

Investigation on Over-nutritional Obesity of College Students in the Tropical Area

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Abstract: In order to evaluate the nutritional status of college students in the tropical area and the levels of obesity among them, the BMI indexes and diet habits of college students are investigated by means of questionnaire survey and interview. This paper studies the over-nutritional obesity and excessive energy intake of college students in the tropical area; the main reasons of over-nutritional obesity are found. It is suggested that college students should keep healthy eating habits, develop healthy living habits and do sports regularly.

1. Introduction

According to the results of college students' physical fitness test, the obesity rate of college students has been rising year by year; obesity has become one of the main reasons which damage college students' health conditions. [1] Over-nutritional obesity is the most common type of obesity. These people do not have endocrine disorders or metabolic diseases; they are simple obese caused by excessive nutrient intake and less energy consumption, and have evenly distributed body fat. [2] Analyzed from the perspective of clinical medicine, over-nutrition obesity is closely related to lifestyle; the main manifestations are low nutrition consumption, inadequate exercises and unhealthy behavior habits. [3] Over-nutritional obesity does great harm to human body. According to relevant statistics, over-nutritional obesity can greatly increase the incidence of cerebral embolism, heart failure, coronary heart disease, hypertension and diabetes mellitus; it can also cause symptoms such as decreased motor ability and joint disease. [4]

2. Research Objects and Research Method

The objects in this research were 800 undergraduates from Hainan Tropical Ocean University, of whom 324 were male and 476 were female. Body mass index (BMI) was used as the tool of detecting obesity caused by over nutrition. [$\text{BMI} = \text{body weight (kg)} / \text{height (m}^2\text{)}$. $\text{BMI} < 18.5 \text{ (kg/m}^2\text{)}$ means leanness; BMI lies between 18.5 to 23.9 (kg/m^2) means normal body figure; $\text{BMI} \geq 24 \text{ (kg/m}^2\text{)}$ means overweight; BMI lies between 24 to 27.9 (kg/m^2) means slightly fat; $\text{BMI} > 28 \text{ (kg/m}^2\text{)}$ means obesity.] Questionnaire survey on obesity was conducted to investigate the influencing factors and dietary status of college students. The energy intake of each student was calculated according to the *Chinese Food Composition Table*. The *National Standard for Residents' Dietary Reference Intakes* issued by the Chinese Nutrition Society was employed for qualitative and quantitative evaluation.

3. Research Results

3.1 The status of obesity.

The rules of BMI index stipulates that, $\text{BMI} \geq 24 \text{ (kg/m}^2\text{)}$ means overweight, BMI lies between 24 to 27.9 (kg/m^2) means slightly fat, while $\text{BMI} > 28 \text{ (kg/m}^2\text{)}$ means obesity. However, when $\text{BMI} \geq 24 \text{ (kg/m}^2\text{)}$, the body fat content and nutritional level of the person are higher than the normal standards. Various degrees of health damage are caused. So $\text{BMI} \geq 24 \text{ (kg/m}^2\text{)}$ was used as the standard of over-nutritional obesity.

Table 1. Obesity in Male Students of the Tropical University

| grade | Number | BMI<18.5 | $18.5 \leq \text{BMI} \leq 23.9$ | BMI ≥ 24 |
|-----------|--------|-----------|----------------------------------|---------------|
| Freshman | 88 | 10 | 61 | 17 |
| Sophomore | 79 | 6 | 54 | 19 |
| Junior | 70 | 8 | 48 | 14 |
| Senior | 87 | 5 | 71 | 11 |
| Total | 324 | 29 (9.0%) | 234 (72.2%) | 61 (18.8%) |

From Table 1, the obesity rate of male students was 18.8%. 72.2% of students were in the range of normal, and 9.0% of students were thin. The obesity rate was the highest in the second year and lowest in the fourth year. The rate of leanness was the highest in the first year and the lowest in the fourth year.

Table 2. Obesity in Female Students of the Tropical University

| grade | Number | BMI<18.5 | $18.5 \leq \text{BMI} \leq 23.9$ | BMI ≥ 24 |
|-----------|--------|------------|----------------------------------|---------------|
| Freshman | 127 | 18 | 91 | 18 |
| Sophomore | 132 | 20 | 85 | 27 |
| Junior | 113 | 13 | 78 | 22 |
| Senior | 104 | 13 | 70 | 21 |
| Total | 476 | 64 (13.4%) | 324 (68.1%) | 88 (18.5%) |

Table 2 shows that the obesity rate was 18.5%. 68.1% of students were in the range of normal, and 13.4% of students were thin. The obesity rate was the highest in the second year and lowest in the first year. The rate of leanness was the highest in the second year.

3.2 The status of energy intake.

The three major energy substances (sugar, fat and protein) are the foundation of human growth and development, and the energy source of all human's vital activities. Energy supply is necessary in the composition of cells, tissues and organs, in the normal metabolism of body systems, and in the functioning of organs. College students are in high metabolism levels; energy is particularly important to the growth and health of college students.

Table 3. Energy Intake of Male Students in the Tropical University

| grade | Number | Energy (kcal) | protein (g) | Fat (g) | Carbondioxide (g) |
|------------------|--------|---------------|-------------|---------|-------------------|
| Freshman | 88 | 2738 | 123 | 68 | 398 |
| Sophomore | 79 | 2690 | 121 | 92 | 362 |
| Junior | 70 | 2588 | 108 | 76 | 371 |
| Senior | 87 | 2926 | 135 | 84 | 403 |
| average | | 2735.5 | 121.75 | 80.0 | 383.5 |
| recomended value | | 2300-2700 | 70-80 | 51-90 | 316-438 |

Table 4. Energy Intake of Female Students in the Tropical University

| grade | Number | Energy (kcal) | protein (g) | Fat (g) | Carbondioxide (g) |
|------------------|--------|---------------|-------------|---------|-------------------|
| Freshman | 127 | 2456 | 104 | 70 | 353 |
| Sophomore | 132 | 2354 | 100 | 83 | 317 |
| Junior | 113 | 2168 | 84 | 72 | 308 |
| Senior | 104 | 2344 | 109 | 65 | 325 |
| average | | 2330.5 | 99.25 | 72.5 | 325.75 |
| recomended value | | 2300-2700 | 70-80 | 51-90 | 316-438 |

Table 3 shows that, for male students in the tropical university, the intake of protein, fat and carbohydrates was within the range of recommended value. But overall, the average energy intake reached 2735.5 kcal, exceeding the recommended value. The average fat intake of sophomores was 92 g, exceeding the recommended maximum value of 90 g, which was in line with the obesity rate, and also well illustrated the positive correlation between nutritional intake and fat content. Table 4 shows that for female college students, the intake values of protein, fat and carbohydrate was also within the recommended range. But overall, the average energy intake of female students was only 2330.5 kcal, just within the recommended range, which effectively explained why the obesity rate of female students was lower than that of male students.

4. Reasons of Over-nutritional Obesity

According to the results of questionnaire survey, there were many reasons which lead to the obesity caused by over-nutrition. The main reasons can be summarized as following: excessive energy intake, social and environmental factors, psychological factors, genetic factors and insufficient exercises. Through the statistical analysis of the survey data, the proportions of male college students who chose above five factors were shown in Figure 1; the proportions of female college students who chose above five factors were shown in Figure 2.

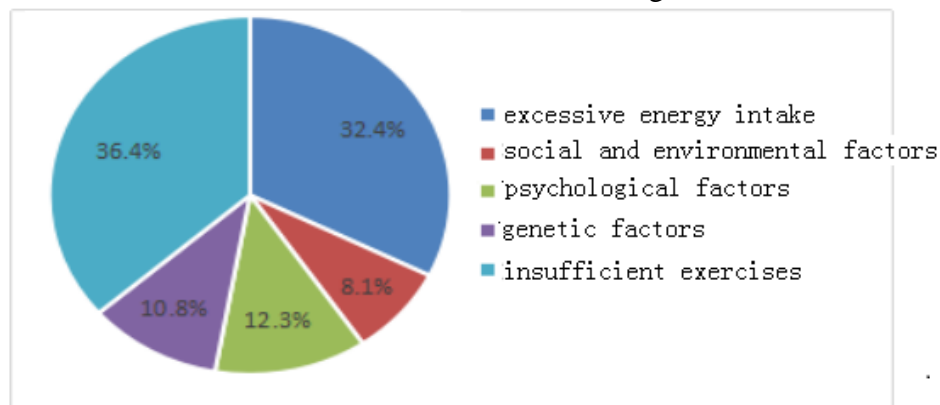


Figure 1 Reasons of over-nutritional obesity among male college students

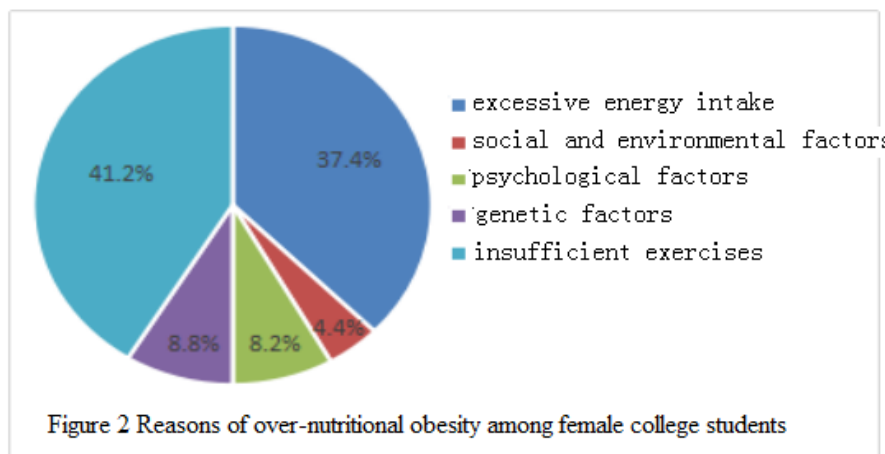


Figure 2 Reasons of over-nutritional obesity among female college students

Figure 2 Reasons of over-nutritional obesity among male college students

4.1 Excessive energy intake.

Obesity means the high fat content of human. One of the biggest reasons is that the energy intake of a person is greater than the energy he or she consumed. Tropical college students often eat too much fat and carbohydrates, which produces more body fat and become an important external reason of over-nutritional obesity. It is especially true when the physical activities are insufficient.

4.2 Social and environmental factors.

With the rapid development of various social and economic undertakings in China, the living standard of residents is improving day by day. People are no longer satisfied by “fill the belly”, but pursue for taste enjoyment. However, excessive material pursuit, especially the dietary pursuit, has become one of main causes of over-nutritional obesity in tropical university students.

4.3 Psychological factors.

In daily life and study, it is inevitably for tropical college students to encounter problems and difficulties. In order to relieve their mood irritability and emotional instability, some college students often eat too much or irregularly, resulting in gastrointestinal disorders and fat accumulation. Gradually the fat content is beyond the normal range.

4.4 Genetic factors.

Heredity is also one of the main causes of over-nutritional obesity. People's food absorbing ability is closely related to genetic factors. For those students who are easy to get fat, although they seldom eat high fat and high-energy food, the fat contents of them are usually exceed the normal standard.

4.5 Reduction in the amount of exercises.

The key to dietary balance is the balance of energy consumption and absorption. With the development of science and technology, the labor consumption of university students is decreasing. [5] In addition, some students do not have the habit of doing sports, and often stay motionless in front of the computer for a long time, resulting in the serious lacking of exercise. The unhealthy lifestyle of college students have contributed to the occurrence of over-nutrition obesity, too.

5. Countermeasures

5.1 College students should keep the healthy diet.

Scientific diet is the basis of health. Tropical college students should reduce the amount of energy intake appropriately. When the energy intake is lower than the energy consumption, the body fat will decompose while the weight will decrease. High-calorie food should be replaced by low-calorie food. Poultry meat and beef can replace fat meat; eggs, soybean products and milk can replace sugary and oily food; chocolate, ice cream, candy and other foods with high sugar content should not be eaten so often. The proportion of vegetables, beans, soybean products should be increased, includes stem vegetables like celery, rape and cabbage, and cucurbites vegetables such as winter melon and zucchini. Students should give the priority to reduce staple food and gradually reduce the intake of sugary and low nutritional food such as desserts and fried snacks, as well as Western-style fast food and sweet drinks. In addition, timely vitamin supplement is also needed.

5.2 College students should develop healthy living habits.

Healthy living habits have important practical value to the prevention and treatment of obesity. College students should establish a healthy and active lifestyle, ensure adequate sleep and keep positive attitude towards life. Smoking, drinking alcohol and gluttony should be avoided. They need to develop the habit of doing sports such as walking, jogging, aerobics, dancing, cycling, swimming, rope skipping, stair climbing and aerobic exercises, since sports can effectively adjust metabolism functions, improve the energy consumption abilities and promote body fat decomposition. At the same time, aerobic exercise can enhance the activity of muscle enzymes and cell metabolism, speed up energy consumption and effectively regulate endocrine function, thereby promoting the decomposition of fat and sugar oxidation, and reducing the content of fat storage.

5.3 College students should do sports more often.

Sports are the fundamental concern and ultimate love for human beings; sports have important practical value for human beings in their entire life. [6] With the rapid development of physical

exercises in the world, sports should be reckoned as a way of life, rather than a kind of exercise. Sports can cultivate the emotional and psychological qualities of people, helping them to develop personality and hone will; sports also serves as the cornerstone of human health. Generally speaking, sports should include physical, physiological, healthy, psychological, nutritional and moral contents. Especially in modern society, Sports should not be limited in competitive sports and PE class, but be elevated to the height of life pursuit. College students should take sports as an unremitting pursuit, and consciously integrate sports into their lives.

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