Electronic Supplementary Material (ESI) for Food & Function.

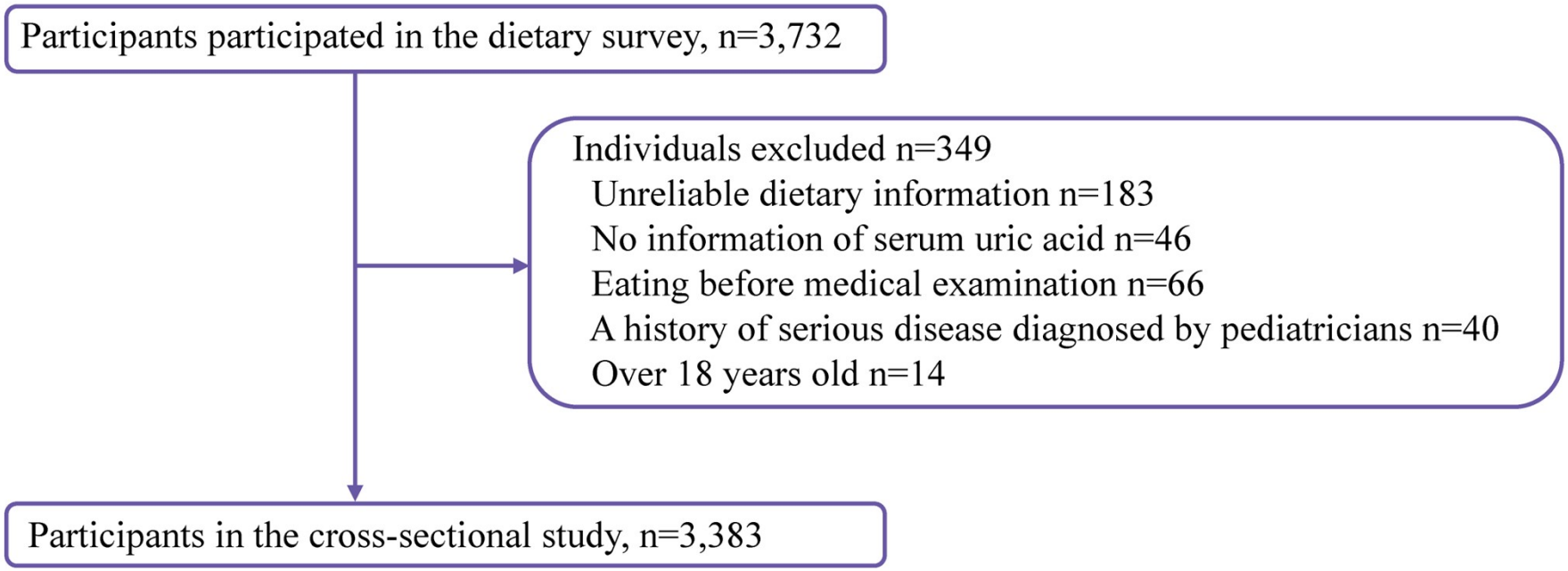
Associations between dietary patterns and serum uric acid concentrations in children and adolescents: a cross-sectional study

Supplementary Material

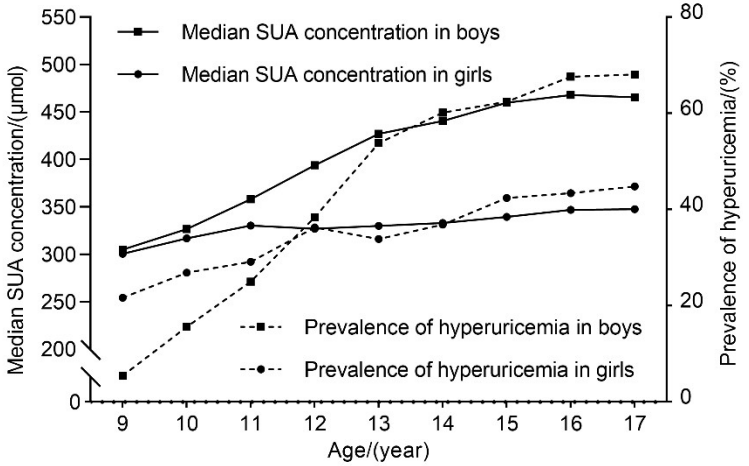
Supplementary Figures (3)

Supplementary Tables (9)

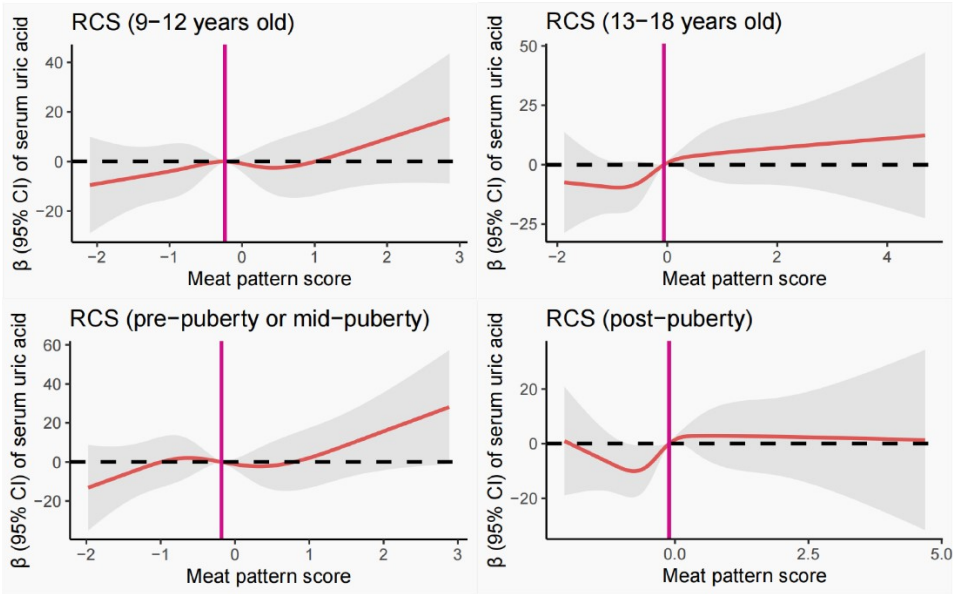
ESI Table 8. Sensitivity analysis of the association between the z-scores of serum uric acid and meat-based diet in the EMSNGS study (n=3,383)
ESI Table 9. Sensitivity analysis of the association between serum uric acid and meat-based diet after excluding participants with missing covariates in the EMSNGS study (n=3,302)



ESI Fig. 1. Flow chart of participants exclusion



ESI Fig. 2. Median serum uric acid and prevalence of hyperuricemia in children and adolescents of different sex and age
SUA, serum uric acid.



ESI Fig. 3. The restricted cubic splines in different age and pubertal status subgroups
RCS, restricted cubic splines; CI, confidence interval.

ESI Table 1. Food items and food groups utilized in the dietary pattern analyses

Food groups	Food Items
Fried food	Fried food (churros, fritters, fried cakes, etc.), instant noodles
Drinks	No sugar drinks, pure fruit and vegetable juice (including freshly squeezed), fruit and vegetable drinks, carbonated drinks (Cola, Sprite, Fenda, soda, etc.), tea drinks, lactic acid bacteria drinks, flavored milk drinks, vegetable protein drinks, whole grain drinks, energy drinks (Monster, Red Bull, Baomine Water, etc.), coffee (Brewed, bottled, freshly ground), freshly made milk tea and fruit tea
Snack foods	Puffed food (potato chips, shrimp, rice crust, etc.), pastries, dried beef/fish/squid silk, candied fruit, chocolate, candy, and ice cream
Processed meat	Processed meat
Nut	Almonds, pecans, pistachios, walnuts, Brazil nuts etc.
Dairy	Milk, yogurt, milk powder, cream, cheese, other dairy
Fruits	Fresh fruits or dried fruits
Whole grains and pulses	Whole grains (brown rice, millet, corn, etc.) or pulses (mung beans, red beans, flower beans, etc.)
Red meats	Red meat
Poultry	Poultry
Refined grain	Rice (rice, rice vermicelli, rice noodles, etc.), flour (steamed buns, noodles, etc.), bread
Soup	Chicken soup, ribs soup, bone broth, tomato soup, nori soup, mushroom soup, etc.
Fish and other seafood	fish, shrimp, lobster, scallops, squid and other aquatic products
Eggs	Fresh eggs (chicken eggs, duck eggs, goose eggs, quail eggs, etc.), salted eggs (salted duck eggs, salted chicken eggs/, salted goose eggs, etc.), preserved Eggs
Tubers	Potatoes, sweet potatoes, purple potatoes, yams, etc.
Vegetable	Dark-colored fresh vegetables or light-colored fresh vegetable
Soybeans and soy products	Soybeans (soybeans, green beans, black beans, etc.), soy milk/tofu brain, tofu and other soy products
Mushrooms	Fresh mushrooms or dried mushrooms

Animal organs and blood	Animal blood, organs of animals (liver, heart, intestines, kidneys, etc.)

ESI Table 2. Baseline characteristics of the study population according to quintile of six major dietary patterns' score (n=3,383)

Quintile	Q1 (n=676)	Q3 (n=677)	Q5 (n=676)	*P*	Q1 (n=676)	Q3 (n=677)	Q5 (n=676)	*P*	Q1 (n=676)	Q3 (n=677)	Q5 (n=676)	*P*
Dietary pattern	Dietary pattern 1: ultra-processed diet				Dietary pattern 2: plant-based nutritious diet				Dietary pattern 3: meat-based diet			
Age (years)	12.6 (2.2)	13.5 (2.3)	14.1 (2.3)	<0.001	14.3 (2.4)	13.2 (2.3)	12.6 (2.1)	<0.001	12.8 (2.5)	13.2 (2.3)	13.9 (2.3)	<0.001
Male (%)	369 (54.6)	349 (51.6)	423 (62.6)	<0.001	402 (59.5)	346 (51.1)	393 (58.1)	0.02	229 (33.9)	363 (53.6)	544 (80.5)	<0.001
Serum uric acid (μmol/L)	360.0 [301.0, 426.0]	367.0 [305.0, 438.0]	386.0 [323.0, 473.0]	<0.001	388.0 [327.0, 466.2]	361.0 [306.0, 431.0]	361.0 [301.0, 439.0]	<0.001	332.0 [287.8, 407.0]	369.0 [314.0, 433.0]	406.5 [342.8, 480.2]	<0.001
Hyperuricemia (%)	243 (35.9)	279 (41.2)	316 (46.7)	<0.001	326 (48.2)	248 (36.6)	251 (37.1)	<0.001	215 (31.8)	270 (39.9)	333 (49.3)	<0.001
High SUA concentration (%)	182 (26.9)	160 (23.6)	179 (26.5)	0.13	186 (27.5)	154 (22.7)	173 (25.6)	0.25	155 (22.9)	174 (25.7)	189 (28.0)	0.18
Overweight or obesity (%)	177 (26.2)	152 (22.5)	173 (25.6)	0.46	167 (24.7)	167 (24.7)	178 (26.3)	0.27	136 (20.1)	172 (25.4)	182 (26.9)	0.006
Dyslipidemia (%)	127 (18.8)	134 (19.8)	121 (17.9)	0.81	127 (18.8)	135 (19.9)	128 (18.9)	0.89	128 (18.9)	121 (17.9)	138 (20.4)	0.81
Prehypertension or hypertension (%)	237 (35.1)	228 (33.7)	281 (41.6)	0.001	275 (40.7)	230 (34.0)	219 (32.4)	0.006	177 (26.2)	242 (35.7)	320 (47.3)	<0.001
Impaired fasting glucose (%)	109 (16.1)	119 (17.6)	110 (16.3)	0.88	82 (12.1)	117 (17.3)	135 (20.0)	0.001	109 (16.1)	95 (14.0)	111 (16.4)	0.43
Puberty status (%)				<0.001				<0.001				<0.001
Pre-puberty	88 (13.0)	60 (8.9)	42 (6.2)		42 (6.2)	73 (10.8)	85 (12.6)		89 (13.2)	82 (12.1)	49 (7.2)	
Mid-puberty	248 (36.7)	162 (23.9)	143 (21.2)		119 (17.6)	188 (27.8)	237 (35.1)		209 (30.9)	170 (25.1)	171 (25.3)	
Post-puberty	340 (50.3)	455 (67.2)	491 (72.6)		515 (76.2)	416 (61.4)	354 (52.4)		378 (55.9)	425 (62.8)	456 (67.5)	
physical activity (%)				0.002				<0.001				<0.001
<0.5 h/day	116 (17.3)	174 (25.7)	175 (26.1)		221 (32.7)	157 (23.3)	104 (15.5)		193 (28.8)	139 (20.6)	145 (21.5)	
0.5-0.9 h/day	332 (49.5)	296 (43.8)	281 (41.9)		304 (45.0)	314 (46.5)	283 (42.1)		286 (42.6)	330 (48.8)	288 (42.7)	
≥1.0 h/day	223 (33.2)	206 (30.5)	214 (31.9)		150 (22.2)	204 (30.2)	286 (42.5)		192 (28.6)	207 (30.6)	241 (35.8)	
Family income (%)				0.20				0.003				0.61
<120,000 CNY	190 (28.4)	200 (29.9)	190 (28.6)		222 (33.2)	179 (27.0)	157 (23.4)		197 (29.4)	188 (28.3)	170 (25.6)	
120,000-250,000 CNY	230 (34.4)	238 (35.6)	230 (34.6)		234 (35.0)	231 (34.8)	241 (35.9)		231 (34.5)	228 (34.3)	224 (33.8)	
≥250,000 CNY	248 (37.1)	231 (34.5)	245 (36.8)		212 (31.7)	254 (38.3)	273 (40.7)		242 (36.1)	249 (37.4)	269 (40.6)	
Maternal degree (%)				0.009				<0.001				0.79
≤ Partial secondary school	135 (20.1)	143 (21.4)	168 (25.2)		183 (27.5)	118 (17.7)	136 (20.2)		153 (22.8)	134 (20.1)	156 (23.5)	
High school diploma	184 (27.5)	179 (26.8)	200 (30.0)		221 (33.2)	194 (29.0)	178 (26.5)		175 (26.1)	193 (29.0)	177 (26.7)	
≥ College degree	351 (52.4)	347 (51.9)	298 (44.7)		262 (39.3)	356 (53.3)	358 (53.3)		343 (51.1)	339 (50.9)	331 (49.8)	
Family history of hyperuricemia or gout (%)	20 (3.0)	19 (2.8)	22 (3.3)	0.97	31 (4.6)	19 (2.8)	25 (3.7)	0.05	19 (2.8)	13 (1.9)	24 (3.6)	0.19
Daily intake												
Energy (kcal/day)	2149.3 [1736.5, 2605.0]	1976.1 [1631.8, 2472.9]	2584.2 [2161.5, 3107.6]	<0.001	2023.8 [1658.1, 2547.2]	2056.2 [1729.7, 2532.6]	2653.7 [2252.3, 3249.8]	<0.001	1736.7 [1429.0, 2134.5]	2081.2 [1800.4, 2440.1]	2943.0 [2525.4, 3433.0]	<0.001
Total protein (g/day)	82.8 [64.5, 105.6]	75.3 [59.7, 98.1]	100.5 [80.1, 123.1]	<0.001	76.4 [59.9, 98.7]	78.9 [64.1, 103.0]	104.2 [84.1, 130.6]	<0.001	61.5 [51.3, 78.3]	78.4 [67.9, 93.4]	121.1 [104.4, 145.5]	<0.001
Total fat (g/day)	77.5 [58.5, 103.0]	67.1 [51.6, 90.2]	96.0 [76.6, 122.5]	<0.001	68.0 [51.4, 94.5]	73.4 [57.1, 93.7]	100.4 [77.0, 128.9]	<0.001	56.9 [44.3, 73.4]	72.2 [59.2, 89.7]	113.7 [93.6, 139.9]	<0.001
Total carbohydrate (g/day)	276.2 [233.3, 335.8]	270.4 [223.2, 328.9]	329.9 [269.7, 400.5]	<0.001	268.8 [218.4, 342.3]	274.1 [229.3, 328.9]	334.9 [287.2, 416.7]	<0.001	251.2 [207.9, 307.8]	278.1 [238.6, 335.7]	355.9 [290.2, 430.6]	<0.001
Total dietary fiber (g/day)	7.7 [5.5, 11.0]	7.0 [4.9, 9.9]	8.5 [6.0, 12.8]	<0.001	5.3 [3.8, 7.3]	7.0 [5.3, 9.2]	12.2 [9.1, 16.7]	<0.001	7.9 [5.5, 11.7]	6.9 [4.9, 10.1]	8.0 [5.8, 12.1]	<0.001
Total cholesterol (g/day)	431.4 [290.5, 573.0]	375.3 [249.7, 528.6]	472.4 [317.7, 644.3]	<0.001	375.2 [255.1, 524.8]	406.6 [270.8, 567.5]	505.7 [359.4, 660.1]	<0.001	327.3 [204.6, 453.8]	380.0 [262.3, 522.4]	599.8 [437.7, 756.3]	<0.001
Total purine (mg/day)	557.0 [420.2, 727.4]	504.2 [392.3, 661.0]	666.1 [525.5, 845.6]	<0.001	554.5 [413.8, 724.8]	537.4 [410.8, 709.5]	658.4 [487.0, 850.7]	<0.001	417.1 [324.8, 549.7]	523.1 [427.4, 640.5]	831.0 [696.1, 1015.1]	<0.001
Guanine (mg/day)	165.4 [130.6, 215.2]	156.3 [123.9, 203.9]	206.9 [164.2, 257.6]	<0.001	168.4 [129.3, 212.2]	166.5 [132.4, 215.2]	201.2 [157.6, 256.2]	<0.001	140.8 [108.8, 186.7]	161.3 [132.4, 197.8]	234.2 [195.4, 286.4]	<0.001
Adenine (mg/day)	164.8 [129.8, 206.8]	157.2 [122.9, 202.4]	204.9 [162.1, 258.5]	<0.001	165.5 [128.3, 210.1]	165.6 [130.6, 208.8]	199.7 [155.8, 253.0]	<0.001	137.5 [108.5, 182.4]	158.8 [131.0, 198.3]	232.3 [190.7, 282.1]	<0.001
Hypoxanthine (mg/day)	179.8 [112.0, 267.3]	154.8 [104.1, 226.2]	211.3 [146.5, 293.3]	<0.001	181.6 [122.8, 270.0]	170.7 [108.6, 248.7]	197.5 [129.7, 288.0]	<0.001	104.5 [68.5, 148.9]	165.6 [124.9, 208.4]	314.2 [249.2, 401.7]	<0.001
Xanthine (mg/day)	41.2 [31.7, 53.0]	31.6 [24.5, 41.8]	37.2 [28.7, 49.2]	<0.001	30.2 [23.6, 38.8]	34.6 [26.6, 45.8]	45.1 [34.2, 57.4]	<0.001	28.8 [21.7, 37.8]	33.2 [26.6, 43.6]	47.9 [38.2, 60.3]	<0.001
Dietary pattern	Dietary pattern 4: soup/seafood/eggs diet				Dietary pattern 5: vegetarian diet				Dietary pattern 6: mushrooms/animal organs diet			
Median standardized score	-1.1 (0.4)	-0.1 (0.1)	1.5 (1.0)	<0.001	-1.1 (0.4)	-0.2 (0.1)	1.5 (1.0)	<0.001	-0.9 (0.4)	-0.1 (0.1)	1.3 (1.5)	<0.001
Age (years)	13.5 (2.5)	13.3 (2.4)	13.3 (2.3)	0.001	13.5 (2.4)	13.4 (2.4)	13.4 (2.3)	0.20	13.2 (2.3)	13.3 (2.4)	13.5 (2.4)	0.37
Men (%)	428 (63.3)	355 (52.4)	368 (54.4)	<0.001	300 (44.4)	378 (55.8)	471 (69.7)	<0.001	425 (62.9)	329 (48.6)	380 (56.2)	<0.001
Serum uric acid (μmol/L)	381.5 [317.0, 452.0]	362.0 [305.0, 442.0]	368.5 [313.5, 443.0]	0.02	369.0 [309.0, 436.0]	364.0 [303.0, 437.0]	380.0 [312.0, 454.5]	0.14	369.0 [310.0, 448.2]	360.0 [304.0, 426.0]	375.5 [313.0, 446.2]	0.07
Hyperuricemia (%)	283 (41.9)	267 (39.4)	277 (41.0)	0.68	285 (42.2)	257 (38.0)	274 (40.5)	0.52	272 (40.2)	250 (36.9)	292 (43.2)	0.02
High SUA concentration (%)	168 (24.9)	171 (25.3)	164 (24.3)	0.90	173 (25.6)	173 (25.6)	160 (23.7)	0.91	153 (22.6)	162 (23.9)	171 (25.3)	0.005
Overweight or obesity (%)	179 (26.5)	158 (23.3)	178 (26.3)	0.28	142 (21.0)	155 (22.9)	224 (33.1)	<0.001	179 (26.5)	149 (22.0)	175 (25.9)	0.19

Hyperlipidemia (%)	136 (20.1)	124 (18.3)	106 (15.7)	0.14	106 (15.7)	139 (20.5)	130 (19.2)	0.16	129 (19.1)	138 (20.4)	114 (16.9)	0.53
Prehypertension or hypertension (%)	268 (39.6)	238 (35.2)	219 (32.4)	0.07	229 (33.9)	226 (33.4)	275 (40.7)	0.001	248 (36.7)	213 (31.5)	253 (37.4)	0.15
Impaired fasting glucose (%)	117 (17.3)	117 (17.3)	119 (17.6)	0.25	112 (16.6)	86 (12.7)	135 (20.0)	0.005	134 (19.8)	100 (14.8)	107 (15.8)	0.09
Puberty status (%)				0.02				0.02				0.67
Pre-puberty	76 (11.2)	65 (9.6)	63 (9.3)		55 (8.1)	75 (11.1)	79 (11.7)		67 (9.9)	67 (9.9)	62 (9.2)	
Mid-puberty	154 (22.8)	192 (28.4)	204 (30.2)		156 (23.1)	198 (29.2)	183 (27.1)		197 (29.1)	178 (26.3)	185 (27.4)	
Post-puberty	446 (66.0)	420 (62.0)	409 (60.5)		465 (68.8)	404 (59.7)	414 (61.2)		412 (60.9)	432 (63.8)	429 (63.5)	
physical activity (%)				0.01				<0.001				0.04
<0.5 h/day	191 (28.4)	160 (23.8)	144 (21.5)		172 (25.7)	166 (24.6)	132 (19.5)		130 (19.3)	176 (26.2)	164 (24.4)	
0.5-1 h/day	290 (43.1)	312 (46.4)	304 (45.3)		308 (46.0)	327 (48.4)	294 (43.5)		316 (46.9)	302 (44.9)	294 (43.7)	
≥0.5 h/day	192 (28.5)	201 (29.9)	223 (33.2)		190 (28.4)	183 (27.1)	250 (37.0)		228 (33.8)	195 (29.0)	215 (31.9)	
Family income (%)				0.01				0.21				0.009
<120,000 CNY†	226 (33.9)	195 (29.1)	166 (25.0)		184 (27.5)	193 (29.0)	177 (26.6)		177 (26.6)	221 (33.5)	197 (29.5)	
120,000-250,000 CNY	230 (34.5)	218 (32.5)	247 (37.2)		223 (33.3)	228 (34.3)	226 (33.9)		209 (31.4)	225 (34.1)	239 (35.8)	
≥250,000 CNY	211 (31.6)	257 (38.4)	251 (37.8)		263 (39.3)	244 (36.7)	263 (39.5)		279 (42.0)	214 (32.4)	232 (34.7)	
Maternal degree (%)				0.81				0.37				0.07
≤ Partial secondary school	160 (23.9)	141 (21.1)	135 (20.2)		151 (22.6)	143 (21.5)	133 (19.9)		127 (19.1)	156 (23.4)	158 (23.7)	
High school diploma	189 (28.2)	196 (29.4)	190 (28.4)		187 (28.0)	171 (25.7)	208 (31.1)		179 (26.9)	196 (29.3)	176 (26.4)	
≥ College degree	321 (47.9)	330 (49.5)	343 (51.3)		331 (49.5)	351 (52.8)	327 (49.0)		359 (54.0)	316 (47.3)	332 (49.8)	
Family history of hyperuricemia or gout (%)	26 (3.9)	15 (2.2)	13 (1.9)	0.06	14 (2.1)	30 (4.5)	24 (3.6)	0.12	23 (3.4)	23 (3.4)	14 (2.1)	0.32
Daily intake												
Energy (kcal/day)	2209.4 [1795.8, 2681.2]	2012.7 [1677.2, 2496.2]	2539.7 [2051.0, 2997.4]	<0.001	1800.2 [1503.9, 2268.8]	2043.2 [1746.1, 2473.7]	2787.6 [2358.0, 3308.6]	<0.001	2364.8 [1953.5, 2886.4]	1894.9 [1616.0, 2419.3]	2455.3 [1975.2, 2942.5]	<0.001
Total protein (g/day)	77.3 [61.9, 99.7]	76.0 [62.6, 97.6]	105.5 [83.8, 130.9]	<0.001	72.6 [56.8, 98.2]	78.3 [62.2, 97.9]	105.7 [84.0, 128.8]	<0.001	95.0 [74.4, 117.6]	72.2 [57.8, 92.7]	95.3 [73.6, 119.0]	<0.001
Total fat (g/day)	68.0 [51.1, 91.1]	71.1 [54.4, 93.4]	101.8 [78.4, 127.6]	<0.001	70.7 [52.0, 97.5]	71.2 [53.8, 92.6]	96.1 [72.0, 120.7]	<0.001	83.9 [64.4, 110.5]	65.4 [49.6, 86.8]	92.3 [70.0, 119.0]	<0.001
Total carbohydrate (g/day)	316.3 [258.3, 386.1]	269.9 [221.2, 328.6]	295.4 [242.9, 354.9]	<0.001	224.1 [192.6, 265.6]	280.6 [242.2, 324.3]	376.7 [319.7, 452.3]	<0.001	304.6 [252.5, 379.2]	262.3 [218.4, 328.0]	308.6 [250.7, 370.6]	<0.001
Total dietary fiber (g/day)	6.8 [4.9, 10.1]	6.9 [4.9, 9.7]	9.3 [6.4, 13.3]	<0.001	5.5 [3.8, 8.5]	6.8 [5.0, 9.4]	10.3 [7.8, 14.3]	<0.001	6.5 [4.7, 9.7]	6.6 [4.8, 9.2]	10.7 [7.5, 14.9]	<0.001
Total cholesterol (g/day)	269.9 [188.0, 385.9]	407.2 [302.1, 516.1]	630.0 [485.3, 842.2]	<0.001	357.9 [244.5, 528.5]	412.3 [269.4, 555.2]	496.6 [347.1, 693.8]	<0.001	490.9 [345.4, 664.4]	348.8 [234.9, 502.7]	453.0 [302.4, 629.8]	<0.001
Total purine (mg/day)	454.5 [355.2, 595.2]	507.4 [408.0, 650.4]	798.7 [644.4, 1004.0]	<0.001	507.7 [380.5, 705.9]	513.9 [399.5, 666.1]	691.7 [536.7, 876.3]	<0.001	566.9 [429.1, 731.5]	491.5 [384.8, 636.7]	707.7 [527.4, 887.0]	<0.001
Guanine (mg/day)	149.7 [119.2, 189.5]	158.6 [128.4, 195.2]	232.4 [189.9, 286.7]	<0.001	142.1 [111.3, 189.3]	159.9 [131.3, 194.6]	225.3 [182.9, 277.7]	<0.001	171.3 [136.2, 223.6]	153.6 [121.2, 193.0]	214.3 [166.3, 266.4]	<0.001
Adenine (mg/day)	148.1 [116.4, 184.3]	156.6 [127.3, 191.5]	231.7 [187.5, 288.5]	<0.001	144.8 [110.4, 187.6]	158.5 [128.1, 195.0]	220.6 [178.0, 277.6]	<0.001	168.9 [133.8, 221.8]	151.3 [120.3, 189.4]	213.4 [165.1, 269.0]	<0.001
Hypoxanthine (mg/day)	123.7 [83.2, 183.5]	160.3 [106.8, 225.2]	276.8 [204.2, 373.1]	<0.001	189.8 [127.6, 285.3]	161.5 [107.2, 236.2]	186.5 [124.1, 264.0]	<0.001	180.1 [112.9, 260.5]	154.8 [103.7, 219.7]	217.1 [148.2, 302.1]	<0.001
Xanthine (mg/day)	30.5 [23.4, 40.2]	32.9 [26.0, 42.7]	47.5 [37.0, 60.2]	<0.001	28.9 [22.2, 38.0]	33.7 [26.0, 42.8]	47.1 [36.2, 59.5]	<0.001	33.7 [26.3, 44.1]	31.7 [24.6, 40.6]	45.5 [35.5, 58.8]	<0.001

CNY, China Yuan; SUA, serum uric acid.

Values are reported as No. (%), means (SD), or medians [Q1, Q3]. *ANOVA, chi-square or Kruskal-Wallis tests where appropriate.

†1 CNY ≈ 0·14 US dollars.

ESI Table 3. Association between six major dietary patterns and high serum uric acid concentrations in the EMSNGS study (n=3,383).

	Quintile of dietary pattern score										*p* for trend	per SD increased dietary pattern scores	
	Q1		Q2		Q3		Q4		Q5				
	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*	OR (95% CI)	*P*		OR (95% CI)	*P*
Dietary pattern 1: ultra-processed diet													
model 1	Ref.	-	0.75 (0.58, 0.96)	0.02	0.84 (0.65, 1.07)	0.16	0.92 (0.72, 1.17)	0.48	0.98 (0.76, 1.25)	0.84	0.48	1.04 (0.96, 1.12)	0.34
model 2	Ref.	-	0.77 (0.59, 1.01)	0.06	0.89 (0.68, 1.16)	0.38	0.99 (0.76, 1.29)	0.94	0.98 (0.75, 1.28)	0.88	0.54	1.03 (0.94, 1.12)	0.57
model 3	Ref.	-	0.79 (0.60, 1.03)	0.09	0.94 (0.72, 1.23)	0.66	1.04 (0.80, 1.37)	0.75	1.08 (0.81, 1.45)	0.59	0.19	1.07 (0.97, 1.18)	0.17
Dietary pattern 2: plant-based nutritious diet													
model 1	Ref.	-	0.80 (0.62, 1.02)	0.07	0.78 (0.61, 1.00)	0.05	0.87 (0.68, 1.12)	0.28	0.91 (0.71, 1.16)	0.45	0.88	1.02 (0.95, 1.11)	0.58
model 2	Ref.	-	0.86 (0.66, 1.12)	0.26	0.78 (0.60, 1.02)	0.07	0.88 (0.68, 1.15)	0.36	0.91 (0.69, 1.20)	0.48	0.67	1.01 (0.92, 1.10)	0.86
model 3	Ref.	-	0.91 (0.70, 1.19)	0.50	0.83 (0.63, 1.08)	0.17	0.96 (0.73, 1.27)	0.78	1.00 (0.74, 1.36)	0.98	0.82	1.05 (0.95, 1.16)	0.39
Dietary pattern 3: meat-based diet													
model 1	Ref.	-	1.06 (0.83, 1.37)	0.64	1.17 (0.91, 1.51)	0.21	1.04 (0.80, 1.35)	0.76	1.34 (1.03, 1.73)	0.03	0.04	1.09 (1.01, 1.18)	0.03
model 2	Ref.	-	0.97 (0.74, 1.26)	0.79	1.13 (0.86, 1.47)	0.39	0.96 (0.72, 1.27)	0.76	1.38 (1.00, 1.89)	0.05	0.06	1.12 (1.01, 1.25)	0.04
model 3	Ref.	-	1.01 (0.77, 1.33)	0.94	1.19 (0.89, 1.58)	0.23	1.01 (0.74, 1.38)	0.94	1.52 (1.05, 2.20)	0.03	0.04	1.18 (1.03, 1.36)	0.02
Dietary pattern 4: soup/seafood/eggs diet													
model 1	Ref.	-	0.94 (0.73, 1.20)	0.61	1.02 (0.80, 1.31)	0.85	1.06 (0.83, 1.35)	0.66	0.97 (0.76, 1.24)	0.81	0.92	0.99 (0.92, 1.07)	0.80
model 2	Ref.	-	0.94 (0.73, 1.23)	0.67	1.02 (0.79, 1.33)	0.86	1.05 (0.81, 1.36)	0.74	0.96 (0.73, 1.25)	0.74	0.94	0.98 (0.90, 1.07)	0.67
model 3	Ref.	-	0.97 (0.74, 1.26)	0.80	1.04 (0.80, 1.35)	0.78	1.08 (0.82, 1.40)	0.59	0.98 (0.75, 1.29)	0.90	0.90	0.99 (0.91, 1.08)	0.85
Dietary pattern 5: vegetarian diet													
model 1	Ref.	-	0.96 (0.75, 1.23)	0.75	1.00 (0.78, 1.27)	0.98	0.93 (0.72, 1.19)	0.55	0.90 (0.70, 1.15)	0.40	0.37	0.91 (0.84, 0.99)	0.03
model 2	Ref.	-	0.99 (0.77, 1.29)	0.96	1.06 (0.82, 1.38)	0.66	0.97 (0.74, 1.27)	0.82	0.85 (0.63, 1.13)	0.25	0.24	0.88 (0.80, 0.97)	0.009
model 3	Ref.	-	1.04 (0.80, 1.36)	0.77	1.12 (0.85, 1.47)	0.42	1.05 (0.79, 1.39)	0.75	0.97 (0.70, 1.34)	0.86	0.82	0.91 (0.82, 1.02)	0.11
Dietary pattern 6: mushrooms/animal organs diet													
model 1	Ref.	-	0.97 (0.75, 1.25)	0.78	1.08 (0.84, 1.39)	0.57	1.46 (1.15, 1.87)	0.002	1.16 (0.90, 1.49)	0.25	0.04	1.08 (1.00, 1.16)	0.04
model 2	Ref.	-	1.00 (0.76, 1.31)	0.99	1.13 (0.86, 1.48)	0.39	1.53 (1.18, 1.98)	0.001	1.21 (0.93, 1.57)	0.16	0.03	1.10 (1.01, 1.19)	0.03
model 3	Ref.	-	1.00 (0.76, 1.32)	0.99	1.15 (0.87, 1.51)	0.33	1.54 (1.18, 2.01)	0.002	1.22 (0.93, 1.60)	0.16	0.03	1.10 (1.01, 1.20)	0.02

OR, odds ratio; CI, confidence interval; Ref., reference; the EMSNGS, the Evaluation and Monitoring on School-based Nutrition and Growth in Shenzhen.

Model 1: adjust for sex and age;

Model 2: adjust for model 1 + geographic region, family income, maternal education, family history of hyperuricemia or gout, physical activity, overweight or obesity, puberty status, total energy intake

Model 3: adjust for model 2 + each other dietary pattern score (quintiles)

ESI Table 4. Association between meat-based diet, food compositions and serum uric acid concentrations in the EMSNGS study (n=3,383).

	Quintile of Dietary Pattern Score										p for trend	per SD increased dietary pattern scores	
	Q1		Q2		Q3		Q4		Q5				
	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P	β (95% CI)	P		β (95% CI)	P
Adjusted model	Ref.	-	-1.30 (-9.35, 6.75)	0.75	5.60 (-2.98, 14.19)	0.20	-0.25 (-9.57, 9.08)	0.96	14.36 (2.58, 26.13)	0.02	0.03	4.89 (0.60, 9.18)	0.03
Adjusted model + total protein (En%)	Ref.	-	-0.66 (-8.81, 7.49)	0.87	6.74 (-2.14, 15.62)	0.14	1.70 (-8.40, 11.79)	0.74	17.16 (4.09, 30.23)	0.01	0.01	6.70 (1.69, 11.70)	0.009
Adjusted model + animal protein (En%)	Ref.	-	-0.44 (-8.64, 7.76)	0.92	7.09 (-1.93, 16.10)	0.12	2.17 (-8.17, 12.51)	0.68	17.94 (4.39, 31.49)	0.009	0.01	7.19 (1.93, 12.45)	0.007
Adjusted model + vegetable protein (En%)	Ref.	-	-0.95 (-9.08, 7.18)	0.82	6.18 (-2.62, 14.98)	0.17	0.61 (-9.14, 10.37)	0.90	15.70 (3.10, 28.30)	0.02	0.02	5.64 (0.94, 10.34)	0.02
Adjusted model + total fat (En%)	Ref.	-	-0.95 (-9.03, 7.13)	0.82	6.26 (-2.43, 14.95)	0.16	0.75 (-8.79, 10.29)	0.88	15.73 (3.62, 27.83)	0.01	0.02	5.63 (1.16, 10.10)	0.01
Adjusted model + animal fat (En%)	Ref.	-	-0.78 (-8.94, 7.37)	0.85	6.49 (-2.39, 15.37)	0.15	1.20 (-8.82, 11.22)	0.81	16.52 (3.52, 29.53)	0.01	0.02	6.21 (1.28, 11.15)	0.01
Adjusted model +vegetable fat (En%)	Ref.	-	-1.40 (-9.46, 6.65)	0.73	5.48 (-3.12, 14.07)	0.21	-0.51 (-9.88, 8.86)	0.92	13.87 (1.97, 25.77)	0.02	0.03	4.71 (0.36, 9.05)	0.03
Adjusted model + total carbohydrate (En%)	Ref.	-	-0.81 (-8.92, 7.30)	0.85	6.50 (-2.26, 15.27)	0.15	1.17 (-8.55, 10.89)	0.81	16.34 (3.93, 28.75)	0.01	0.01	6.03 (1.39, 10.66)	0.01
Adjusted model + total dietary fiber (g/d)	Ref.	-	-1.44 (-9.57, 6.69)	0.73	5.38 (-3.41, 14.17)	0.23	-0.57 (-10.31, 9.16)	0.91	13.81 (1.18, 26.44)	0.03	0.05	4.98 (0.10, 9.87)	0.05
Adjusted model + total cholesterol (g/d)	Ref.	-	-1.10 (-9.16, 6.95)	0.79	5.89 (-2.71, 14.50)	0.18	0.27 (-9.13, 9.66)	0.96	15.16 (3.25, 27.07)	0.01	0.02	5.42 (1.02, 9.81)	0.02
Adjusted model + total purines (mg/d)	Ref.	-	-1.57 (-9.63, 6.49)	0.70	5.08 (-3.56, 13.71)	0.25	-1.27 (-10.75, 8.21)	0.79	12.22 (-0.10, 24.55)	0.05	0.08	3.88 (-0.86, 8.63)	0.11
Adjusted model + guanine (mg/d)	Ref.	-	-1.30 (-9.35, 6.75)	0.75	5.64 (-2.95, 14.23)	0.20	-0.35 (-9.67, 8.98)	0.94	13.94 (2.15, 25.73)	0.02	0.03	4.66 (0.35, 8.97)	0.03
Adjusted model + adenine (mg/d)	Ref.	-	-1.15 (-9.19, 6.90)	0.78	5.88 (-2.71, 14.46)	0.18	0.01 (-9.31, 9.34)	1.00	14.51 (2.73, 26.28)	0.02	0.02	4.89 (0.60, 9.19)	0.03
Adjusted model + hypoxanthine (mg/d)	Ref.	-	-1.47 (-9.55, 6.62)	0.72	5.26 (-3.47, 13.99)	0.24	-0.87 (-10.61, 8.87)	0.86	13.12 (0.09, 26.15)	0.05	0.09	4.61 (-0.74, 9.95)	0.09
Adjusted model + xanthine (mg/d)	Ref.	-	-1.10 (-9.18, 6.98)	0.79	5.84 (-2.79, 14.47)	0.19	0.00 (-9.36, 9.37)	1.00	14.73 (2.88, 26.58)	0.02	0.02	5.15 (0.80, 9.49)	0.02
Adjusted model + (total purines - hypoxanthine) (mg/d)	Ref.	-	-1.32 (-9.36, 6.74)	0.75	5.64 (-2.94, 14.23)	0.20	-0.30 (-9.62, 9.03)	0.95	14.04 (2.26, 25.82)	0.02	0.03	4.69 (0.39, 8.99)	0.03

CI, confidence interval; Ref., reference; the EMSNGS, the Evaluation and Monitoring on School-based Nutrition and Growth in Shenzhen.

Adjust for sex, age, geographic region, family income, maternal education, family history of hyperuricemia or gout, physical activity, overweight or obesity, puberty status, total energy intake and each other dietary pattern score (quintiles).

ESI Table 5. Factor-Matrix loadings for the five major dietary patterns identified by principal component analysis using varimax rotation after removing high hypoxanthine food groups

	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5
Fried food (g/d)	0.717				
Snack foods (g/d)	0.695				
Drinks (g/d)	0.648				
whole grains and pulses (g/d)		0.637			
Fruits (g/d)		0.587			
Vegetable (g/d)		0.469			
Refined grain (g/d)			0.724		
Soybeans and soy products (g/d)			0.506		
Eggs (g/d)			0.427		
Animal organs and blood (g/d)				0.701	
Mushrooms (g/d)				0.667	
Nut (g/d)					0.561
Tubers (g/d)		0.455			-0.551
Dairy (g/d)			0.361		0.461

Factor loads above 0.35 are shown. The value of Kaiser-Meyer-Olkin measure of sampling adequacy is 0.685. P for Bartlett's Test of Sphericity < 0.001. Five factors explained 47.44% of the variance.

ESI Table 6. The association between five dietary patterns without hypoxanthine-rich food groups and serum uric acid concentrations in the EMSNGS study (n=3,383)

	Quintile of Dietary Pattern Score										*p* for trend	per SD increased dietary pattern scores	
	Q1		Q2		Q3		Q4		Q5				
	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*		β (95% CI)	*P*
Dietary pattern 1	Ref.	-	-8.81 (-16.91, -0.70)	0.03	-7.00 (-15.19, 1.20)	0.09	-4.38 (-12.72, 3.97)	0.30	-0.53 (-9.37, 8.31)	0.91	0.51	0.62 (-2.33, 3.57)	0.68
Dietary pattern 2	Ref.	-	-1.62 (-10.14, 6.90)	0.71	-3.51 (-12.04, 5.02)	0.42	-6.08 (-14.78, 2.62)	0.17	-9.22 (-18.42, -0.01)	0.05	0.03	-3.76 (-6.75, -0.77)	0.01
Dietary pattern 3	Ref.	-	3.44 (-4.62, 11.50)	0.40	2.41 (-5.93, 10.75)	0.57	-2.56 (-11.51, 6.40)	0.58	0.06 (-10.68, 10.80)	0.99	0.68	-1.07 (-4.79, 2.66)	0.57
Dietary pattern 4	Ref.	-	2.64 (-5.63, 10.91)	0.53	5.74 (-2.62, 14.10)	0.18	3.60 (-4.92, 12.13)	0.41	7.12 (-1.61, 15.85)	0.11	0.13	2.76 (-0.13, 5.64)	0.06
Dietary pattern 5	Ref.	-	-2.60 (-10.96, 5.75)	0.54	2.50 (-5.96, 10.95)	0.56	3.67 (-4.73, 12.06)	0.39	7.68 (-0.89, 16.26)	0.08	0.04	2.94 (0.19, 5.70)	0.04

CI, confidence interval; Ref., reference; the EMSNGS, the Evaluation and Monitoring on School-based Nutrition and Growth in Shenzhen.

Adjust for sex, age, geographic region, family income, maternal education, family history of hyperuricemia or gout, physical activity, overweight or obesity, puberty status, total energy intake and each other dietary pattern score (quintiles).

ESI Table 7. The Pearson correlation coefficient between the scores of dietary pattern 5 (without hypoxanthine-rich food groups) and the scores of six dietary patterns (with all food groups)

	ultra-processed diet	plant-based nutritious diet	meat-based diet	soup/seafood/eggs diet	vegetarian diet	mushrooms/animal organs diet
r	0.083	0.656	0.180	0.016	-0.598	-0.044
P	<0.001	<0.001	<0.001	0.34	<0.001	0.011

ESI Table 8. Sensitivity analysis of the association between the z-scores of serum uric acid and meat-based diet in the EMSNGS study (n=3,383)

	Quintile of Dietary Pattern Score												per SD increased dietary pattern scores	
	Q1		Q2		Q3		Q4		Q5		*p* for trend			
	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*			β (95% CI)	*P*
Dietary pattern 1	Ref.	-	-0.04 (-0.14, 0.06)	0.42	0.01 (-0.09, 0.12)	0.80	0.05 (-0.06, 0.15)	0.38	0.02 (-0.10, 0.13)	0.78	0.43		0.02 (-0.02, 0.06)	0.26
Dietary pattern 2	Ref.	-	-0.04 (-0.15, 0.06)	0.40	-0.05 (-0.15, 0.06)	0.36	-0.08 (-0.18, 0.03)	0.15	-0.03 (-0.15, 0.09)	0.63	0.59		-0.01 (-0.05, 0.03)	0.64
Dietary pattern 3	Ref.	-	-0.01 (-0.11, 0.10)	0.91	0.08 (-0.02, 0.19)	0.13	0.02 (-0.10, 0.13)	0.77	0.15 (0.01, 0.29)	0.04	0.05		0.05 (-0.01, 0.10)	0.08
Dietary pattern 4	Ref.	-	-0.03 (-0.14, 0.07)	0.51	0.00 (-0.10, 0.10)	0.97	-0.01 (-0.11, 0.10)	0.92	0.03 (-0.07, 0.14)	0.55	0.42		0.01 (-0.03, 0.04)	0.71
Dietary pattern 5	Ref.	-	0.04 (-0.06, 0.14)	0.47	-0.01 (-0.12, 0.09)	0.83	-0.03 (-0.14, 0.08)	0.58	-0.09 (-0.21, 0.03)	0.16	0.08		-0.04 (-0.08, 0.01)	0.10
Dietary pattern 6	Ref.	-	-0.01 (-0.12, 0.09)	0.80	0.05 (-0.05, 0.15)	0.34	0.08 (-0.03, 0.18)	0.15	0.07 (-0.04, 0.17)	0.21	0.09		0.03 (-0.01, 0.06)	0.07

CI, confidence interval; Ref., reference; the EMSNGS, the Evaluation and Monitoring on School-based Nutrition and Growth in Shenzhen.

Adjust for sex, age, geographic region, family income, maternal education, family history of hyperuricemia or gout, physical activity, overweight or obesity, puberty status, total energy intake and each other dietary pattern score (quintiles).

ESI Table 9. Sensitivity analysis of the association between serum uric acid and meat-based diet after excluding participants with missing covariates in the EMSNGS study (n=3,302)

	Quintile of Dietary Pattern Score										*P* for trend	per SD increased dietary pattern scores	
	Q1		Q2		Q3		Q4		Q5				
	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*	β (95% CI)	*P*		β (95% CI)	*P*
Dietary pattern 1	Ref.	-	-3.36 (-11.48, 4.77)	0.42	2.15 (-6.18, 10.48)	0.61	4.75 (-3.73, 13.23)	0.27	3.84 (-5.41, 13.09)	0.42	0.17	1.99 (-1.20, 5.17)	0.22
Dietary pattern 2	Ref.	-	-2.84 (-11.29, 5.60)	0.51	-3.01 (-11.52, 5.51)	0.49	-3.23 (-12.00, 5.54)	0.47	-0.20 (-9.81, 9.41)	0.97	0.96	0.49 (-2.73, 3.72)	0.77
Dietary pattern 3	Ref.	-	-2.84 (-10.95, 5.28)	0.49	4.36 (-4.34, 13.06)	0.33	-1.82 (-11.27, 7.64)	0.71	11.47 (-0.47, 23.42)	0.06	0.08	4.59 (0.23, 8.96)	0.04
Dietary pattern 4	Ref.	-	-4.54 (-12.86, 3.78)	0.29	-2.67 (-10.99, 5.66)	0.53	-2.88 (-11.22, 5.45)	0.50	-2.65 (-11.28, 5.99)	0.55	0.73	-1.19 (-3.97, 1.59)	0.40
Dietary pattern 5	Ref.	-	3.81 (-4.42, 12.05)	0.36	0.45 (-8.02, 8.93)	0.92	-3.26 (-12.10, 5.59)	0.47	-6.83 (-16.93, 3.28)	0.19	0.08	-2.80 (-6.24, 0.63)	0.11
Dietary pattern 6	Ref.	-	-0.99 (-9.33, 7.35)	0.82	2.83 (-5.68, 11.34)	0.52	7.15 (-1.31, 15.62)	0.10	3.12 (-5.34, 11.59)	0.47	0.22	2.19 (-0.62, 5.00)	0.13

Adjust for sex, age, geographic region, family income, maternal education, family history of hyperuricemia or gout, physical activity, overweight or obesity, puberty status, total energy intake and each other dietary pattern score (quintiles).