45, 60	61, 605	
No. of participants/cases	6623/223	6622/183	6622/191	6623/209	

Fully adjusted model ^c	Reference	0.83 (0.66, 1.05)	0.88 (0.67, 1.15)	0.96 (0.69, 1.32)	0.84
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^a The linear trend was tested using the median value of each quartile as a continuous variable based on Cox proportional hazard model.

^b Hazard ratio (95% confidence interval) (all such values).

^c Adjusted for age, sex, body mass index, education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), energy intake per day, water intake per day, and calcium intake per day.

Table S9. Associations between dietary patterns and incident nephrolithiasis (2,131 participants with history of nutritional supplements intake were excluded).

Dietary patterns	Quartiles (n = 24,359)				<i>P</i> trend ^a
	Q1	Q2	Q3	Q4	
Fruit and sweet foods pattern					
No. of participants/cases	6,090/193	6,090/205	6,089/196	6,090/171	
Fully adjusted model ^c	Reference	1.04 (0.84, 1.29) ^b	1.04 (0.83, 1.30)	0.89 (0.69, 1.14)	0.34
Balanced pattern					
No. of participants/cases	6,090/210	6,090/184	6,089/180	6,090/191	
Fully adjusted model ^c	Reference	0.84 (0.67, 1.05)	0.74 (0.57, 0.96)	0.73 (0.54, 0.99)	0.03
Animal foods pattern					
No. of participants/cases	6,090/185	6,090/185	6,089/198	6,090/197	
Fully adjusted model ^c	Reference	0.97 (0.76, 1.22)	1.14 (0.90, 1.44)	1.06 (0.82, 1.37)	0.48
PDI					
No. of participants/cases	5,959/189	5,781/187	6,179/200	6,440/189	
Fully adjusted model ^d	Reference	1.10 (0.88, 1.39)	1.11 (0.87, 1.41)	1.02 (0.79, 1.33)	0.99
hPDI					
No. of participants/cases	6,251/180	6,201/181	5,477/174	6,430/230	
Fully adjusted model ^d	Reference	0.94 (0.76, 1.16)	0.95 (0.76, 1.18)	0.95 (0.76, 1.19)	0.71
uPDI					
No. of participants/cases	6,403/200	5,409/160	6,392/188	6,155/217	
Fully adjusted model ^d	Reference	1.04 (0.84, 1.29)	1.11 (0.89, 1.37)	1.43 (1.11, 1.84)	0.01
Vegan diet	No	Yes			
No. of participants/cases	22,134/688	2,225/77			
Fully adjusted model ^e	Reference	0.82 (0.58, 1.17)			
Lacto-ovo-vegetarian diet	No	Yes			
No. of participants/cases	21,918/677	2,441/88			
Fully adjusted model ^e	Reference	0.96 (0.69, 1.33)			
Fish-vegetarian diet	No	Yes			
No. of participants/cases	21,676/665	2,683/100			

Fully adjusted model ^e	Reference	1.07 (0.79, 1.44)
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PDI, overall plant-based diet index; hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index.

^a The linear trend was tested using the median value of each quartile as a continuous variable based on Cox proportional hazard model.

^b Hazard ratio (95% confidence interval) (all such values).

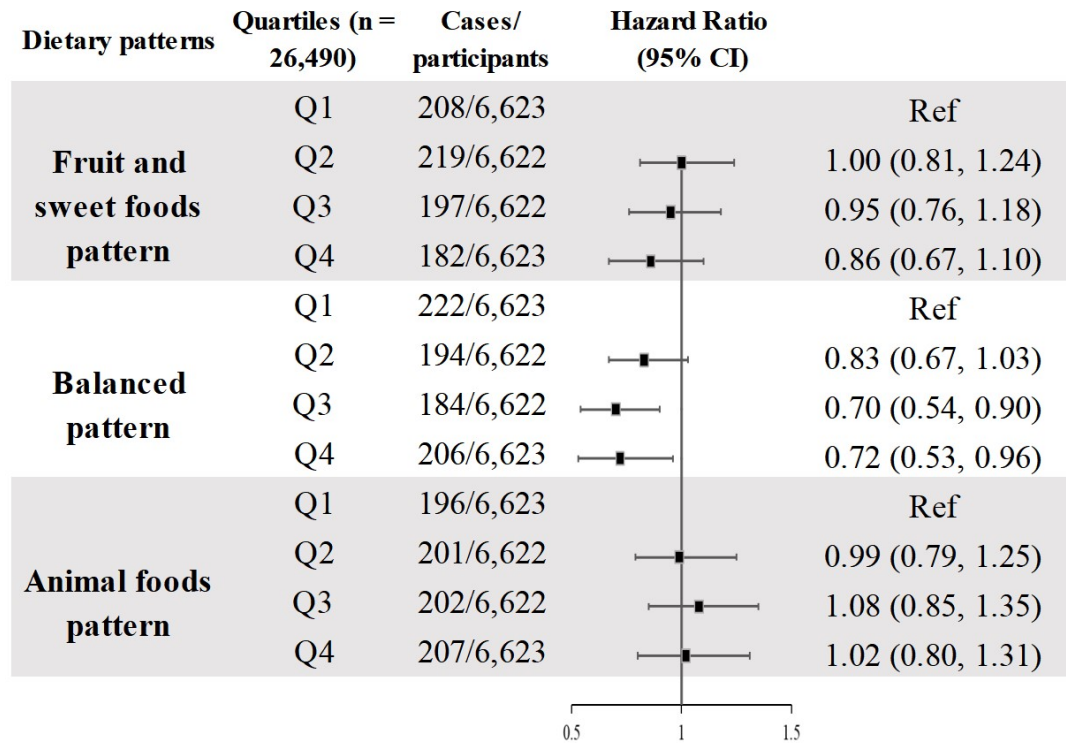
^c Adjusted for age, sex, body mass index, education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), energy intake per day, water intake per day, and calcium intake per day, and the other two major dietary patterns.

^d Adjusted for age, sex, body mass index, education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), energy intake per day, water intake per day, calcium intake per day, and alcohol and alcoholic beverages intake.

^e Adjusted for age, sex, body mass index, education levels, employment status, household income, smoking status, drinking status, physical activity, diabetes, hypertension, dyslipidemia, family history of diseases (cardiovascular diseases, hypertension, and diabetes), energy intake per day, water intake per day, and calcium intake per day, sweet foods (including western-style cake, cookie, Chinese cake, and ice cream and candy) intake per day, and beverages (tea, coffee, sugar-containing beverages, fruits and vegetables juice, and alcohol and alcoholic beverages) intake per day.

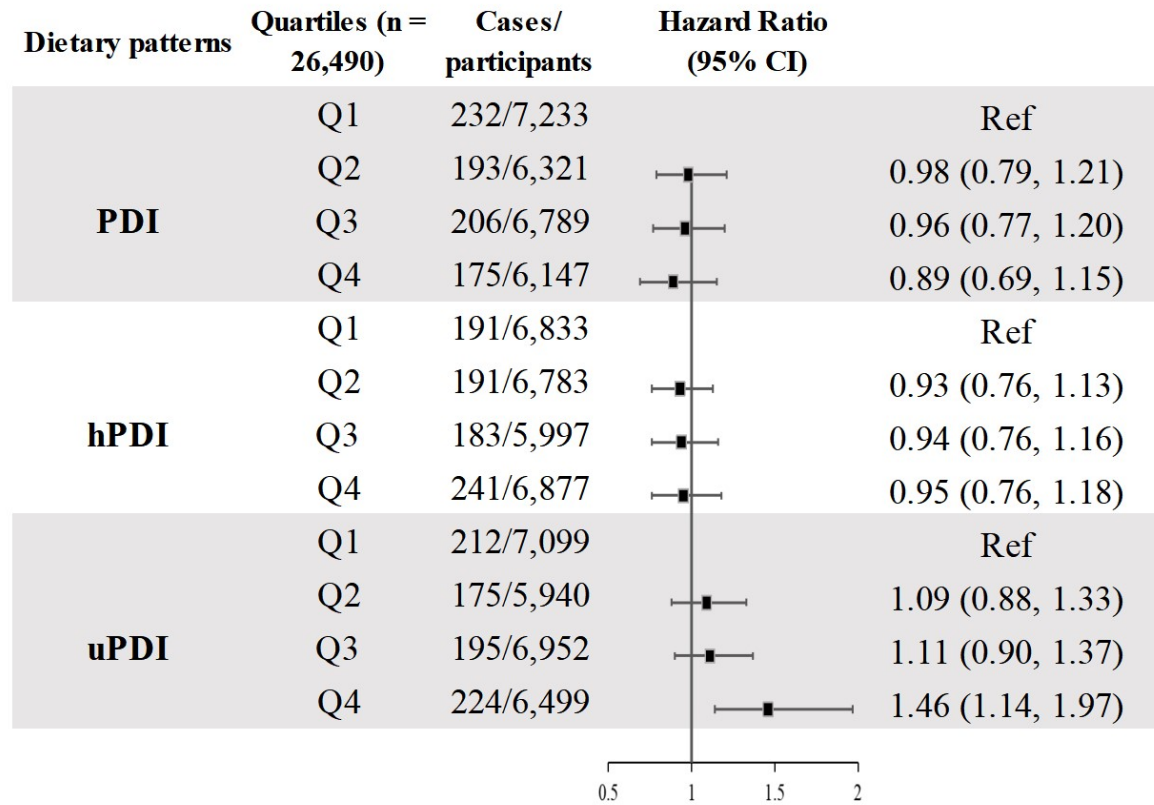
Supplementary Figure 1

Associations between major dietary patterns determined by factor analysis and incident nephrolithiasis



Supplementary Figure 2

Associations between PDI, hPDI, uPDI, and incident nephrolithiasis



Supplementary Figure 3

Associations between vegan diet, lacto-ovo-vegetarian diet, fish-vegetarian diet, and incident nephrolithiasis

