The difference in food and nutrient intake between smokers and non-smokers in an elderly Chinese population in Beijing, China

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This study examined variations in dietary intake, which are associated with differences in education, lifestyle and health behaviours of elderly men and women (n=350) in Beijing. Twenty-four-hour dietary recalls were obtained through in-home interview. Nutrient analyses of the reported diets were carried out using the Chinese nutrient data base. It was found that more men than women smoked and that alcohol consumption was associated with smoking. Smokers had a lower intake of vitamin C (P<0.01), carotenoids (P<0.05) and calcium (P<0.05) than non-smokers in both genders. Female smokers also showed a lower intake of fruits, vegetables and milk compared with female non-smokers.

Introduction

Smoking has been documented as a single health habit that contributes significantly to various preventable chronic diseases including cancer and heart disease. It accounts for more than 30% of all cancer deaths and 80% of lung cancer deaths in the United States14. Male smokers were at three times the risk of heart disease compared with non-smokers1. Studies documented that the cessation of smoking is associated with a substantial reduction in risk by about 50% within 5 years15. Apart from smoking itself, characteristics of smokers such as dietary habits, both in food pattern and in nutrient intake, may also contribute to the increased risk of diseases compared with non-smokers. Studies have demonstrated that the intake of dietary fibre and a number of minerals and vitamins, notably vitamin C, are lower in smokers than non-smokers4,5. However, most investigations have been conducted in populations of developed countries where the prevalence of smoking has been on the decline in recent years. Little is known about the effects of smoking on the dietary intake of individuals in the developing world, where the prevalence of smoking is noticeably higher, particularly in men6.

The purpose of this study was to present food and nutrient intakes in elderly smokers and non-smokers living in Beijing, China.

Subjects and methods

The study was conducted during October 1990 to February 1991 in Beijing, China. The sampling frame was the population of elderly aged 55 and above, registered as the current urban residents of city of Beijing. Three-hundred and thirty-three elderly individuals were selected from two urban districts of Beijing. Three-hundred and thirteen agreed to participate in the study. Eight individuals were excluded from the study because of a physical or mental disability. The final number of study participants, therefore, was 305, 123 men and 182 women. The participants were grouped on the basis of gender and self-reported smoking status.

Each participant provided information or medical history, socio-economic status, health behaviour and lifestyle including smoking and drinking status during a home visit interview.

Dietary intake was estimated using the 24-hour recall method. Subjects were asked to recall all foods and beverages eaten in the last 24 hours. Interviews were conducted on weekdays. Energy and nutrient intake were calculated using the Chinese Food Composition Tables11, Anthropometric measurements including body weight, height, mid-arm circumference (MAC), triceps skinfold thickness (TST), as well as blood glucose and blood pressure were taken at the interview.

'Smokers' were defined as current cigarette smokers, who smoked at least one cigarette per day for at least one year. Life-long non-smokers and ex-smokers were classified together as 'non-smokers'.

Statistical analyses were carried out using SAS Statistical Software package11. Data were logarithmically transformed where appropriate and the analysis of covariance (ANCOVA) was performed controlling age and education levels. Food and nutrient intakes and body composition values were presented by smoking status using absolute means.

Results

The characteristics of the study population are summarised in Table 1. Characteristics of study participants by smoking status.

<table>
<thead>
<tr>
<th></th>
<th>Smokers (n=305)</th>
<th>Non-smokers (n=214)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>52(44.7%)</td>
<td>71(55.3%)</td>
</tr>
<tr>
<td>Female</td>
<td>253(95.3%)</td>
<td>143(79.0%)</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td>66.9±7.3</td>
<td>67.3±7.4</td>
</tr>
<tr>
<td><strong>Alcohol drinking</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>29.3±48.0</td>
<td>5.9±16.5</td>
</tr>
<tr>
<td>Female</td>
<td>14.7±28.7</td>
<td>6.7±20.0</td>
</tr>
<tr>
<td><strong>Skipping breakfast</strong></td>
<td>12(13.2%)</td>
<td>146(68.4%)</td>
</tr>
</tbody>
</table>

Significant difference from smokers: *P<0.01; **P<0.001.
FOOD AND NUTRIENT INTAKE IN ELDERLY CHINESE SMOKERS AND NON-SMOKERS

YANGFANG WANG and DAPINE ROE

Table 1. There were 91 (30 %) smokers and 214 (70 %) non-smokers. The prevalence of smoking was 42.7 % (53) for men and 21.0 % (38) for women. The average age was 67.4 ± 6.7 years. There was no difference in mean age between smokers and non-smokers.

Health behaviour
There were marked differences in health behaviour between smokers and non-smokers. Smokers had significantly higher intakes of all dietary nutrients than non-smokers (Table 1). Among the smokers, 30 % drank alcohol regularly while only 13 % of non-smokers reported the same (Figure 1).

In addition, smoking was associated with the habit of skipping breakfast in this elderly population. Thirteen per cent of smokers reported skipping breakfast regularly, while 6 % of non-smokers reported skipping breakfast (Table 1). There was no difference in skipping breakfast between sexes in each smoking status.

Food and nutrient intake
Food was divided into seven major food groups as cereals, fruits, vegetables, meat (including pork, beef, lamb and poultry), eggs, milk (plus other dairy foods), and seafood. In women, non-smokers had a higher intake of fruits, vegetables and milk than smokers, adjusting for age and educational level (Table 2). In men, non-smokers also had a high intake of fruits compared to smokers, but this was not statistically significant.

Table 3 describes the mean nutrient intake between smokers and non-smokers.

Consistently associated with reduced risk of lung cancer and possibly other cancers as well.3-5,14 However, the protective factor is difficult to identify and the role of β-carotene in cancer prevention remains unclear. The lower intake of vitamin C and β-carotene in smokers since this vitamin is thought to protect against cancer through reduction functions which serve both to prevent carcinogens from forming and to decrease the effects of certain chemical agents and through the enhancement of host resistance.5 Several studies have shown that smokers have lower serum vitamin C levels than non-smokers. It has been suggested, therefore, that smokers have increased vitamin C requirements.4 On the basis of this argument, the intake of vitamin C in the smokers in this study may not be high enough to counteract the increased intake of vitamin C from their smoking habit, although the mean vitamin C intake of the smokers in this study reached the requirement of Chinese RDA (50 mg/day). Researchers have estimated that a daily intake of at least 140 mg is required for smokers to offset the adverse effect of smoking on serum vitamin C levels.3,7 Differences in nutrient intakes were also reflected in the various food sources; the non-smokers contributed most to a particular nutrient. Unlike in Western countries, where dietary vitamin C and β-carotene, mainly supplied by fruits, the major source of vitamin C in the elderly Chinese population was mainly from vegetables (77 %), whereas only 21 % of vitamin C was from fruits. Similarly, β-carotene was mainly derived from vegetables (78 %), followed by fruits (11 %). Regular smokers had significantly higher fruit intake and non-smokers had significantly lower intakes of those vitamins. These findings may be of clinical and preventive importance since epidemiological research has suggested that increased intakes of vegetables and fruits are positive

Table 3. Daily nutrient intakes by smoking status in females.

Table 4. Anthropometric measurements by smoking status in males.

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References
consequently associated with reduced risk of lung cancer and possibly other cancers as well. 58,59 However, the protective factor is difficult to identify and the role of β-carotene in cancer prevention remains uncertain. The lower intake of vitamin C is not likely due to smoking but to other factors as well, since this vitamin is thought to protect against cancer through reduction functions which serve both to prevent carcinogens from forming and to decrease the genotoxic effects of certain chemical agents and through the enhancement of host resistance. 55,56 Several studies have shown that smokers have lower serum vitamin C levels than non-smokers. It has been suggested, therefore, that smokers have increased vitamin C requirements. 57 On the basis of this argument, the intake of vitamin C in the smokers in this study may be not high enough to counteract the increased loss of vitamin C turnover from their smoking habit, although the mean vitamin C intake of the smokers in this study reached the requirement of Chinese RDA (50 mg/day). Researchers have estimated that a daily intake of at least 140 mg is required for smokers to offset the adverse effect of smoking on serum vitamin C levels. 58,59 Differences in nutrient intakes were also reflected in the various food items found to have contributed most to a particular nutritional profile. Unlike in Western countries, where dietary vitamin C and β-carotene are mainly supplied by fruits, the major sources of vitamin C for Chinese population was mainly from vegetables (77%), whereas only 21% of vitamin C was from fruits. Similarly, β-carotene was mainly derived from vegetables (78%), followed by fruits (11%). Roughly equal proportions of fruits and vegetable intake of smokers were significantly lower than non-smokers in female subjects. Prey et al. 50 have suggested that observed differences in the food and nutrient intakes of smokers may arise from cigarette smoking directly influencing dietary choices through such mechanisms as alterations in taste or olfaction.

There are many factors that may interact with smoking effect when examining the association of dietary intake with smoking status. Social class is one of the most influential factors for smoking to be inversely associated with smoking behaviour. 52,53 In this study, the effects of smoking on nutrient intake was analysed by controlling for educational levels — an indicator of social economic status. The study results revealed that social class status had great impact on the intake of dietary vitamin C after education level was adjusted. Alcohol consumption is another factor that may complicate the diet and smoking association. It was reported that alcohol consumption has its own independent effect on food intake and is similar to that of smoking. 54 A random cross-sectional studies found that alcohol consumption is positively associated with smoking. 55,56 The same relationship was identified by the present study. Smokers were more likely to consume alcohol than the non-smokers.

Anthropometric data showed that the smokers were slimmer and had a lower BMI than the non-smokers. In spite of the fact that the energy intake was almost the same as that of non-smokers, this is in agreement with other studies. The only known mechanism that can be used to explain the lower body weight and body fat among smokers is the increased metabolism theory. 57 Metabolic rate is an important and often overlooked variable in energy balance. Seventy-five percent of total energy expenditure comes in the form of metabolism. 58 However, this study was not able to perform the dose-response analysis in order to provide conclusive evidence for the relationship between smoking and body weight. In conclusion, this study demonstrates that current smokers have a diet that is low in micronutrient intakes, especially vitamin C and carotenoids, and a high alcohol intake. This may appear to have different dietary habits and health behaviour. Given the prevalence of cigarette smoking is high in this Chinese elderly population, these observations should be considered in future studies where the diet-related diseases in Chinese population.

References


Table 1. Percentage of smoking and non-smoking men and women. The prevalence of smoking was 42.7 % (53) for men and 21.0 % (38) for women. The average age was 67.4 ± 6.7 years. There was no difference in mean age between smokers and non-smokers.

Table 2. Daily food intakes by smoking status among females.

Table 3. Mean anthropometric measurements by smoking status in males.

Table 4. Anthropometric measurements by smoking status in male subjects.

Figure 1. Percentage of alcohol drinking among smokers and non-smokers.
Chinese characteristics of coronary heart disease: risk factors and mortality in peninsular Malaysia

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Introduction

Among the early clinical reports on coronary heart disease (CHD) in Malaysia was Paullister's 
description of 89 cases in the Penang General Hospital between 1952 and 1955. He observed that coronary artery disease was more common among Indians than Chinese. There were few Malay patients for comparison. At the same hospital between 1958 and 1960, Khaira 
reported that out of 50 cases of cardiovascular diseases, hypertensive heart disease (diastolic pressure >95 mmHg; 38.8%) and CHD (20.4%) formed the major types. The author observed that the incidence of CHD among the Penang heart patients was high compared to the pattern of heart disease in western countries. The patients were from various ethnic and economic groups.

In contrast, the incidence of CHD was reported low (2.5%) among 10,000 subjects who attended a private general practice in a medium-sized town between 1963 and 1965. This report found hypertension (diastolic pressure >100 mmHg), rheumatic heart disease and congenital heart disease to be the major cardiovascular diseases accounting for 84% of the total. The frequency of hypertension was reportedly higher among the Malays and Indians than the Chinese when compared to their ethnic distributions in the population. Documentation of CHD experiences in hospitals increased with the setting up of Coronary Care Units in several public hospitals.

CHD risk factors among the ethnic groups

Since the Framingham Heart Study in 1948, numerous experimental and epidemiologic studies in various countries have been undertaken. Several risk factors related to the development of CHD have been identified and these include a high level of fat consumption, high serum cholesterol, glucose intolerance, high blood pressure, cigarette smoking and obesity.

Studies on the prevalence of CHD risk factors among Malaysians have been on the rise since the early 1960s. Chong 
and Lau et al. were among the earliest to present serum cholesterol values of apparently healthy males of Malay, Chinese and Indian origin. The former study involved a small number of subjects (84) and the mean serum cholesterol levels for the three ethnic groups were between 180-196 mg/dl. Likewise Lau et al. found the three ethnic groups (512 subjects) had a low mean serum cholesterol value of 171 mg/dl. Their serum cholesterol levels showed a peak in the 30-39 age group and a flattening out in the 40-49 age group indicating an earlier peak than in western countries. The Malaysian aborigines males possess an even lower serum cholesterol level than the other ethnic groups, and this factor plus a physically active life and a diet consisting largely of unrefined carbohydrates were suggested to attribute to an absence of CHD among the aborigines.

Nonetheless, subsequent studies in the 1970s and 1980s indicated that the mean serum cholesterol levels among Malay males appeared to be higher than the levels reported during the 1960s. In the study by Chong and Kho involving a total of 1,025 subjects, the mean serum cholesterol ranged from 203-237 mg/dl, 197-232 mg/dl and 192-217 mg/dl for Malay, Chinese and Indian men respectively. Teo et al. in a study in 1982-1985, showed that the