

Supplementary Table S1. Age-standardized characteristics of study population according to baseline EDIP score (NHS1)

	Quintiles of EDIP score (2006)				
	Q1	Q2	Q3	Q4	Q5
Number of participants	11017	11210	11377	11667	12161
Median EDIP score	-0.12	0.08	0.21	0.34	0.56
Age (year)	73.3 (6.6)	73.3 (6.8)	73 (6.8)	72.9 (6.7)	72.6 (6.6)
Race (non-white%)	4.6	5	5.3	6.2	7.5
BMI (kg/m ²)	24.9 (4.3)	25.8 (4.8)	26.4 (5)	27 (5.3)	27.8 (5.7)
Physical activity (MET-h/wk)	21.4 (22.3)	19.7 (21.1)	18.5 (20.5)	17.1 (19.6)	15.6 (19.6)
Smoking					
Never%	38.3	45.9	49	48.6	48.1
Past%	55.8	49.4	46.2	46.3	45
Current%	5.9	4.7	4.8	5.2	6.9
Dietary factors					
Total energy intake (kcal/d)	1542.5 (502.6)	1673.8 (531)	1715.6 (546)	1709.7 (544.6)	1654.8 (572.1)
Red meat intake, serving/week	1.1 (1.1)	1.4 (1.2)	1.7 (1.4)	2 (1.7)	2.5 (2.3)
Processed meat intake, serving/week	0.5 (0.8)	0.7 (0.9)	0.9 (1.1)	1.1 (1.3)	1.5 (2)
Dietary fiber intake (g/d)	19.2 (4.7)	19.4 (4.4)	19.1 (4.3)	18.8 (4.2)	18.1 (4.4)
Alcohol consumption (g/d)	13.5 (15.9)	6.3 (9.2)	4.6 (7.9)	3.8 (7.5)	3 (6.8)
Parity (parous%)	93	93.5	93.1	93.1	93
Ever use of menopausal hormone, %	73	72.2	73	71	68.7
Hysterectomy, %	38.5	42.6	43.5	45.2	47.6
Diabetes, %	4.3	7	8.8	10.7	14
Hypertension, %	44	47.4	48.5	51.6	54.7
Neurologic disease, %	1.9	2.1	2.2	2.5	2.8
Cholecystectomy, %	12.7	15.1	17.3	19.4	21.4

Notes: Baseline EDIP score was calculated based on 2006 questionnaire data which is the closest cycle to the start of follow-up (2008-2012). Values are Means (SD) for continuous variables and percentages for categorical variables unless otherwise noted. Characteristics listed are standardized to the age distribution of the study population except for the variable age. Neurologic diseases in our analysis are defined as a confirmed diagnosis of stroke,

Parkinson's disease, multiple sclerosis, or amyotrophic lateral sclerosis. Abbreviation: MET, metabolic equivalent of activity. EDIP score is the weighted sum of 18 food groups and assesses the inflammatory potential of diet. The food groups included were: processed meat, red meat, organ meat, other fish [canned tuna, shrimp, lobster, scallops, fish, or other seafood other than dark-meat fish], other vegetables [stick celery, mushrooms, green pepper, corn, mixed vegetables, eggplant, zucchini, alfalfa sprouts, cucumber], refined grains, high-energy beverages, low-energy beverages, tomatoes, beer, wine, tea, coffee, dark yellow vegetables [carrots, squash, yams or sweet potatoes], leafy green vegetables (spinach, iceberg or head lettuce, or romaine or leaf lettuce), snacks, fruit juices, and pizza. Lower EDIP scores indicate anti-inflammatory diets while higher scores indicate pro-inflammatory diets. All EDIP scores are energy-adjusted.

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Supplementary Table S2. Pro-inflammatory diet and risk of *severe fecal incontinence* in older women (NHS1)

	Quintiles of EDIP score					P-trend
	Q1	Q2	Q3	Q4	Q5	
Overall						
Person-years	40960	40903	41005	41111	41219	
Cases, n	781	825	923	918	1024	
Model 1	ref	1.05 (0.95, 1.15)	1.19 (1.08, 1.31)	1.19 (1.08, 1.31)	1.37 (1.25, 1.51)	<0.0001
Model 2	ref	1.02 (0.93, 1.13)	1.14 (1.04, 1.26)	1.12 (1.02, 1.23)	1.25 (1.14, 1.37)	<0.0001
Model 3	ref	1.03 (0.93, 1.13)	1.15 (1.05, 1.27)	1.13 (1.02, 1.24)	1.25 (1.13, 1.38)	<0.0001
Solid stool						
Person-years	41232	41168	41310	41416	41587	
Cases, n	483	541	590	591	624	
Model 1	ref	1.11 (0.98, 1.25)	1.23 (1.09, 1.38)	1.24 (1.10, 1.40)	1.37 (1.21, 1.54)	<0.0001
Model 2	ref	1.09 (0.96, 1.23)	1.19 (1.06, 1.35)	1.19 (1.05, 1.35)	1.27 (1.12, 1.44)	<0.0001
Model 3	ref	1.09 (0.96, 1.23)	1.20 (1.06, 1.36)	1.20 (1.06, 1.36)	1.29 (1.14, 1.45)	<0.0001
Liquid stool						
Person-years	41326	41300	41429	41552	41667	
Cases, n	379	391	456	432	546	
Model 1	ref	1.02 (0.89, 1.18)	1.21 (1.05, 1.38)	1.15 (1.00, 1.31)	1.48 (1.30, 1.69)	<.0001
Model 2	ref	0.99 (0.85, 1.14)	1.13 (0.99, 1.30)	1.04 (0.91, 1.19)	1.28 (1.12, 1.47)	0.0001
Model 3	ref	1.00 (0.86, 1.15)	1.14 (1.00, 1.31)	1.04 (0.91, 1.20)	1.27 (1.11, 1.45)	0.0003

Notes: Abbreviation: EDIP: Empirical Dietary Inflammatory Pattern; HR: Hazard Ratio; CI: confidence Interval. Severe FI was defined as a report of at least one liquid or solid FI episode per week in the past year. Model 1: Cox proportional hazards model stratified by age (continuous, month) and time periods (in 2-year intervals); Model 2: Model 1+ race (white, non-white), smoking (never, past, current), body mass index (<18.5, 18.5–24.9, 25–29.9, 30–34.9, 35 kg/m²), physical activity (<3, 3–8, 9–17, 18–26, 27+ metabolic equivalent of task–hours/week), menopausal hormone use (never users, past users, current users), parity (number of live births), hysterectomy (yes or no), hypertension (yes or no), diabetes mellitus (yes or no), neurologic disease (yes or no), and history of cholecystectomy (yes or no); Model 3: Model 2 + dietary fiber intake. P for trend was calculated using the median of each quintile of EDIP score as a continuous variable. All EDIP scores are energy-adjusted.

Supplementary Methods

Study Population

The Nurses' Health Study (NHS) is a prospective, ongoing cohort in the US that began in 1976 and enrolled 121,700 female registered nurses aged 30-55 years old at baseline. Every two years, participants complete follow-up questionnaires and report updated information about their lifestyle and health.¹ Every two to four years, participants update their dietary habits through validated semi-quantitative food frequency questionnaires (FFQ).^{2,3} The baseline for our current analysis was 2008 and we included 57,432 women with completed dietary data who reported no prevalent FI on the 2008 questionnaire and without personal history of inflammatory bowel disease, colorectal cancer, and inability to walk. Follow-up time was defined as time from the return date of the 2008 questionnaire to the date of report of FI, date of the last questionnaire returned, death of any cause, or June 1, 2012, whichever came first.

Ascertainment of FI Outcome

FI data was collected through questionnaires in the 2008, 2010, and 2012 cycles. Women were asked, "On average, how often in the past year have you experienced any amount of accidental bowel leakage?" Response categories included "never," "< once per month," "1-3 times per month," "about once per week," "several times per week," or "nearly daily." Women were considered to have FI if they reported incontinence of liquid or solid stool at least monthly with at least weekly FI considered "severe FI"; this definition was consistent with previous studies using this cohort.^{4,5}

Assessment of Empirical Dietary Inflammatory Pattern Score

Details of the development and validation of the EDIP score has been published previously.^{6,7} Briefly, the EDIP score is a weighted sum of 18 food groups that are most predictive of three established plasma inflammatory markers: C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor alpha - receptor 2 (TNF α -R2). The 18 food items and the dietary pattern were identified by entering 39 pre-defined food groups into reduced-rank

regression models followed by stepwise linear regression.^{7, 8} Lower EDIP scores indicate anti-inflammatory diets while higher scores indicate pro-inflammatory diets.

The score was developed using data from 5230 women from NHS1 and has been validated in two independent samples from the Nurses' Health Study II (N=1002) and Health Professionals Follow-Up Study (N= 2632)⁷ with replication in a multi-ethnic population of postmenopausal women in the US.⁹

In our cohort, EDIP score was calculated for each participant using FFQ data from each questionnaire cycle and adjusted for total energy intake based on the residual method.¹⁰ Our main exposure of interest was recent EDIP measured in 2006 and updated through 2010. In secondary analyses, we computed cumulative average EDIP score for each questionnaire cycle by averaging EDIP scores in all prior cycles up to the latest to capture long-term dietary inflammatory pattern.

Assessment of covariates

Factors such as body weight, physical activity, smoking status, menopausal hormone use, and medical history were collected by self-administered questionnaires during follow-up.^{2, 3,}

¹¹ Covariates were time-varying from updated questionnaires.

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