

Nutritional Situation of a Chinese Community

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ABSTRACT

Aim: To evaluate the anthropometric measurements and dietary intake of the free-living elderly in a Chinese community.

Method: A survey was carried out on 48 male and female subjects aged 60 to 96 years using anthropometric, dietary intake and questionnaire techniques.

Results: The study indicated female subjects to have more health problems, like pain at the joints (33%), hypertension (17%) and diabetes (27%) as compared to the male subjects. Dietary intake analysis showed the Chinese male subjects to have a higher energy intake (1,623 kcal) compared to the females (1,197 kcal) even though they did not fulfill the recommended dietary intake. The intake for energy, fats and carbohydrates, was found to be significantly different ($p < 0.05$) between both sexes. Anthropometric measurements indicated male elderly subjects to be significantly heavier ($p < 0.05$, 55.4 kg) and taller (161.8 cm) than female elderly subjects (49.5 kg; 146.2 cm respectively). About half of the elderly were normal in their BMI (male 55.6%; female 50%) and only 6.6% of the female subjects were obese. More male subjects were found to be underweight (33%) compared to female subjects (17%). Waist hip ratio was 0.92 for male and 0.87 for female.

Conclusion: Our study showed that female elderly subjects had more health problems compared to male elderly subjects. On the whole, the elderly did not fulfill the recommended amount for energy intake while the percentage for carbohydrates, fats and protein from the total calorie intake were not in accordance with the healthy diet guidelines. Anthropometrically, male subjects were heavier and taller than female subjects. Looking at body mass index, most of the male elderly subjects were in the normal to underweight range. With these results, more research is warranted to give a clearer picture of the Chinese elderly in the country.

Keywords: nutrition, elderly, anthropometric, food intake

INTRODUCTION

In the past years, interest in the nutritional status of the elderly has markedly increased because of the increasing number of elderly people in the general

population and its implication for healthcare. With increasing life expectancy resulting in a rising proportion of elderly in all populations, increasing importance is being attached to improving the quality of life in the elderly so that the rise in life expectancy should not be accompanied by a proportionate increase in life with disabilities⁽¹⁾. It is generally accepted that the elderly are more likely to suffer from nutritional deficiencies than any other population group. Although the concept of subclinical malnutrition is not very well defined, there are reasons to believe that a marginal dietary intake may aggravate both physical and mental health. Thus, early detection of any health problem is essential so that appropriate intervention may be made. In Malaysia, nutritional studies were mostly carried out on the Malay elderly, that is in terms of dietary intake and anthropometric measurement⁽²⁻⁴⁾. Studies on the Chinese community have been reported but it was on the aspect of nutrition education needs⁽⁵⁾. The present study was designed to examine the anthropometric measurements and dietary intakes of the free-living elderly in a Chinese Community in Alor Gajah, Malacca.

METHODS

Sample

The 48 subjects in this study consisted of 18 male subjects aged 62 – 84 years (mean age 70.2) and 30 female subjects aged 60 – 96 years (mean age 72.9 years). All the subjects are residing in Kampung Baru Tabuh Naning, Alor Gajah, Malacca. It is a typical Chinese village which was formed since the British Administration in Malaya. It is situated at the border of Malacca and Negeri Sembilan with an area of 12 hektar and a population of 473, out of which are 130 Chinese and 3 Indian families. They are mostly rubber tappers and vegetable planters. The subjects were selected on a voluntary basis and those who were bedridden were not included in the study.

Interview

A questionnaire was worked out to obtain information about certain factors relating to the nutritional status of the population ie. eating problems, food preparation, education level and (former) occupation.

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In cases where the subjects were unable to answer questions posed to them, the questions were then passed to the spouse or other relatives. The interview was conducted in Mandarin, Hakka and Cantonese.

Anthropometric assessment

The elderly were weighed at home on a portable Seca-standard weighing machine wearing light clothing but no shoes. Their height was also measured without shoes. Both weight and height measurements were used to calculate body mass index (BMI), whereby the height (kg) was divided by the squared weight (m²). Other measurements taken were arm circumference, waist, hip, knee height and skinfold thickness (tricep, bicep, subscapula and suprailiac).

Dietary intake

The dietary intake was assessed by a 3-day food record collected during two successive weekdays and one weekend by trained enumerators. The amount of food items were recorded in household measures. At the end of the 3-day food recording period, the records were collected and checked with the subjects. Any omissions or discrepancies were then rectified. The food records were then coded by food item and amount and analysed for nutrient composition based on the Nutrient Composition of Malaysian Foods.

The average daily intakes of nutrients were compared to the Recommended Dietary Allowance (RDA) for Malaysians. Two-thirds (67%) of the RDA level of intake supposedly adequate in evaluating individual nutrient intake was used as a reference value. An intake below this value was not necessarily inadequate but indicated an increased risk of malnutrition. The data was then analysed using SAS program for \pm test and correlation coefficient.

(33%), hypertension (17%) and diabetes (27%). Although there was a high percentage of elderly who had poor vision and needed to use spectacles (male = 44.4%, the female = 46.7%) only 33.3% of the female used spectacles compared to all the male subjects (44.4%). This indicates that not all the elderly are taking care of their own health.

Table I – Demographic characteristic of the elderly

| Characteristic | Number (%) | Mean |
|---------------------------------|------------|-----------------|
| Sex : Male | 18 (37.5) | |
| Female | 30 (62.5) | |
| Age (years) : | | |
| Male | | 70.2 \pm 7.5 |
| Female | | 72.9 \pm 10.1 |
| Birthplace : | | |
| China | 23 (47.9) | |
| Malaysia | 22 (45.8) | |
| Others | 3 (6.2) | |
| Marital status : | | |
| Married | 22 (45.8) | |
| Widowed | 24 (50.5) | |
| Single | 2 (4.2) | |
| Source of income : | | |
| Family | 32 (66.7) | |
| Pension | 1 (2.1) | |
| Working and family | 15 (31.1) | |
| Total income : | | |
| > RM500 | 27 (56.3) | |
| RM300 – RM500 | 14 (29.2) | |
| RM150 – RM300 | 5 (10.4) | |
| < RM150 | 2 (4.2) | |
| Level of education : | | |
| Primary school | 7 (14.6) | |
| Secondary school | 2 (4.2) | |
| Informal school | 7 (14.6) | |
| Illiterate | 32 (66.7) | |
| Length of stay in the village : | | |
| > 5 years | 47 (97.9) | |
| 2 – 5 years | 1 (2.1) | |
| Living with : | | |
| Spouse only | 1 (2.1) | |
| Children/grandchildren | 24 (50.0) | |
| Alone | 4 (8.3) | |
| Others | 19 (39.6) | |

RESULTS

Subject profile

Fifty percent of the elderly subjects lived with their own families who prepared their meals while the other 50% had to prepare their own meals. Most of the elderly (66.7%) depended on their families for financial support. Even so, 31% of the elderly were involved in vegetable farming, rubber tapping, selling noodles and other jobs. Only one elderly received pension. This shows that there is still a small percentage of elderly who are active and healthy. About 67% of the elderly are illiterate, 15% had informal education, 15% had primary education and 4% had secondary education (Table I).

The subjects' response to questions relating to their nutritional status is shown in Table II. The most common symptoms were poor vision, hearing impairment, joint pain and difficulty in swallowing. In comparing male with female subjects, the former seem to have more health problems like joint pain

Table II – Factors relating to nutritional status of the elderly

| | Male (n=18) (%) | Female (n=30) (%) |
|--------------------------|--------------------|----------------------|
| Good appetite | 18 (100) | 28 (93.3) |
| Using dentures | 10 (55.6) | 14 (46.7) |
| Using spectacles | 8 (44.4) | 10 (33.3) |
| Smoking | | |
| Current smokers | 9 (50.0) | 1 (3.3) |
| Non-smokers | 9 (50.0) | 29 (96.7) |
| Consuming alcohol | 8 (44.4) | 3 (10) |
| Poor vision | 8 (44.4) | 14 (46.7) |
| Hearing impairment | 2 (11.1) | 7 (23.3) |
| Constipation | 0 (0) | 5 (16.6) |
| Joint pain | 3 (16.6) | 10 (33.3) |
| Hypertension | 2 (11.1) | 5 (16.6) |
| Diabetes | 0 (0) | 8 (26.6) |
| Difficulty in swallowing | 4 (22.2) | 15 (50.0) |

Table III – Daily energy and nutrient intake by sex (mean ± standard deviation)

| Nutrient | Male n=18 | Female n=30 | Total n=48 | % Contribution of major nutrients to total calorie |
|-------------------|--------------|----------------|---------------|---|
| Energy (kcal) | 1623 ± 514 | 1197 ± 322* | 1357 ± 457 | |
| Proteins (g) | 60 ± 21 | 48 ± 29 | 53 ± 26 | 16% |
| Fats (g) | 61 ± 26 | 43 ± 18* | 50 ± 23 | 33% |
| Carbohydrates (g) | 196 ± 65 | 159 ± 44* | 173 ± 55 | 51% |
| Clacium (mg) | 323 ± 90 | 298 ± 193 | 307 ± 162 | |
| Ferum (mg) | 12 ± 4 | 10 ± 6 | 11 ± 5 | |
| Vitamin A (µg) | 513 ± 196 | 423 ± 237 | 457 ± 225 | |
| Thiamine (mg) | 1.3 ± 0.6 | 1.1 ± 0.7 | 1.1 ± 0.7 | |
| Riboflavin (mg) | 1.1 ± 0.3 | 0.9 ± 0.4 | 1.0 ± 0.4 | |
| Niacin (mg) | 9.6 ± 3.8 | 8.0 ± 4.1 | 8.6 ± 4.0 | |
| Vitamin C (mg) | 56 ± 37 | 63 ± 45 | 60 ± 42 | |

* Significant at $p < 0.05$

Table IV – Anthropometric measurements according to sex (mean ± standard deviation)

| | Male n=18 | Female n=30 | Total n=48 |
|---------------------------|--------------|----------------|---------------|
| Weight (kg) | 55.4 ± 9.4 | 49.5 ± 9.6* | 51.7 ± 9.9 |
| Height (cm) | 161.8 ± 4.8 | 146.2 ± 8.1* | 152.1 ± 10.3 |
| Estimated height (cm) | 156.2 ± 5.9 | 147.1 ± 4.9* | 150.5 ± 6.8 |
| BMI (kg/m ²) | 21.2 ± 3.8 | 23.1 ± 3.9 | 22.4 ± 3.9 |
| % Fat | 21.4 ± 6.9 | 32.8 ± 6.8* | 28.6 ± 8.8 |
| Arm circumference (cm) | 26.8 ± 3.7 | 26.6 ± 4.3 | 26.7 ± 4.1 |
| Muscle circumference (cm) | 23.6 ± 2.7 | 21.3 ± 2.6* | 22.3 ± 2.9 |
| Waist hip ratio | 0.92 ± 0.06 | 0.87 ± 0.07* | 0.89 ± 0.07 |

* Significant at $p < 0.05$

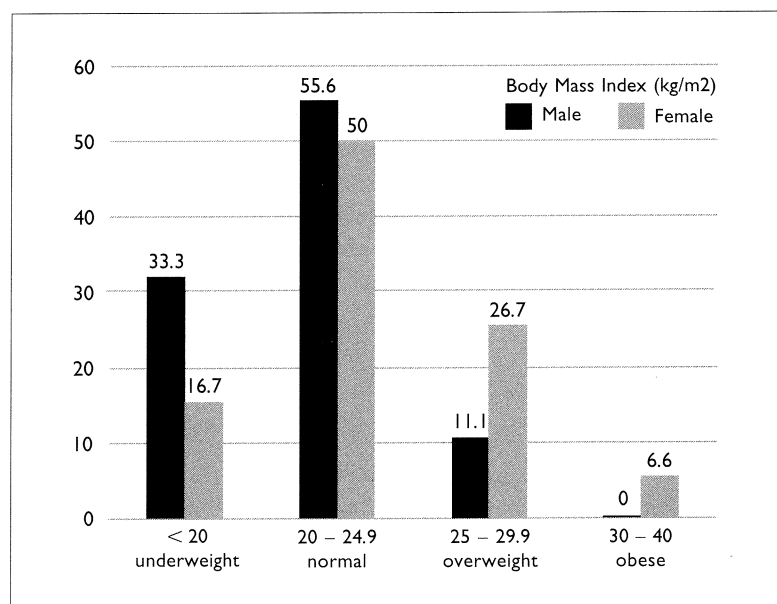


Fig 1 – Classification of body mass index (BMI) by sex according to Garrow (1981).

Dietary intake

Results from the dietary intake survey show that the male subjects consumed more energy (1,623 kcal) and all the other nutrients (Table III compared to the female subjects except for vitamin C, which is the reverse (male – 56 mg and female – 43 mg). However, statistics indicate a significant difference ($p < 0.05$) only for energy, fats and carbohydrates. The percentage of calorie from the total food intake for proteins, fats and carbohydrates was 16%, 33% and 51% respectively.

Anthropometric

Anthropometric measurements of the elderly indicate the male subjects to be significantly heavier (55.4 kg) and taller (146.2 cm) than female subjects (49.5 kg; 146.2 cm) at $p < 0.05$ (Table IV). Fat percentage is also higher among the female subjects (32.8%) as compared to the male subjects (21.4%). Looking at the body mass index (BMI), none of the elderly male is obese compared to 6.6% of the female subjects (Fig 1). About half of the elderly are normal in weight (male: 55.6% and female 50%), whereas 33% of the male subjects and 17% of female subjects are found to be underweight. Waist hip ratio (WHR) values are 0.92 for male and 0.87 for female with an average of 0.89.

DISCUSSION

Demographic data permits identification of the population. Among these data, age, sex, marital status and race are perhaps most important because at a population level, each is related to the functional status⁽⁶⁾. The mean age of the elderly in this study was 70 years for male subjects and 72.9 years for female subjects. About half of the subjects originated from China (47.9%). This background information will explain their food habit and their choice of food, which was influenced by their parents and grandparents. Since most of the subjects were not highly educated, they earn their living by doing business, farming and other odd jobs. Out of the samples studied, 31% of the elderly are still involved in vegetable farming, rubber tapping and selling noodles. This shows that there is still a small percentage of the elderly who are active and healthy. Most of the elderly lived with their children or relatives and only 8.3% lived alone. According to Kart and Metress⁽⁷⁾, the loss of companionship can seriously affect an individual's motivation to shop, cook, eat, remain active, or even go on living. Flint et al⁽⁸⁾ also stated that malnutrition frequently occurs in elderly who live alone but it may not be necessarily true because it also depends on their natural food habit which is influenced by their culture and previous generation. Each elderly person is the product of years of experience in a socio-cultural setting modified only by individual perception and choice. Dietary habits and ideas are likewise long-standing and difficult to change.

One of the natural occurrences that accompanies aging is an increase in the prevalence of disabilities and diseases. The incidence of concurrent illnesses and multiple disabilities rises sharply with age and is greatest in the very old segment of the population, those over 85 years of age; whereas a large percentage of the population over 65 years of age is relatively healthy and vigorous⁽⁹⁾. Table II shows the contributing factors related to nutritional status of the elderly. The most common factors are the use of dentures, poor vision, hearing impairment, joint pain and difficulty in swallowing. These biophysical changes often affect dietary intake.

The loss of taste, which is related to a declining number of taste buds, is a common complaint among the elderly. A diminished sense of taste especially for sweetness and saltiness can lead to over seasoning of foods with consequent irritation of sensitive parts of the digestive tract. The decrease in the number of taste receptors in the mouth is part and parcel of the aging process⁽¹⁰⁾. This could be a contributing factor to the occurrence of hypertension and diabetes among the elderly.

Satiety is likely related to taste, what is considered satiating in preceding years may be different in old age. Reasons for the change in perception of taste and satiety of foods are not clear.

Loss of teeth or the existence of denture problems can lead to dietary modifications that stress on foods which are softer and easier to chew. These foods are often found to have more calories than fruits and vegetables. If properly fitted dentures are not available, impairment of consumption of a large variety of foods results⁽¹¹⁾.

Deteriorating vision, stroke or chronic arthritis can further complicate the loss of neuromuscular co-ordination. Fine motor co-ordination will decline with age, but the existence of a chronic disease such as arthritis may greatly magnify the function as significance of any change. Neuromuscular problems may lead to an inability to handle certain utensils, appliances or foods. For those living alone, this inability can lead to the inefficient use of food resources. In the presence of others, it is a source of embarrassment that can lead to a diminished consumption of important foods.

All these factors could be a contributing factor to the variation in the range of energy and nutrient intake. The range for energy and nutrient intake varies greatly and this is related to the variation in food intake pattern and food habit between individuals. The energy intake of the elderly subjects when compared with the recommended dietary intake (male 2,020 kcal, female 1,600 kcal) was found to be inadequate.

The inadequacy of energy intake among elderly was also reported by other local studies⁽³⁻⁴⁾. Maintenance of energy intake is important to avoid protein metabolism for energy. The percentage of

elderly whose energy intake was lower than the RDA was 72% male and 90% female whereas for protein, there were only 11% and 13% respectively. Based on the healthy diet guidelines, the ratio of 16%: 33%: 51% for protein, fat and carbohydrate to the total calorie intake respectively was not in accordance with the guidelines (protein 15%, fat 30%, carbohydrate 55% – 60%). Looking at the nutrient intake when compared to 2/3 RDA, a higher percentage of the elderly were deficient in calcium (36.7%), vitamin A (43.3%), riboflavin (43.3%) and niacin 33.3%. The contributing factor to low energy and nutrient intake in this study is related to dental problems whereby 33% male and 50% female did not have any teeth. Although about 50% of the subjects were wearing dentures, but their dentures were not well-fitted and this greatly influenced their daily food intake. Other related factors like loss of taste, swallowing difficulty, joint pain and poor vision may also influence the food intake of the elderly.

Anthropometric measurements were carried out to determine the physical dimension and raw composition of an individual based on age and the different degree of nutrition⁽¹²⁾. The mean body weight and height of male subjects are higher than female subjects. A similar situation is observed among the elderly Malay of Kampung Sungai Merab, Selangor⁽¹³⁾. According to Frisancho⁽¹³⁾, the difference could be due to influencing factors like age, sex and body size. It is well recognised that average height decreases with age. Part of the effect is related to loss of stature in individuals, an effect that has been attributed to weakening or imbalance of muscle groups, postural changes, osteoporosis and disk deterioration⁽¹⁴⁾. Decline in height appears to begin slightly earlier in male subjects than female subjects, but the difference is not statistically significant. The rate of decline per year is less in the male subjects than in the female subjects. This greater rate of decline in females is consistent with the reported higher incidence of osteoporosis and its complication in older women⁽¹⁵⁾.

The body mass index is now widely used as an index of body fatness. Using Garrow⁽¹⁶⁾ proposed cut-off values for the classification of obesity, the mean body mass indexes of 21.2 kg/m² and 23.1 kg/m² for male and female in this study respectively were within the range for normal weight. However a higher percentage of male subjects were underweight (33.3%) and none were obese as compared to female subjects (16.7% underweight and 6.6% obese). The higher rate of underweight among male subjects were related to the faster loss of lean body mass among the male subjects compared to female subjects⁽¹⁷⁾. The waist hip ratio values were normal for both sexes. According to Bjorntorp⁽¹⁸⁾, a ratio of more than 1.0 for male and 0.8 for female will indicate an increased complication in relation with death.

CONCLUSION

In conclusion, the study showed that the elderly female subjects had more health problems like poor vision, joint pain, hypertension and diabetes as compared to the elderly male subjects. The energy intake of the subjects did not fulfill the recommended amount, with a higher percentage of inadequacy among the female subjects. Looking at the percentage of carbohydrate, fat and protein from total calorie intake, the percentage obtained was not in accordance with the healthy diet guidelines. The male subjects were significantly ($p < 0.05$) heavier and taller than the female subjects. Looking at the body mass index, only 6.6% of elderly female were obese whereas 33% of male elderly 17% of elderly female were underweight. These results will give us an idea on the nutritional status of the Chinese community. More research on this community is warranted so as to provide a clearer picture of them in the country and thus, some information for the planning strategies in Malaysia.

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