OPEN ACCESS Freely available online

Journal of Nutrition & Food Sciences

Research Article

A Research for Nutritional Knowledge and Eating Habits of Medical Students in Hengyan

Xiaoping Long[1], Lihu Xie[2], Haoyan Xiao[1], Xuan Liu[3], Qiongshi Hu[4], Shuang Wu[3], Jiange Wu[5], Yaodong Liu[6], Tianyi Jiang[3*]

[1]Department of Pulmonary and Critical Care Medicine, University of South China, Hengyang, China; [2]Department of Rheumatology and Immunology, University of South China, Hengyang, China; [3]Department of Preventive Medicine, University of South China, Hengyang, China; [4]Department of Public Health Laboratory Sciences, University of South China, Hengyang, China; [5]Department of Infectious Diseases, University of South China, Hengyang, China; [6]Department of Pharmaceutical Science, University of South China, Hengyang, China

ABSTRACT

Nutrition is an important factor for ensuring growth and development. Nutritional knowledge is one of the factors affecting eating habits and maintaining a healthy life. However, nutritional knowledge and life practices of medical students in Hengyang have not been studied. In the current study, a self-reported questionnaire was administered to 4950 students, ranging in age from 18 to 23 years. Medical students from the University of South China, Human Polytechnic of Environment and Biology, Health School of Nuclear Industry (2430 male and 2520 female) participated in this research. The data was analyzed by *chi-square* test using IBM SPSS Statistics v. 22.0 and p value less than 0.01 was considered statistically significant. Our results showed that 71.45% (95% CI: 8.22%, 11.21%) of students had a normal BMI and 2.18% (95% CI: 4.35%, 6.92%) of students were underweight. The prevalence of overweight and obesity was 26.36% (95% CI: 18.63%, 24.25%). In terms of nutritional knowledge status, 90.34% of all students showed satisfactory knowledge and no significant difference was observed between males and females. Breakfast skipping was present habit in girls and underweight students. 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. Especially high consumption of alcohol and soft drinks was noted for males, while females showed high consumption of sweets. Takeout food was quite practiced habit, especially in overweight and obese students. Furthermore, most of the students exhibited external eating when being stress out at school. In conclusion, our study provided a new understanding of nutritional knowledge and eating behaviors among medical students. In addition, psychological counseling for students is necessary to help students to alleviate stress. Finally, rectifying the bad eating behaviors.

Keywords: Medical students; Nutritional knowledge; Eating habits; Nutrition; China

INTRODUCTION

Accumulating evidence demonstrated the importance of proper nutrition for a healthy lifestyle. Appropriate nutrition plays a vital role in optimal cardiovascular function, muscle strength, respiratory ventilation and 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 [1].

Correspondence to: Tianyi Jiang, Department of Preventive Medicine, University of South China, Hengyang, China; E-mail: jiang_tianyi@usc.edu.cn

Received: 08-Nov-2023, Manuscript No. JNFS-23-27953; **Editor assigned:** 13-Nov-2023, PreQC No. JNFS-23-27953 (PQ); **Reviewed:** 27-Nov-2023, QC No. JNFS-23-27953; **Revised:** 02-Apr-2025, Manuscript No. JNFS-23-27953 (R); **Published:** 09-Apr-2025, DOI: 10.35248/2155-9600.25.15.61

Citation: Long X, Xie L, Xiao H, Liu X, Hu Q, Wu S, et al. (2025) A Research for Nutritional Knowledge and Eating Habits of Medical Students in Hengyan. J Nutr Food Sci. 15:61

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 by increasing consumption of animal proteins, dairy products, refined grains and sugar sweetened beverages, contributing to the increasing prevalence of obesity, which is a major risk of many non-communicable nutrition related diseases such as hypertension, diabetes mellitus, cardiovascular diseases, stroke and nutrition induced cancer. Similar to Western countries, along with these changes of dietary pattern have come along with new health problems. Available studies have reported that the non-communicable 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. The World Health Organization (WHO) reported that the lack of adequate nutritional knowledge promotes unhealthy eating practices among individuals. In addition, environmental factors such as food availability, food marketing strategy and social environment have been shown to have an impact on food choice. 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 [2].

Since medical students are the health professionals of the future, they are expected to possess accurate nutritional knowledge and behavior in their school years. At the same time, their nutritional knowledge status, which not only affects their own health and life quality, but also is a reflection of their health attitude and behavior. Therefore, it is essential to find out their nutritional knowledge, behavior and status, which are of great significance to them and future patients. 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. Their life practices and health consciousness were also investigated [3].

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, date of approval: 23.03.2022). Medical students from university of south China (2430 male and 2520 female) participated in this study. A sample of 4950 students aged 18-23 years were administered a self-administered, anonymous questionnaire. The general information of participants such as gender, height, weight was recorded. BMI was categorized into four groups: Underweight (<18.5 kg/m^2), normal weight (18.5 kg/m^2-24.9 kg/m^2), overweight (25 kg/m^2-29.9 kg/m^2) and obese (≥ 30 kg/m^2) due to WHO BMI classifications. 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 [4].

Lifestyle practices were questioned by 11 questions regarding meal frequency, breakfast skipping, overeat, consumption frequency of some food groups (e.g. sweets, takeout food, vegetables and fruits), intake of water, alcohol and soft drinks, (9 questions), with 2 questions related to health consciousness (understanding of taking nutritional balanced food is important for maintaining a healthy life, considering the nutritional balance when selecting food) [5].

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 [6].

RESULTS

Demographic data

The study consisted of selected 2430 male and 2520 female medical students; age 17-23 from the University of South China, Human Polytechnic of Environment and Biology, Health School of Nuclear Industry. Majority of the respondents were on their 3rd year (34%) followed by 2nd year (27%), 1st year (21%) and 4th year (18%) level in college. 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% (3537/4950) of students were classified into the normal weight category, 2.18% (108/4950) of students were underweight (BMI ≤ 18.5), 20.55% (1017/4950) of students were overweight (25<BMI<29.9) and 5.81%(288/4950) of students were obese (BMI ≥ 30). BMI values of deviations from the average sample show the presence of few extreme values (Table 1) [7].

Table 1: Characteristics of medical students.

Gender	Average height (cm)		BMI							
			<18.5 (%)		18.5-24.91 (%)		25.0-29.9 (%)		≥ 30 (%)	
Male	173.0 ± 0.03	69.29 ± 9.15	4	1.48	193	71.48	54	20	19	7.04
Female	159 ± 0.04	55.32 ± 7.35	8	2.86	200	71.43	59	21.07	13	4.64
Total	-	-	12	2.18	393	71.45	113	20.55	32	5.82

Nutritional knowledge assessment

The results showed in Table 2 revealed participants' levels of nutritional knowledge. There was no reliable difference was found for both year and gender of the medical students in terms of nutritional knowledge. In total, 90.34% of all students represented satisfactory knowledge, while 9.66% of all students represented partially knowledge. Interestingly, students with BMI ≤ 18.5 kg/m^2 showed the best knowledge (94.44% *vs.* 90.33% in normal weight, 91.15% in overweight and 86.11% in obese. However, for the small number of students in this group (N=108), 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. The three major sources of nutritional knowledge of the respondents were from text book (70.3%), internet (26.5%) and TV (3.2%) [8].

Table 2: Nutritional knowledge for medical college students.

Knowledge assessment	BMI														
	<18.5				18.5-24.91				25.0-29.9				≥ 30			
	Male (%)		Female (%)		Male (%)		Female (%)		Male (%)		Female (%)		Male (%)		Female (%)		p values
Satisfactory	4	100	8	100	175	90.67	180	90	49	90.74	54	91.52	18	94.74	12	92.31	n.s
Partially	0	0	0	0	18	9.33	20	10	5	9.26	5	8.47	1	5.26	1	7.69	

The nutritional knowledge was compared by gender. Significant differences between sexes were determined by *chi-square* analyses (p<0.05)

Lifestyle practices

The lifestyle practices of students were compared by gender. Students usually have 3 meals per day (79.09% of total), while more than three quarters of students with BMI ≤ 18.5 kg/m^2 reported taking meals irregularly; there were no significant gender differences. However, a significant gender difference was found in the response relating to daily breakfast intake. Males eat breakfast on a daily basis more often than females do (69.51% *vs.* 63.81%) (P<0.01). 19.79% of male and 13.53% of female reported to have eaten their breakfast 3 or 4 times per week. 5.51% of male and 13.1% of female reported that they skipped breakfast 5 or 6 times per week and 5.19% of male and 9.56% of female reported that they never ate their breakfast. Vegetables and fruit were consumed on a daily basis by 84.64% of females. Males consumed these foods on a daily basis in smaller percentage (53.25%). The present study demonstrated high consumption of take-out food. In total, 52.97% of all students reported eating takeout food every day. Females consumed sweets on a daily basis significantly more than males (38.73% *vs.* 24.73%), while males consumed soft drinks on a daily basis more than females (35.1% *vs.* 23.49%). Especially, students from overweight or obese are particularly accustomed to consume sweets and drink soft drinks. When students eating

out, males have a significantly greater desire to drink alcohol than females when eating out (54.4% *vs.* 10.87%). Intake of water can be considered as adequate since intake of 1.5 and more liters of water per day was found in 71.49% of all students, according to recommendations. Males consume water on a daily basis more than females do (76.3% *vs.* 66.87%). Although most of students (86.12%) accepts the concept of taking nutritional balanced food is important for maintaining a healthy weight, whereas only a small number of students (20.18%) applied this concept when they selecting food. Furthermore, most students accustom to external eating when experiencing stress (74.83%)[9].

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. Moreover, males were more likely to be obese than females, consistent with findings in previous studies. It is notable that China has successfully reduced the prevalence of malnutrition, whereas a new challenging as the prevalence of overweight and obesity significantly increased in recent years. 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. 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. Therefore, using BMI to judge overweight or obesity is not accurate, racial differences and genetic factors should be taken into consideration [10-15].

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), the outline of China's food and nutrition development (2014-2020) (issued in 2014), the outline of 'Healthy China 2030' (issued in 2016), the national nutrition plan (2017-2030) in 2017, and healthy China initiative (2019-2030) in 2019. 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 [16].

Our study showed that the majority of students regularly eat three times per day (79.07%), 69.23% of all students' eats 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 males. Consistently, in our study, females showed higher consumption of vegetables and fruits on a daily basis (84.64% *vs.* 53.25% in males). Students from overweight and obese groups prefer to skip breakfast, which confirming the association of higher BMI and breakfast skipping, as reported previously. Previous study has reported that breakfast skipping habits may correspond to the appearance and further development of obesity. Eating breakfast is the most important meal of the day. Breakfast serves as fuel and source of nutrient and energy needed for our body to perform a high quality workout. Therefore, the importance of regular eating habits should be emphasized in over weighted and obese students. Girls showed higher consumption of vegetables and fruit on a daily basis. Vegetables and fruit have been largely recognized for their roles for the prevention of overweight and obesity. Thus, vegetables and fruit should be consumed every day [17].

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 preferred to drink soft drinks on a daily basis and consume alcohol when eating outside. According to European commission report, sugar content in sweets and soft drinks are normally above the recommended level. Many health issues such as obesity, dental caries and potential enamel erosion are associated with high consumption of sweets and soft drinks. Also, soft drinks jeopardize the accrual of maximal peak bone mass and cause calcium deficiency with an attendant risk of osteoporosis. 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. 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. Furthermore, there are potential food safety risks such as food borne illness [18].

Finally, we investigated health consciousness among students. Although, most of students understand the importance of a healthy eating habit to prevent disease and delay health deterioration. They also know that food choice can be critical in determine lifespan, but few people can resist the temptation of unhealthy foods. The convenience and availability of unhealthy foods, such as junk food and fast food, are the major reasons why people choose them. Nowadays, many students do not have enough time to cook and unhealthy foods are an attractive option. It is likely that there are junk food and fast food ready for purchase anywhere. Every grocery store has them and there are vending machines selling them in almost every corner of most urbanized properties. The affordability is another main component of the big draw to unhealthy foods. Junk food and fast food are much cheaper than meals cooked with ingredients from the farmers market. When these foods are accessible and affordable, they have easily become the substitute for healthy choices. Although high levels of salt, sugar and Tran's fat are detrimental to the body, they make foods appealing to the taste buds. Therefore, people tend to eat them [19].

Our results showed that 74.83% of all students reported overeating when they under stress. Medical students in China face severe depression and anxiety due to their harsh circumstances, such as the academic pressure and the stress of clinical practice. A number of studies have shown that stress is

associated with eating behaviour. It has been reported that 35%-40% of people increase their food intake when experiencing stress. For example, an individual may increase the food intake when experiencing stress, which leads to external eating. Moreover, previous studies have found that stress is associated with increased consumption of unhealthy foods with high amount of fat and sugar. In line with these studies, our results showed that most of students prefer to external eating when suffering from stress [20].

CONCLUSION

In conclusion, the current study aimed to determine the health, nutritional knowledge and dietary habit of medical students in Hengyang. We recorded the distribution of BMI among medical students and found a low prevalence of obesity. In addition, our results revealed satisfactory knowledge of nutrition in medical students and no significant differences were found among participants. Based 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 the consumption of takeout food, sweets, alcohol and soft drinks and other unhealthy dietary behaviors should be rectified. Although, students understood the importance of taking nutritional balanced food. However, students were difficult to apply this concept when they selecting foods. Based on the findings of this study, the following recommendations have been developed. First, there is a need to continuously promote the education of nutritional knowledge to students because what they eat are the sources of energy needed for them to perform their daily workout. Second, since the major sources of nutritional knowledge were text book, internet and TV, they are important to give reliable and concrete information. Thus, consultations with nutrition experts before displaying on the screen are highly recommended. Furthermore, regularly attending to nutrition related seminars and conferences will also help keeping students well educated with the latest nutritional knowledge. School administrators should conduct a nutrition program or seminar once every semester to keep the students aware of the importance of proper nutrition on their health. Furthermore, psychological counseling for students should be organized on a regular basis to help students to eliminate worries and overcome difficulties. In turn, students could benefit from healthy eating behaviors and prevention of illness. Governments efforts are essential to enhance people's health awareness. Thus, the government should provide leadership and work collectively across departments of legislation, regulation and taxation leverage to run campaigns to promote healthy eating. For example, the government can subsidize the production of green food with high quality of protein, vitamins and minerals, which make it possible for more students to have access to healthy diet. Besides, taxation should be imposed on products, such as high fat or trans-fat food so as to discourage the consumption of them.

AUTHORS' CONTRIBUTIONS

Xiaoping Long carried out questionnaire design and manuscript drafting. Lihu Xie has involved in drafting and revision of the article. Haoyan Xiao contributed to the data entry and its analysis. Xuan Liu contributed to the revision of the data. Qiongshi Hu and Shuang Wu contributed to the data collection. Jiange Wu, Yaodong Liu and Tianyi Jiang contributed to final approval of the manuscript and total coordination of the study.

FUNDING

No grant money or other financial support was received during the conduct of this study.

INSTITUTIONAL REVIEW BOARD STATEMENT

This study was conducted in accordance with the guidelines laid down in the Declaration of Helsinki. All procedures involving human participants were approved by the university of south China (Ethical Approval Number: CB/T 35892-2022, date of approval: 23.03.2022).

INFORMED CONSENT STATEMENT

Written informed consent was obtained from all participants prior to participation.

DATA AVAILABILITY STATEMENT

The data are not publicly available but are available upon reasonable request to the corresponding author Tianyi Jiang (jiang_tianyi@usc.edu.cn).

ACKNOWLEDGEMENT

The authors thank the editor-in-chief and the anonymous reviewers for their constructive comments, which helped to improve the quality of this manuscript. The authors gratefully acknowledge the participants for the time they spent completing the questionnaires.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

REFERENCES

1. Mansi IA, Mansi N, Shaker H, Banks D. Stair design in the United States and obesity: The need for a change. South Med J. 2009;102(6):610-614.
2. Du S, Mroz TA, Zhai F, Popkin BM. Rapid income growth adversely affects diet quality in China-particularly for the poor. Soc Sci Med. 2004;59(7):1505-1515.
3. Ding G, Chen J. Strengthen national nutrition surveillance and adopt effective intervention strategies to reduce the incidence of nutritional diseases. Chin J Epidemiol. 2018;48:517-522.

4. Wang J, Lin X, Bloomgarden ZT, Ning G. The Jiangnan diet, a healthy diet pattern for Chinese. J Diabetes. 2020;12(5):365-371.
5. Pols MA, Peeters PH, Twisk JW, Kemper HC, Grobbee DE. Physical activity and cardiovascular disease risk profile in women. Am J Epidemiol. 1997;146(4):322-328.
6. Yang X, Li J, Hu D, Chen J, Li Y, Huang J, et al. Predicting the 10-year risks of atherosclerotic cardiovascular disease in Chinese population: The China-PAR project (prediction for ASCVD risk in China). Circulation. 2016;134(19):1430-1440.
7. Ma RC. Epidemiology of diabetes and diabetic complications in China. Diabetologia. 2018;61(6):1249-1260.
8. Tian M, Chen Y, Zhao R, Chen L, Chen X, Feng D, et al. Chronic disease knowledge and its determinants among chronically ill adults in rural areas of Shanxi Province in China: A cross-sectional study. BMC Public Health. 2011;11:1-9.
9. Wang Z, Chen Z, Zhang L, Wang X, Hao G, Zhang Z, et al. Status of hypertension in China: Results from the China hypertension survey, 2012–2015. Circulation. 2018;137(22):2344-2356.
10. World Health Organisation. Obesity, preventing and managing the global epidemic: Report of the WHO consultation. World Health Organ Tech Rep Ser. 2000;894:1-253.
11. Attorp A, Scott JE, Yew AC, Rhodes RE, Barr SI, Naylor PJ. Associations between socioeconomic, parental and home environment factors and fruit and vegetable consumption of children in grades five and six in British Columbia, Canada. BMC Public Health. 2014;14:1-9.
12. Kowaleski-Jones L, Wen M. Community and child energy balance: Differential associations between neighborhood environment and overweight risk by gender. Int J Environ Health Res. 2013;23(5):434-445.
13. Sakamaki R, Toyama K, Amamoto R, Liu CJ, Shinfuku N. Nutritional knowledge, food habits and health attitude of Chinese university students–a cross sectional study. Nutr J. 2005;4:1-5.
14. Mokdad AH, Ford ES, Bowman BA, Dietz WH, Vinicor F, Bales VS, et al. Prevalence of obesity, diabetes and obesity-related health risk factors, 2001. JAMA. 2003;289(1):76-79.
15. Zhu S. Development of nutritional studies in China. Eur J Clin Nutr. 2021;75(2):230-231.
16. Lowry R, Galuska DA, Fulton JE, Wechsler H, Kann L, Collins JL. Physical activity, food choice and weight management goals and practices among US college students. Am J Prev Med. 2000;18(1):18-27.
17. Wang J, Thornton JC, Russell M, Burastero S, Heymsfield S, Pierson Jr RN. Asians have lower Body Mass Index (BMI) but higher percent body fat than do whites: Comparisons of anthropometric measurements. Am J Clin Nutr. 1994;60(1):23-28.
18. Cheng G, Yang F, Xiong F, Zhao L, Zhang L, Wang Y. Comparison of nutrition education policies and programs for children in China and other selected developed countries. GHJ. 2020;4(3):72-78.
19. Sattler FA, Eickmeyer S, Eisenkolb J. Body image disturbance in children and adolescents with anorexia nervosa and bulimia nervosa: A systematic review. Eat Weight Disord. 2020;25:857-865.
20. Smith BL, Handley P, Eldredge DA. Sex differences in exercise motivation and body-image satisfaction among college students. Percept Mot Skills. 1998;86(2):723-732.