A Comparative Study of Dietary Intake among Urban Japanese and Chinese Aged 50 ~ 79

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Abstract

This study examined the difference in dietary intake between middle-aged and elderly Japanese and Chinese. Volunteers aged 50 ~ 79 living in two cities in both Japan and China were recruited in local community service centers and were asked to complete a 3-day diet recording. The final results were based on 356 subjects (166 Chinese and 190 Japanese). In men, the Japanese subjects significantly consumed more energy, with a large proportion of the energy coming from carbohydrates, dietary fiber, vitamin A, vitamin B₂, vitamin C and they consumed less iron, and a lower proportion of energy from protein and fat than in the Chinese subjects. In women, the Japanese subjects had significantly higher intakes of energy, the proportion of energy from carbohydrates, dietary fiber, calcium, vitamin A, vitamin B₁, vitamin B₂, vitamin C and they consumed less iron, with the proportion of energy from protein and from fat in comparison with the Chinese women. Fat intake provided more than 29% of the total dietary energy in Chinese subjects. Daily intake of food items was significantly greater in the Japanese participants, both men and women (18.54 ± 2.85 , 20.11 ± 2.40 , respectively), than in the Chinese subjects (14.11 ± 3.62 , 15.51 ± 4.15 , respectively) ($p < 0.01$ by Mann Whitney U-test). The present study suggests that the middle-aged and elderly Chinese subjects should increase their variety of foods consumed while decreasing their consumption of high-fat foods. For the Japanese subjects, the higher intake of total calories among the woman should also be noted.

Key words: nutrient intake, food items, middle-aged and elderly, urban Japanese and Chinese.

Introduction

It is well known that the life expectancy of the Japanese population is the highest in the world, and the mortality rates from heart disease and some cancers in Japan is quite low in comparison with those in other developed countries. The incidence of disease and the maximum life span can be affected by not only genetic complements, but also environmental factors in which nutrition is considered to be the most significant one¹⁻³⁾. So far, there have been few reports in literature concerning dietary information about middle-aged and elderly Chinese, and concerning the differences in dietary patterns between middle-aged and elderly Chinese and Japanese. Previous research on the difference in nutrient intake between Japanese and Chinese has

focused primarily on children^{4,5)}, in which it is noteworthy that both the urban younger Chinese and the younger Japanese are now tending to change their diet patterns to a more Western style⁶⁻⁸⁾. These great changes make the comparison of diet patterns of the two younger populations more difficult, and may alter the disease patterns of the two groups in the future. However, the middle-aged and the elderly usually prefer to keep their traditional diet patterns, while accordingly, having their nutrient intake less changed over time. This study was initiated to find out whether there is any difference in nutrient intake and in diet structure between urban Japanese and Chinese aged 50 ~ 79, which may further provide certain information for understanding the relationship between dietary factors and the major illness patterns of the different cultures for future studies.

Subjects and Methods

1. Study design

The main study was conducted in urban Taiyuan city (with total urban population of 1,570,000 in 1995) and in Shanghai

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city (with total urban population of 8,690,000 in 1995) in China, and in Okayama city (with total population of 628,305 in 1999) and Tamano city (with total population of 70,447 in 1999) in Japan from September to November 1998. Volunteers were recruited in local community service centers through public notice. Generally, free-living, healthy Japanese and Chinese aged 50 ~ 79 in these areas were eligible for this study. Of the 500 subjects (250 Japanese and 250 Chinese) who agreed to participate, 367 returned their questionnaires (73% response rate). The final results were based on 356 subjects (166 Chinese and 190 Japanese) after we excluded those failing to complete the diet records, those with extremely low or high total energy intake (< 600 or > 3500 kcal per day), and those who failed to record their body weight, height, educational status and employment status.

2. Questionnaire

In conformity with the Recommendations from the Helsinki Declaration and to better understand the purpose of our study, a descriptive informed consent was distributed to the subjects together with a validated self-administered diet record. Questionnaires in both Japanese and Chinese versions have been validated by repeating two preliminary surveys under the same conditions at 3-month intervals before we started the formal one (unpublished data). Participants who agreed to attend this study were asked to complete a 3-day diet recording (3 consecutive days, including 2 weekdays and 1 weekend day), and were given both oral and written instructions on how to record all foods consumed at home, the workplace or elsewhere on 3 consecutive days. Corresponding serving sizes were listed in the diet record. The subjects were also asked to specify other foods not listed on the questionnaire that they consumed during the period of the 3-day recordings and to indicate the used portion size.

In addition, we gave each subject a food list in which frequently used food items or groups were included, and asked them to check any food item or group that they had consumed at least once a week during the past year.

Non-dietary information, including body weight and height, cigarette smoking, consumption of alcohol, etc., were also obtained from the subjects. Education was classified into three categories: less than high school, high school graduate, and beyond high school. Employment status was defined as two categories, retired or unemployed, and employed. Body mass index (BMI) was calculated as body weight (kg) / height (m)².

Each volunteer who returned the completed questionnaire was offered a gift as a token of appreciation.

3. Statistical analyses

The daily intake of nutrient was computed by using both a Japanese food database and a Chinese food database based on official food composition tables^{9,10}. However information on specific micronutrients (such as vitamin E) is not available from the database.

All data are presented as means $\pm$ standard deviation (SD). A statistical comparison between the groups was undertaken by Mann Whitney *U*-test and χ^2 test. Spearman's correlation coefficient was used to compare the nutrient intake with the eating variety (the number of food items consumed daily). For further evaluation, a logistic regression analysis was used to analyze how the number of food intake could be affected by some variables of interest (educational level, age and gender, etc.). The computations were performed with a Windows version SPSS 8.0 statistical program package (SPSS Inc. Illinois, USA).

Results

Table 1 summarizes the characteristics of the study population. The proportion of Japanese men (53%) and women (47%) in the study sample was similar to the proportion of Chinese men (51%) and women (49%), in which 53% were in their fifties, 30% in their sixties and 17% in their seventies among Japanese subjects, and 43%, 40% and 18%, respectively, among the Chinese subjects. The subjects in Japan were shorter and leaner, and their BMI was also significantly lower, in

Table 1 Characteristics of Japanese and Chinese subjects aged 50 ~ 79

Variables	Men		Women	
	Japanese (n=100)	Chinese (n=84)	Japanese (n=90)	Chinese (n=82)
Age (years)				
50-59	44 (44%)*	25 (30%)	57 (63%)	46 (56%)
60-69	34 (34%)	36 (43%)	23 (26%)	30 (37%)
70-79	22 (22%)	23 (27%)	10 (11%)	6 (7%)
Employment status				
Retired or unemployed	21 (21%)	63 (75%)	48 (53%)	62 (76%)
Employed	79 (79%)	21 (25%)	42 (47%)	20 (24%)
Educational status				
< High school	15 (15%)	14 (17%)	17 (19%)	15 (18%)
High school graduate	37 (37%)	43 (51%)	54 (60%)	41 (50%)
> High school	48 (48%)	27 (32%)	19 (21%)	26 (32%)
Current smoker	42 (42%)	22 (26%)	1 (1%)	1 (1%)
Regular drinker	71 (71%)	30 (36%)	38 (42%)	13 (16%)
Multivitamin user	21 (21%)	37 (44%)	22 (24%)	38 (46%)
Regular exercise	64 (64%)	54 (64%)	46 (51%)	57 (70%)
Height(cm) @	165.8 $\pm$ 5.2	169.5 $\pm$ 6.0 **	153.3 $\pm$ 4.7	158.8 $\pm$ 4.3 **
Weight(kg) @	63.4 $\pm$ 7.6	68.3 $\pm$ 10.2 *	52.9 $\pm$ 6.0	58.6 $\pm$ 7.2 **
BMI(kg/m ²) @, †	23.1 $\pm$ 2.4	23.7 $\pm$ 3.0	22.5 $\pm$ 2.3	23.2 $\pm$ 2.8

#, Number of subjects (%)

@, Data of height, weight and BMI are expressed as means $\pm$ SD

†, Body Mass Index.

**, Statistically significant at $P < 0.01$ (Mann-Whitney *U*-test).

comparison with those in China.

Data on mean daily intake estimated from 3-day records are presented in Table 2. In men, the Japanese subjects significantly took in more energy, the large proportion of energy coming from carbohydrates, dietary fiber, vitamin A, vitamin B₂, vitamin C but they took in less iron and a lower proportion of energy from protein and from fat than the Chinese subjects. In women, the Japanese subjects had a significantly higher intake of energy, the larger proportion of energy from carbohydrates, dietary fiber, calcium, vitamin A, vitamin B₁, vitamin B₂, vitamin C and but they had a lower intake of iron and a lower proportion of energy from protein and from fat in comparison with the Chinese subjects. Fat intake provided more than 29% of the total dietary energy in both men and women of the Chinese subjects, which has exceeded the Chinese Recommended Dietary Allowances (RDAs) of 20-25%⁽¹⁾. About 49% of the Chinese subjects, in comparison with 12% of the Japanese subjects, received more than 30% of their dietary energy from fat. The mean energy intake from alcohol consumption was 110 ± 159 Kcal in the Japanese subjects and 27 ± 92 Kcal in the Chinese subjects ($p < 0.01$), and 57% Japanese subjects and 26% Chinese subjects reported drinking regularly (at least once a week) (see Table 1).

A comparison between the nutrient intake estimated for the two groups and the RDAs of both countries showed that all nutrient intake by the participants was over 70% of RDAs except vitamin A and vitamin B₁ in the Chinese subjects^(1,12). The

estimated total number of food items taken from meals plus snacks for a day (Table 2) was significantly greater in the Japanese participants, for both men and women (18.54 ± 2.85 , 20.11 ± 2.40 , respectively) than in the Chinese subjects (14.11 ± 3.62 , 15.51 ± 4.15 , respectively) ($p < 0.01$ by Mann-Whitney *U*-test). The number of food items consumed daily positively correlated with the intake of each nutrient ($r: 0.428 \sim 0.683$ by Spearman's correlation coefficient analysis). The logistic regression analysis indicated that the Japanese subjects tended to take more than 15 food items daily compared with the Chinese subjects, and so did women compared with men (Table 3).

Fig. 1 and Fig. 2 show a comparison between the two populations in the proportions of subjects consuming selected food items or groups at least once a week during the past year. In comparison with the Chinese men, there were significantly higher proportions of Japanese men consuming rice, bread, seafood, beef, sausage/ham, tofu, seaweed, raw vegetables, coffee, tea, milk, cheese, yogurt, fruit juice, candies/sweets, snacks, butter/margarine and jam, and a lower proportion of Japanese men consuming porridge, noodles, millet, pork, mutton, nuts/seeds, cooked green-yellow vegetables, other cooked vegetables and soymilk. In comparison with the Chinese women, there were significantly higher proportions of Japanese women consuming bread, potatoes/sweet potatoes, seafood, chicken, beef, sausage/ham, seaweed, raw vegetables, coffee, tea, milk, cheese, yogurt, candies/sweets, butter/margarine and jam, and a

Table 2 Daily nutrient intake of Japanese and Chinese subjects aged 50 ~ 79

	Group	Men	Woman	Total
		Mean $\pm$ SD (n)	Mean $\pm$ SD (n)	Mean $\pm$ SD (n)
Total energy intake (Kcal)	Japanese	$1809 \pm 500(100)$	$1775 \pm 350(90)$	$1793 \pm 434(190)$
	Chinese	$1612 \pm 473(84)$	$1435 \pm 400(82)$	$1524 \pm 446(166)$
Fat (g)	Japanese	$45.5 \pm 18.4(100)$	$53.1 \pm 15.5(90)$	$49.1 \pm 17.5(190)$
	Chinese	$51.8 \pm 19.1(84)$	$48.0 \pm 17.6(82)$	$49.9 \pm 18.4(166)$
Fat (% of energy)	Japanese	$22.2 \pm 5.0(100)$	$26.7 \pm 4.1(90)$	$24.3 \pm 5.1(190)$
	Chinese	$29.0 \pm 6.9(84)$	$29.7 \pm 5.2(82)$	$29.4 \pm 6.4(166)$
Protein (g)	Japanese	$64.2 \pm 21.7(100)$	$66.4 \pm 15.1(90)$	$65.3 \pm 18.8(190)$
	Chinese	$61.1 \pm 18.2(84)$	$60.5 \pm 18.0(82)$	$60.8 \pm 18.1(166)$
Protein (% of energy)	Japanese	$14.1 \pm 2.2(100)$	$15.0 \pm 1.9(90)$	$14.5 \pm 2.1(190)$
	Chinese	$15.4 \pm 2.8(84)$	$17.2 \pm 3.7(82)$	$16.3 \pm 3.4(166)$
Carbohydrate (g)	Japanese	$289 \pm 77(100)$	$260 \pm 49(90)$	$275 \pm 67(190)$
	Chinese	$207 \pm 59(84)$	$189 \pm 57(82)$	$198 \pm 59(166)$
Carbohydrate (% of energy)	Japanese	$64.3 \pm 6.4(100)$	$58.8 \pm 4.4(90)$	$61.7 \pm 6.2(190)$
	Chinese	$52.1 \pm 8.5(84)$	$53.0 \pm 7.1(82)$	$52.5 \pm 7.8(166)$
Energy from alcohol (Kcal)	Japanese	$175 \pm 184(100)$	$38 \pm 75(90)$	$110 \pm 159(190)$
	Chinese	$49 \pm 126(84)$	$4 \pm 13(82)$	$27 \pm 92(166)$
Dietary fiber (g)	Japanese	$17 \pm 8(100)$	$20 \pm 6(90)$	$19 \pm 7(190)$
	Chinese	$10 \pm 4(84)$	$10 \pm 4(82)$	$10 \pm 4(166)$
Calcium (mg)	Japanese	$635 \pm 312(100)$	$740 \pm 244(90)$	$684 \pm 286(190)$
	Chinese	$582 \pm 220(84)$	$557 \pm 229(82)$	$570 \pm 224(166)$
Iron (mg)	Japanese	$10.1 \pm 4.4(100)$	$10.9 \pm 3.2(90)$	$10.5 \pm 3.9(190)$
	Chinese	$16.3 \pm 5.0(84)$	$15.8 \pm 5.0(82)$	$16.1 \pm 5.0(166)$
Vitamin A (IU)	Japanese	$2893 \pm 1554(100)$	$3424 \pm 1194(90)$	$3144 \pm 1417(190)$
	Chinese	$1686 \pm 927(84)$	$1890 \pm 1270(82)$	$1787 \pm 1111(166)$
Vitamin B ₁ (mg)	Japanese	$0.83 \pm 0.30(100)$	$0.87 \pm 0.22(90)$	$0.85 \pm 0.27(190)$
	Chinese	$0.79 \pm 0.26(84)$	$0.75 \pm 0.30(82)$	$0.77 \pm 0.28(166)$
Vitamin B ₂ (mg)	Japanese	$1.15 \pm 0.45(100)$	$1.27 \pm 0.34(90)$	$1.20 \pm 0.40(190)$
	Chinese	$0.90 \pm 0.27(84)$	$0.84 \pm 0.31(82)$	$0.87 \pm 0.29(166)$
Vitamin C (mg)	Japanese	$133.4 \pm 73.5(100)$	$151 \pm 51(90)$	$142 \pm 64(190)$
	Chinese	$86.7 \pm 53.7(84)$	$86.2 \pm 50.7(82)$	$86 \pm 52(166)$
Food item (number)	Japanese	$18.5 \pm 2.9(100)$	$20.1 \pm 2.4(90)$	$19.3 \pm 2.8(190)$
	Chinese	$14.1 \pm 3.6(84)$	$15.5 \pm 4.2(82)$	$14.8 \pm 3.9(166)$

* Statistically significant at $p < 0.05$ (Mann-Whitney *U*-test).

** Statistically significant at $p < 0.01$.

lower proportion of Japanese women consuming porridge, millet, mutton, cooked green-yellow vegetables, other cooked vegetables and soymilk.

Table 3 Logistic regression analysis for variables associated with eating variety^a

Variables	OR ^b	CI (95%) ^c	P value
Age			
50-59	1.00		
60-69	1.60	0.82 - 3.13	0.17
70-79	1.34	0.56 - 3.20	0.52
Gender			
Men	1.00		
Women	2.67	1.49 - 4.80	0.001
Educational status			
>High school	1.00		
High school graduate	1.47	0.82 - 2.63	0.20
<High school	0.82	0.37 - 1.79	0.61
Group			
Japanese	1.00		
Chinese	0.09	0.05 - 0.17	< 0.001
Employment status			
Employed	1.00		
Retired or unemployed	0.82	0.40 - 1.67	0.58
Regular exercise			
Yes	1.00		
No	0.89	0.50 - 1.58	0.69
Predictive probability	77%		

^a eating variety was categorized as daily intake of the number of foods ≤ 15 items or > 15 items.

^b odds ratio.

^c confidence interval.

Discussion

The main finding of this study was that urban Japanese subjects aged 50 ~ 79 tend to have a low-fat, high-carbohydrate diet, and Chinese subjects a high-fat, high-protein diet. The nutrient intake data obtained in this dietary survey are in close agreement with the data for the same ages found in the literatures from both countries^{6,13,14}. Higher dietary fat is associated with increased risk of heart disease and some cancers¹⁵⁻¹⁸. In contrast with the Chinese subjects, the Japanese subjects had an intake of lower fat energy and higher carbohydrate energy as well as higher dietary fiber. These diet patterns have been recommended as a way to reduce the risk of coronary heart disease and colon cancer¹⁷⁻²⁰. China, especially in urban areas, is now undergoing rapid economic changes. Popkin et al. have reported that there has been a per capita increase in the total amount of oil available for consumption in China since the 1980s, and there has also been a shift in the structure of the diet with a notable increase in the proportion of the population consuming more energy from fat^{8,21}. In our results, there was also such a tendency even among the Chinese subjects aged 50 ~ 79. Recently, the prevalence of heart disease and the mortality rates from some types of cancer have increasingly been reported in China^{18,22}. Therefore, the higher dietary fat intake by the Chinese subjects should receive more attention in terms of preventing the onset of chronic diseases in the future.

Our study demonstrated that the Chinese subjects, both men and women, consumed a higher amount of iron than the Japanese subjects, which was compatible with the results of Nakatsuka et al.²³. We have examined a single breakfast meal

Fig. 1 Proportion of both Japanese and Chinese female subjects aged 50 or over consuming food items or groups at least once a week during the past year. * $P < 0.05$, ** $P < 0.01$ by χ^2 test.

Fig. 2 Proportion of both Japanese and Chinese male subjects aged 50 or over consuming food items or groups at least once a week during the past year. * $P < 0.05$, ** $P < 0.01$ by χ^2 test.

based upon one subject's diet record, by both Japanese and Chinese food databases, in order to see any difference in the calculation of nutrient intakes between the two databases (Table 4). We found that there was a strong positive correlation between the two databases in the amount of total energy, protein, fat, carbohydrate and the other nutrients except iron. The amount of iron contained in Chinese food (based on the Chinese Food Composition Table) appeared higher ($p=0.073$ by the paired t -test) than that in Japanese food (based on the Japanese Food Composition Table). Therefore, the higher iron intake among Chinese subjects was probably attributed to a higher iron concentration in Chinese food. Alternatively, there might have been a difference in the iron measurement techniques used that could account for this factor between the two countries. It is necessary to further confirm the analytic techniques used in the two countries for measurement of iron levels in food.

In the present study, we analyzed the dietary intake of each population based on the Food Composition Table of each country since the sources of variation, such as the differences in food distribution systems, in harvesting conditions, in genetic variability of food, etc. between the two countries, would contribute to the difference of the nutrient content of food in each country.

We also found that the intake of food rich in total vitamin A, as well as in vitamin C, by the subjects in Japan was almost twice the intake by those in China. Many studies have proved that an increased consumption of food rich in antioxidant vitamins (vitamin A, vitamin C) contributes to reducing the risk of chronic diseases associated with aging^{1,20,24-29}. A diet rich in fruit and vegetables was observed to increase the antioxidant capacity of human plasma^{30,31}, and there was a positive correlation between maximum life span of species and the concentrations of some antioxidants in plasma³¹. Further studies are needed to confirm the present results of a high intake of foods rich in vitamin A, vitamin C by the middle-aged and elderly Japanese population.

In the present study the Japanese subjects showed a wide variety of food consumption and the more food items consumed, the nearer they approached the recommended nutrient intake. Professional nutritionists usually recommend "eating a balanced diet" because life-long eating patterns in optimum balance might reduce the risk of chronic diseases¹⁵. Besides, daily consumption of a wide variety of food items from major food groups has been reported to be helpful in obtaining a balanced diet^{15,32}. On the other hand, we also found that although the Japanese subjects aged 50 ~ 79 showed a great variety of food consumption, their dietary patterns seemed closer to the Western style in comparison with the Chinese subjects. For instance, the Japanese subjects more frequently consumed sausage/ham, coffee, dairy products, butter/margarine than the Chinese subjects. The higher proportion of Japanese subjects consuming dairy products probably contributed to the higher calcium intake among them.

In comparison with the Chinese subjects, a significantly higher proportion of Japanese subjects consumed candies/sweets at least once a week during the past year, and a higher intake of total calories was also observed among the Japanese woman subjects. In Japan, there is an increased tendency recently in the incidence of diabetes mellitus (especially non-insulin-dependent diabetes mellitus) and in the prevalence of obesity among the middle-aged and elderly population³³. We suggest that the Japanese woman subjects should pay more attention to the amount of total calories intake that might increase the risk of diabetes mellitus in later life.

The fact that the Chinese subjects had a lower total energy intake but a higher BMI value than the Japanese subjects in our results might be due to the difference in calorie intake from fat between the two groups. Alternatively, it is also possibly due to the difference in activities of daily living between the two groups. Our study showed 64% of the Japanese subjects and 25% of the Chinese subjects among the study population still hold a career that might likely contribute to the difference in the degree of activity. Unfortunately, data on the activities of daily living of the

Table 4 Comparison of nutrient intake derived from one subject's breakfast meal - based on both Japanese and Chinese Food Composition Tables

Food item	Energy (Kcal)		Protein (g)		Fat (g)		Carbohydrate (g)		Calcium (mg)		Iron (mg)		Vitamin A (IU)		Vitamin B ₁ (mg)		Vitamin B ₂ (mg)		Vitamin C (mg)		Dietary fiber (g)	
	J [#]	C [#]	J	C	J	C	J	C	J	C	J	C	J	C	J	C	J	C	J	C	J	C
Milk (whole fat)																						
200 g	118	108	5.8	6.0	6.4	6.4	9.0	6.8	200	228	0.2	0.2	220	160	0.06	0.06	0.30	0.32	0	0	0	0
Bread (sliced)																						
50 g	130	156	4.2	4.2	1.9	2.5	24.1	29.1	18	25	0.5	1.0	0	0	0.04	0.01	0.04	0.03	0	0	1.1	0.3
Butter																						
10 g	76	74	0.1	0	8.3	8.3	0	0	1	0	0	0.1	280	176	0	0	0	0.01	0	0	0	0
Egg (boiled)																						
50 g	76	69	6.0	6.3	5.1	4.5	0.4	0.8	25	24	0.8	1.0	290	516	0.04	0.04	0.22	0.16	0	0	0	0
Apple																						
150 g	64	60	0.3	0.2	0.1	0.2	17.3	14.2	4	5	0.1	0.7	0	10	0.01	0.07	0.01	0.02	4	5	1.7	1.4
Total	464	467	16.4	16.7	21.8	21.9	50.8	50.9	248	282	1.6	3.0	790	862	0.15	0.18	0.57	0.54	4	5	2.8	1.7

#, J represents the nutrient intake analyzed by Japanese Food Composition Table;

C represents the nutrient intake analyzed by Chinese Food Composition Table.

subjects is not available.

A concern of seasonal variation in food consumption can be ruled out in our study because it was carried out in the same season (autumn) and in the same year in both countries. However, the other potential limitations to the study include the fact that there was a small sampler size and there was a possibility of a selection bias, that is, an unrandomized selection of the subjects in our study. Therefore, the observed dietary patterns do not necessarily represent the whole status of urban middle-aged and elderly populations in both countries. On the other hand, a recording bias, a hardly avoidable problem in nutritional survey, can not be ruled out. In our study, the food records were quantified by determining volumes using household measuring tools or by food-specific units instead of weighed intake, which may cause the results to be less precise, particularly in men. Inaccuracy in recording the diet intake commonly occurred in men³⁴. However, the multiple-day diet records method that we have used in our study is considered to be useful for estimating intake in culturally diverse populations³⁵, and other studies have also indicated that 3-day diet records can provide intake estimates for population groups although 7-day or 12-day diet records are more adequate to provide estimates for individuals^{36,37}.

Age is usually regarded as a confounder of dietary intake. The present study found that the nutrient intake of the subjects

reduced slightly as age went up but we did not find any significant difference (by one-way analysis of variance) in each nutrient intake among subjects in their 50's, 60's and 70's in both population groups.

In terms of comparison of the usual dietary intake between the two populations, it is critical to realize that dietary patterns have geographic and seasonal variations. Further investigation, conducted in different areas and seasons in both countries, is now in progress.

In conclusion, the results of the present study provide evidence to encourage the middle-aged and elderly Chinese subjects to increase eating more food variety, particularly more foods rich in antioxidant vitamins, under a condition of decreasing consumption of high-fat foods.

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