Nutritional Knowledge and Eating Habits of Medical students in Hengyang

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Abstract

Background

Nutrition is an important issue to ensure growth and development. Nutritional knowledge is one of the factors affecting the eating habits and maintaining the healthy life. However, nutritional knowledge and life practices of medical students in Hengyang have not been studied.

Methods

A self-reported questionnaire was administered to 550 students, ranging in age from 18–23 years. Medical students from the University of South China (270 men and 280 women) participated in this research. SPSS 20.0 was used to analyze the experimental data, one way analysis of variance (ANOVA) was used for the comparison between groups, and \( p < 0.01 \) was considered statistically significant. Frequency distributions and Chi-square analyses were conducted, and a \( p \) value less than 0.01 was considered statistically significant.

Results

Our results showed that 71.45% of students had a normal BMI and 2.18% of students were underweight, with an increased prevalence of overweight and obesity. Even though students understand the importance of taking nutritional balanced food, whereas only a small number of students take it into consideration when they are selecting food.

Background

Accumulating evidence demonstrated the importance of proper nutrition for a healthy lifestyle[1]. Appropriate nutrition plays a vital role in optimal cardiovascular function, muscle strength, respiratory ventilation, protection from infection, wound healing, and psychological well-being. Additionally, appropriate nutritional intake helps to prevent nutrition-related diseases through a balanced diet containing a variety of food constituents including carbohydrates, proteins, fats, vitamins, minerals, and water, which are required for body building, energy supply, and functional regulation.

Driven by rapid economic growth and drastic shifts in diets, the nutritional intake of individuals in China has been shifting from high-fiber, calorie-sparse, low-protein diets to low-fiber, calorie-dense, and high-protein diets [2] by increasing consumption of animal proteins, dairy products, refined grains [3], and sugar sweetened beverages [4], contributing to the increasing prevalence of obesity, which is a major risk for many noncommunicable nutrition-related diseases such as hypertension, diabetes mellitus, cardiovascular diseases, stroke, and nutrition-induced cancer [5]. Similar to Western countries, along with these changes of dietary pattern, have come along with new health problems. Available studies have reported that the noncommunicable nutrition-related diseases, such as type 2 diabetes mellitus, cardiovascular disease, and Hypertension increased approximately 4–12-folds in the past decades and account for 70% of disability-adjusted life-years lost and 80% of deaths in China [6–9]. The World Health Organization (WHO) reported that the lack of adequate nutritional knowledge promotes unhealthy eating practices among individuals [10]. In addition, environmental factors such as food availability, food marketing strategy and social environment have been shown to have an impact on food choice [11, 12]. When foods are not consumed in quantities commensurate with individuals’ body requirement, malnutrition or over-nutrition may happen. Thus, gaining correct knowledge about nutrition and being encouraged to bring healthy eating habits is importance for maintaining health and disease prevention in all population groups.

College students are potentially important target for the promotion of healthy lifestyles. In addition, Nutritional education has been implemented for many years in China. However, little is known concerning the nutritional knowledge related behavior of medical students in Hengyang. The object of this study was to investigate the relative level of nutritional knowledge among medical students in Hengyang. The life practices and health consciousness were also investigated.

Materials And Methods

This study was carried out between April 2022 and June 2022, and approved by the University of South China (Ethical Approval Number: CB/T 35892 – 2022). Medical students from University of South China (270 male and 280 female) participated in this study. A sample of 550 students aged 18–23 years were administered a self-administered, anonymous questionnaire. The general information of participants such as gender, height, weight were recorded. BMI was categorized into four groups: underweight (< 18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25-29.9 kg/m²), and obese (≥ 30 kg/m²) due to WHO BMI classifications [13]. The content and format of the questionnaire were designed by the authors according to a national dietary survey held by the department of Hengyang center for disease control and prevention. Questionnaire included questions regarding general information such as age, gender, height and weight. Self-reported height and weight were used to calculate BMI (kg/m²). Nutritional knowledge was questioned by 20 questions regarding to the nutritional functions of nutrients (e.g. carbohydrate, lipid, protein, vitamins, minerals), and nutrition in the prevention of various diseases (e.g. scurvy and osteoporosis). Each knowledge statement had multiple choices with a single correct answer. The scoring system was 1 for the correct answer and 0 for incorrect answer. Using purposively set benchmark mean values, the
item scores (nutritional knowledge) were interpreted as follows: satisfactory knowledge = 18–20; partially knowledge = 12–18; inadequate knowledge < 12.

Lifestyle practices were questioned by 10 questions regarding meal frequency, breakfast skipping, consumption frequency of some food groups (e.g. sweets, take-out food, vegetables and fruits), intake of water, alcohol and carbonated beverages (8 questions). Informed consent was obtained from all participants according to the Declaration of Helsinki. The statistical software package SPSS 20.0 was used for the analysis of data. In this study, Frequency distributions and Chi-square analyses were conducted, and a p value less than 0.01 was considered statistically significant.

Results
Characteristics of the sample and BMI categories

The response rate was 70%. The characteristics of the subjects are shown in Table 1. A total of 270 male and 280 female participated in this study. The average height of male and female students were 173.0 ± 0.03 and 159 ± 0.04 cm, while the average weight of male and female students were 69.29 ± 9.15 kg and 55.32 ± 7.35 kg. The average BMI for male students was 23.22 ± 3.54, with the categories BMI ≤ 18.5 (1.48%), 18.5 < BMI < 24.9 (71.48%), 25 < BMI < 29.9 (20.00%) and BMI ≥ 30 (7.04%). The average BMI for female students was 22.08 ± 3.35, with the categories BMI ≤ 18.5 (2.86%), 18.5 < BMI < 24.9 (71.43%), 25 < BMI < 29.9 (21.07%) and BMI ≥ 30 (4.64%). In current study, 71.45% (393/550) of students were classified into the normal weight category, 2.18% (12/550) of students were underweight (BMI ≤ 18.5), 20.55% (113/550) of students were overweight (25 < BMI < 29.9) and 5.81% (32/550) of students were obese (BMI ≥ 30). BMI values of deviations from the average sample show the presence of few extreme values.

<table>
<thead>
<tr>
<th>Gender</th>
<th>average height (cm)</th>
<th>BMI</th>
<th>&lt; 18.5 (%)</th>
<th>18.5-24.91 (%)</th>
<th>25.0-29.9 (%)</th>
<th>≥ 30 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>173.0 ± 0.03</td>
<td></td>
<td>4</td>
<td>193</td>
<td>71.48</td>
<td>20.00</td>
</tr>
<tr>
<td>Female</td>
<td>159 ± 0.04</td>
<td></td>
<td>8</td>
<td>200</td>
<td>71.43</td>
<td>59</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>12</td>
<td>2.18</td>
<td>393</td>
<td>71.45</td>
<td>113</td>
</tr>
</tbody>
</table>

Nutritional Knowledge Assessment

The results in Table 2 revealed students’ levels of nutritional knowledge. In total, 86.18% of all students represented satisfactory knowledge, while 13.82% of all students represented partially knowledge. Furthermore, the results in Table 2 revealed no significant differences between male and female students in their level of nutritional knowledge. Interestingly, students with BMI ≤ 18.5 kg/m² showed the best knowledge. However, for the small number of students in this group (N = 12), the results cannot be used to draw any firm conclusions. Students in this study knew full well that carbohydrates serve as energy sources and as essential structural components in organisms; lipids serve as the energy-storage depot for organisms and also provide thermal insulation; proteins are directly involved in the chemical processes essential for life; vitamin A supports cell growth, vision, immune function and foetal development, calcium is beneficial for bone mineralization and water provides a host of essential functions for good health; fruits and vegetables are good resources of vitamins, milk and other dairy products are rich in calcium. In addition, the students extremely knew that the lack of vitamin C results in scurvy, and getting enough calcium and vitamin D help in the prevention of osteoporosis.

<table>
<thead>
<tr>
<th>Knowledge assessment BMI</th>
<th>&lt; 18.5 (%)</th>
<th>18.5-24.91 (%)</th>
<th>25.0-29.9 (%)</th>
<th>≥ 30 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male (%)</td>
<td>Female (%)</td>
<td>Male (%)</td>
<td>Female (%)</td>
<td>Male (%)</td>
</tr>
<tr>
<td>Satisfactory</td>
<td>4</td>
<td>100.00</td>
<td>8</td>
<td>100.00</td>
</tr>
<tr>
<td>Partially</td>
<td>0</td>
<td>0.00</td>
<td>18</td>
<td>9.33</td>
</tr>
<tr>
<td>The nutritional knowledge was compared by gender. Significant differences between sexes were determined by Chi-square analyses (p &lt; 0.05).</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Lifestyle practices
The lifestyle practices of students was compared by gender (Additional File 1). The majority of students (77.82%) reported taking meals 3 times per day; there were no gender differences. However, a significant gender difference was found in the response relating to daily breakfast intake, with 60.00% of males and 70.71% of females reporting eating breakfast regularly ($p < 0.01$). The frequency of daily sweets intake was significantly higher in females (32.14%) than in males (12.59%) ($p < 0.01$). A total of 78.73% of all students reported eating vegetables and fruit daily. Female students (84.64%) tend to eat more vegetables and fruit than males daily (72.59%) ($p < 0.01$). The present study demonstrated high consumption of take-out food. In total, 53.09% of all students reported eating take-out food everyday. When the students eat out, male students prefer to drink alcohol (54.44% vs 16.07%) and carbonated beverages (69.26% vs 48.21%) than males ($p < 0.01$). Intake of water can be considered as adequate since intake of 1.5 and more liters of water per day was found in 72.91% of all students, according to recommendations. Males consume water on a daily basis more than females do (78.89% vs. 67.14%). Students from overweight and obese are particularly accustomed to eat sweets and take-out food (Data not shown). Although 85.45% of all students accepts the concept of taking nutritional balanced food is important for maintaining a healthy weight, whereas only a small number of students (20.55%) apply this concept when they selecting food.

The main source of information about food and nutrition was school (80.3% for males, 80.0% for females). Other sources were internet (56.3% for males, 55.7% for females), TV (33.5% for males, 32.1% for females). Multiple choices were possible.

**Discussion**

This study investigated the nutritional knowledge and lifestyle practices among college population in Hengyang, Hunan, China. In addition, we tried to find out the issues of nutrition and give advice to maintain a healthy life for this population group. As a result, the increases in the prevalence of overweight and obesity was observed in both males and females when compared to previous study in Beijing [14]. Moreover, Males were more likely to be obese than females, consistent with findings in previous studies [15]. It is notable that China has successfully reduced the prevalence of malnutrition [16], whereas a new challenging as the prevalence of overweight and obesity significantly increased in recent years [17]. The prevalence of overweight and obesity observed in the participants was much lower than that in Western populations. For example, 35% of the students are reported to be overweight or obese in the United States [18]. The definition of obesity is based on the research of Caucasian populations. Asian populations have a higher body fat (%) at a lower BMI compared to Caucasians [19]. Therefore, using BMI to judge overweight or obesity is not accurate, racial differences and genetic factors should be taken into consideration.

In the last decade, in order to promote national nutrition initiatives and enhance the health status, China has promulgated and implemented a series of national policies such as the Management Measures of Nutrition Improvement Work (issued in 2010) [20], the Outline of China's Food and Nutrition Development (2014–2020) (issued in 2014) [21], the Outline of ‘Healthy China 2030’ (issued in 2016) [22], the National Nutrition Plan (2017–2030) in 2017 [23], and Healthy China Initiative (2019–2030) in 2019 [24]. These policies strengthened the necessity of promoting nutritional education and healthy eating behaviors. The high percentage of correct answers of nutritional knowledge obtained from our study demonstrated a great achievement of nutritional education in China.

Our study showed that the majority of students regularly eat three times per day, 78.73% of students eat vegetables and fruits per day. These healthy eating habits ought to be encouraged. It was reported that females prefer to be thinner, and express more anxiety about becoming fat than men [25, 26]. Consistently, in our study, females showed higher consumption of vegetables and fruits on a daily basis. Students from over weighted and obese groups rarely eat breakfast (Data not shown), which confirming the association of higher BMI and breakfast skipping, as reported previously [27, 28]. Previous study has reported that breakfast skipping habits may correspond to the appearance and further development of obesity [29]. Therefore, the importance of regular eating habits should be emphasized in over weighted and obese students.

Of great concern, our results showed that females consumed more sweets on a daily basis even if their weight management is in question. Males are prefer to drink carbonated beverages and alcohol than females when eating outside. According to European Commission report, sugar content in sweets and carbonated beverages is normally above the recommended level [30]. Many health issues such as obesity, dental caries and potential enamel erosion are associated with high consumption of sweets and carbonated beverages. Also, carbonated beverages jeopardize the acrual of maximal peak bone mass and cause calcium deficiency with an attendant risk of osteoporosis [31]. Alcohol has a significant impact on individual's health issue. Drinking alcohol is associated with a risk of developing health problems such as diabetes and cancer [32]. Another important dieting trend that cannot be ignored is the meals at fingertips. While the development of takeout apps make food convenient and accessible for people, it significantly changed individual's eating behavior. When compared to the home-made meals, take-out food has considerable higher oil, salt, unhealthy fat, and sugars [33]. Furthermore, there is potential food safety risks such as food-borne illness [34].

Finally, we investigated health consciousness among students. Although, most of students accepted the importance of taking nutritional balanced food for maintaining a healthy weight, but it is difficult to apply this concept when they selecting what to eat.

**Conclusions**

The current study revealed satisfactory knowledge of nutrition in medical students. Also, students understand the importance of of taking nutritional balanced food. Base on these results, we can infer that China has achieved a notable success in nutritional education. The regular eating pattern, vegetable and fruit intake ought to be encouraged. On the other hand, bad eating behaviors such as take-out food, drinking alcohol and carbonate
beverages, and other unhealthy dietary behaviors should be rectified. Finally, no significant differences were found in the nutritional knowledge level in participants. Therefore, the nutritional knowledge level did not significantly affect their opinions on the lifestyle practices they usually engaged in. Thus, Our findings suggest the urgent need for strategies designed to change the eating habits and improve the nutritional well-being of individuals.

Declarations

Authors' contributions

Tianyi Jiang carried out questionnaire design, manuscript drafting and total coordination of the study. Xuan Liu contributed to the data entry and its analysis. Jiange Wu contributed to the questionnaire design and data collection. Tianyi Jiang contributed to final approval of the manuscript.

Competing interests

The authors declare that there are no conflicts of interest.

Ethics approval and consent to participate

Informed ethics approval and consent were obtained from all participants.

Consent for publication

All co-authors agree to publication in the Nutrition Journal.

Availability of data and material

All data analyzed during this study are included in this published article.

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References


Supplementary Files

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