3． Association of Pro-Inflammatory Diet with Long-Term Risk of All Cause and Cardiovascular Disease Mortality: NIPPON DATA80

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Introduction

Dietary inflammatory potential may amplify all-cause and cardiovascular disease (CVD) mortality. However, the association of a pro-inflammatory diet with all-cause and CVD mortality remains inconclusive as there is yet no study using a dietary record method that has been conducted in a large general population. Furthermore, an underestimation of the pro-inflammatory diet may exist due to the unmeasured effect of salt intake. Thus, in this present study, we aimed to investigate how a pro-inflammatory diet is associated with the long-term risk of all-cause and CVD mortality and how this association is influenced by salt intake in a representative Japanese population.

Methods

The National Integrated Project for Prospective Observation of Non-communicable Disease and its Trends in the Aged, 1980 (NIPPON DATA80), is a prospective cohort study of the National Survey of Circulatory Disorders and the National Nutrition Survey of Japan conducted by the Japanese Ministry of Health and Welfare throughout Japan in 1980. Participants were adults aged ≥ 30 years from 300 districts randomly selected throughout Japan and enrolled in the baseline survey. After considering the exclusion criteria, 9284 individuals (56% women aged 30-92 years) were included in this study. In total, 20 dietary parameters derived from 3-day weighed dietary records were used to calculate the dietary inflammatory index (DII) for each participants. A positive DII score was representative of a pro-inflammatory diet, whereas a negative DII score indicated an anti-inflammatory diet. The causes of death were monitored until 2009. The Cox proportional hazards model was used to determine multivariable-adjusted hazard ratios (HRs). Stratified analysis according to salt intake level was also performed.

Results

The average DII was determined to be −0.44 (range −3.94, 3.24). In the group with high salt intake, the multivariable-adjusted hazard ratios for all-cause and CVD mortality consecutively increased across DII quartiles. Compared with the lowest quartile of DII, multivariable-adjusted HRs (95% confidence intervals) in the highest quartile were 1.33 (1.15, 1.53), 1.50 (1.18, 1.91), 1.88 (1.30, 2.71), 1.93 (1.13, 3.32), and 1.41 (0.99, 2.01) for all-cause mortality, CVD mortality, atherosclerotic CVD mortality, coronary heart disease mortality, and stroke mortality, respectively. Conversely, in-group with low salt intake, only all-cause mortality was associated with DII score (Table).

Conclusions

As per our findings, a pro-inflammatory diet was determined to be positively associated with the long-term risk of all-cause and CVD mortality in a representative Japanese population. Thus, considering both salt intake and pro-inflammatory diet is deemed crucial for a comprehensive assessment of CVD risk.

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Table Multivariable-adjusted HRs§ and 95% CIs by DII quartiles for all-cause and cardiovascular disease mortality according to salt intake level

	Q1 (n=2321)	Q2 (n=2321)	Q3 (n=2321)	Q4 (n=2321)	*p* for trend
	HR (95% CI)	HR (95% CI)	HR (95% CI)	HR (95% CI)	
Salt intake					
≥13.2 g/day (n=4642)					
Person-years	28305	28020	28431	27821	
All-cause mortality					
n	415	424	417	452	
HR (95% CI)	1.00 (ref.)	1.12 (0.98, 1.29)	1.19 (1.04, 1.37)	1.33 (1.15, 1.53)	<0.001
CVD mortality					
n	148	144	147	154	
HR (95% CI)	1.00 (ref.)	1.11 (0.88, 1.40)	1.29 (1.02, 1.63)	1.50 (1.18, 1.91)	<0.001
ASCVD mortality					
n	59	69	70	72	
HR (95% CI)	1.00 (ref.)	1.36 (0.95, 1.93)	1.58 (1.11, 2.25)	1.88 (1.30, 2.71)	0.001
CHD mortality					
n	28	30	29	33	
HR (95% CI)	1.00 (ref.)	1.28 (0.76, 2.15)	1.41 (0.83, 2.40)	1.93 (1.13, 3.32)	0.018
Stroke mortality					
n	68	62	71	71	
HR (95% CI)	1.00 (ref.)	1.01 (0.71, 1.43)	1.31 (0.93, 1.83)	1.41 (0.99, 2.01)	0.025
<13.2 g/day (n=4642)					
Person-years	28298	28338	28196	27910	
All-cause mortality					
n	429	393	407	444	
HR (95% CI)	1.00 (ref.)	1.18 (1.03, 1.35)	1.14 (0.99, 1.30)	1.23 (1.07, 1.41)	0.009
CVD mortality					
n	145	127	143	141	
HR (95% CI)	1.00 (ref.)	1.16 (0.91, 1.47)	1.19 (0.94, 1.51)	1.23 (0.97, 1.56)	0.099
ASCVD mortality					
n	70	64	64	71	
HR (95% CI)	1.00 (ref.)	1.21 (0.86, 1.71)	1.08 (0.77, 1.52)	1.20 (0.85, 1.68)	0.443
CHD mortality					
n	33	25	24	32	
HR (95% CI)	1.00 (ref.)	0.97 (0.58, 1.64)	0.88 (0.52, 1.50)	1.21 (0.73, 1.99)	0.580
Stroke mortality					
n	54	56	71	56	
HR (95% CI)	1.00 (ref.)	1.36 (0.94, 1.99)	1.56 (1.09, 2.23)	1.23 (0.84, 1.80)	0.226

The Cox proportional hazard model was used to estimate hazard ratios (HRs) and 95% confidence intervals (95% CIs). §Adjusted for age, sex, BMI, smoking status, drinking status, and work strength.
DII, Dietary Inflammatory Index; CVD, cardiovascular disease; ASCVD, atherosclerotic cardiovascular diseases; CHD, coronary heart disease; Q, quartile; ref., reference.