

Supplementary Materials

Regional dietary patterns and risk of primary liver cancer in anhui, china: a population-based case-control study

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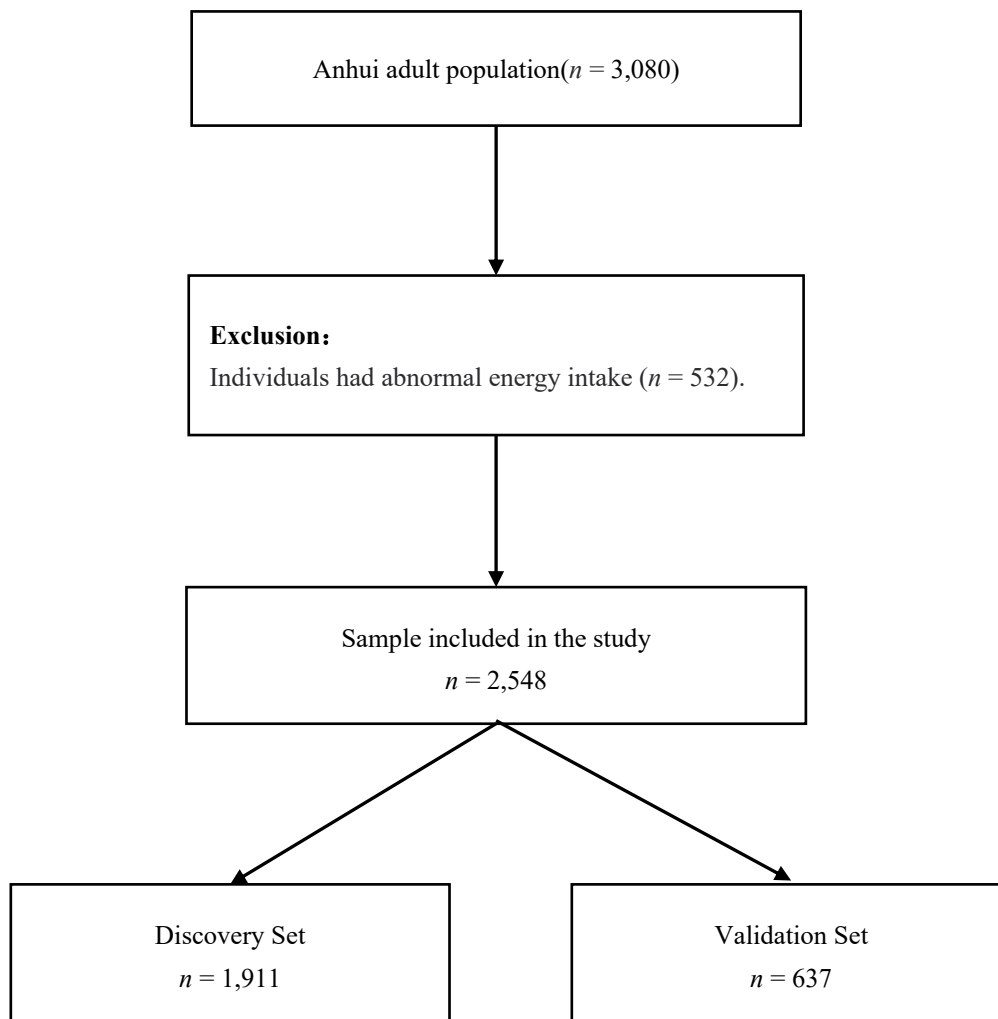
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Supplementary Figure 1. Flowchart of participant selection for the two-stage dietary pattern analysis. Abnormal energy intake was defined as $> 3,500$ or < 600 kcal/day for females and $> 4,200$ or < 800 kcal/day for males. The included sample ($n = 2,548$) was randomly partitioned into a discovery set ($n = 1,911$) and a validation set ($n = 637$).

Supplementary Table 1. Food groups and self-reported salty taste preference used in dietary pattern analysis¹

Food group	Food and self-reported preference
Refined grains	Dumplings (jiaozi), fried dough sticks (youtiao), instant noodles, millet porridge, polished rice, rice noodles, rice porridge, steamed buns (mantou), steamed stuffed buns (baozi), white bread, wheat noodles
Whole grains	Black rice, brown rice, buckwheat, fresh corn, oats, whole wheat bread, whole wheat kernels
Tubers	Lotus root, potato, sweet potato, yam
Dark vegetables	Bok choy, broccoli, cabbage, carrot, cauliflower, celery, Chinese cabbage (napa cabbage), coriander (cilantro), eggplant, leek, lettuce, pepper (bell pepper, chilli pepper), radish (white radish), shepherd's purse, spinach, tomato
Cucurbitaceous vegetables	Chayote, cucumber, winter melon
Allium vegetables	Garlic, garlic sprouts, onion, scallion
Legumes and legume products	Bean sprouts, broad beans, cowpeas, dried beancurd sticks, edamame, kidney beans, mung beans, peas, red beans (adzuki beans), soy milk, tofu, vegetarian chicken
Mushrooms and algae	Kelp, laver (nori), oyster mushrooms, shiitake mushrooms, wood ear mushrooms
Fruits	Apple, pear, orange/tangerine, banana, grape, watermelon, peach, dragon fruit, pineapple, strawberry, kiwi fruit
Red meat	Pork, beef, mutton, organ
Poultry	Chicken, duck, goose, pigeon
Fish and shellfish	Crabs, freshwater fish, loaches, marine fish, prawns, shrimp
Eggs	Duck eggs, hen eggs
Dairy products	Milk, yoghurt
Nuts and seeds	Almonds, cashews, hazelnuts, peanuts, pine nuts, pistachios, sunflower seeds, walnuts
salt-cured meat and fish	Cured fish, salt-cured meat
Pickled vegetables	Pickled vegetables
Vegetable oils	Olive oil, vegetable oil
Chinese liquor	Chinese liquor
Tea	Black tea, green tea, oolong tea, other teas
Preference for salty taste	Self-reported preference for salty taste

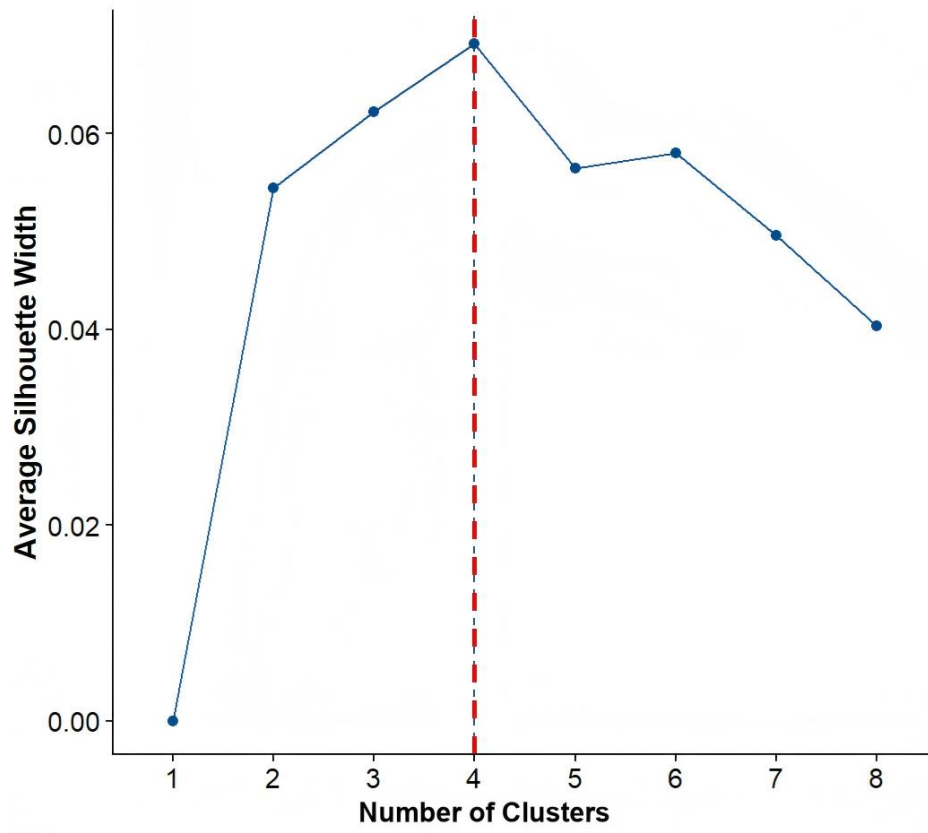
¹Salty taste preference was self-reported and categorised as much lighter than average, slightly lighter than average, average, slightly saltier than average, or much saltier than average.

Supplementary Table 2. Characteristics in the Anhui population^{1,2,3}

	Discovery set	Validation set	<i>P</i>
No. of participants	1911	637	
Female (%)	59.6	59.2	0.89
Age (years)	51 (38, 64)	51 (36, 64)	0.55
Education (%)			0.79
Primary school or below	37.0	35.6	
Junior high school	40.8	41.3	
Senior high school or above	22.2	22.9	
Income (%)			0.94
< 10, 000 Yuan	40.9	39.9	
10, 000-20, 000 Yuan	26.5	27.8	
> 20, 000 Yuan	30.6	30.5	
Married (%)	81.6	81.2	0.38
Smoking status (%)			0.97
Never smokers	74.0	73.8	
Former/Current smokers	25.6	25.9	
Alcohol drinking (%)			0.14
Never/light drinkers	76.0	78.0	
Moderate drinkers	5.4	5.7	
Heavy drinkers	16.2	12.9	

BMI (kg/m²)	24.0 (21.7, 26.5)	24.3 (21.8, 26.8)	0.21
Energy intake (kcal/day)	2424 (1953, 2946)	2391 (1923, 2984)	0.77
Physical activity (METs-h/week)	126 (80, 184)	122 (85, 203)	0.48
Diabetes (%)	11.6	10.8	0.64

¹Continuous variables were presented as median (IQR), while categorical variables are presented as %; ²Values of polytomous variables may not sum to 100% due to missing values or rounding; ³*P* values were derived from the Wilcoxon rank-sum test for continuous variables and the chi-square test for categorical variables. BMI: Body mass index; MET: metabolic equivalent of task; IQR: interquartile range.



Supplementary Figure 2. Selection of the number of dietary patterns using the average silhouette width.

Supplementary Table 3. Consistency and internal stability of the 4 identified dietary patterns^{1,2}

Description	Variance Explained (%)	Loading	Consistency	Stability
High refined grain-low whole grain pattern	12.10	Whole grains (-0.72), refined grains (0.69)	1.00	1.00
Diverse plant-based pattern	8.57	Tubers (0.37), dark vegetables (0.37), cucurbitaceous vegetables (0.34), allium vegetables (0.18), legumes and legume products (0.44), mushrooms and algae (0.40), fruits (0.38), eggs (0.05), dairy products (0.16), nuts and seeds (0.24)	0.98	0.72
Red meat-poultry-aquatic product pattern	8.22	Red meat (0.56), poultry (0.54), Fish and shellfish (0.48), vegetable oils (-0.40),	1.00	0.62
Alcohol and preserved food co-consumption pattern	6.79	Chinese liquor (0.20), salty taste preference (0.10), tea (0.28), preserved vegetables (0.69), processed meat (0.63)	0.99	0.94
Cumulative explained variance	35.68			

¹The HCA-PCA approach was used in the validation set. Structural consistency was quantified using TCC; values ≥ 0.95 indicate high structural consistency. Internal stability was assessed within the discovery set using 200 iterations of subsampling (each drawing 80% of the sample without replacement). Cluster stability was measured by the mean Jaccard similarity index across subsamples, with values $>$

0.60 indicating acceptable stability; ²Salty taste preference was included as a standardised categorical variable in the model. TCC: Tucker's Congruence Coefficient.

Supplementary Table 4. Associations between dietary pattern scores and PLC risk in the HBV-negative subgroup ($n = 677$)^{1,2,3}

Dietary pattern	Cases/Controls	OR (95%CI)			
		T2 vs. T1	T3 vs. T1	<i>P</i> _{trend}	<i>P</i> _{interaction}
High refined grain-low whole grain pattern	152/525	2.78 (1.42, 5.73)	4.86 (2.56, 9.84)	< 0.01	0.81
Diverse plant-based pattern	152/525	0.88 (0.50, 1.55)	1.60 (0.97, 2.69)	0.05	0.27
Red meat-poultry-aquatic product pattern	152/525	1.69 (0.99, 2.93)	2.41 (1.43, 4.15)	< 0.01	0.47
Alcohol and preserved food co-consumption pattern	152/525	0.85 (0.47, 1.51)	2.47 (1.50, 4.12)	< 0.01	0.21

¹The association was estimated using unconditional logistic regression. Because of sparse data and quasi-complete separation in the HBV-positive subgroup, Firth's penalised likelihood method was applied; ²The model was adjusted for education (primary school or below, junior high school, senior high school or above), annual household per capita income (< 10,000 Yuan, 10,000-20,000 Yuan, > 20,000 Yuan), energy intake (kcal/day, continuous), marital status, smoking status (never, former or current), alcohol drinking (never or light, moderate, heavy), physical activity (continuous), BMI (continuous), diabetes at baseline; ³*P*_{trend} was conducted using the median value of each tertile as a continuous variable. *P*_{interaction} was obtained by testing the multiplicative interaction between dietary pattern tertiles and HBV infection status. BMI: Body mass index; OR: odds ratio; CI: confidence interval; PLC: primary liver cancer.