

Research Article

Characteristics Analysis of Dietary Intake on Male Physical Education Major College Students

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Abstract: The aim of the present study was to investigate the dietary intake in male college students between non-Physical Education (PE) and PE major and to reveal the characteristics of dietary intake in physical education students. 32 male students voluntarily participated in this study, 16 were non-PE major students and 16 physical education major. Their dietary intake of 3 days were recorded. The conclusion revealed that the total energy intake of PE Major students was insufficient and carbohydrate, protein and fat disproportionate and it appeared the excessive fat intake and the carbohydrate intake inadequate; vegetables and fruits, milk and dairy intake of PE major students were insufficient and most micro-nutrients of PE majors students were significantly lower than the recommended amount, vitamin including vitamin B1, vitamin B2 and vitamin C and minerals including Ca and Cu.

Keywords: Characteristics analysis, college student, dietary intake, nutrients

INTRODUCTION

There are many researches on the dietary intake in the recent literature. It is an emerging research fields. A study (Shankar *et al.*, 2004) investigated the nutrition, exercise, diet and health risk factors of 422 Black and White college females. The study revealed that both groups showed marked deficiencies in key nutrients and Black females had higher fat and calorie intake than White females. In selecting foods, White females relied more on nutrition knowledge and Black females were more influenced by cultural traditions. Gordon *et al.* (2012) examined the dietary intake of Arab international college students and dietary changes associated with relocation to the United States and the study also evaluated overall differences in food intake based on sex and marital status. Sealey-Potts *et al.* (2009) indicated that 60% of the participants in their study will gain understanding on the relationship of dietary intake, nutrition knowledge and body satisfaction and be able to determine the need for future assessment of college-age adults. Inserra *et al.* (2007) determined if short-term nutrition education can increase calcium intake or breakfast consumption in African American College Students. Pereyra *et al.* (1997) identified dietary and dieting behaviors of college females with strong eating attitudes. Jennifer *et al.* (2013) examined the differences in anthropometric measures and selected dietary components between young adults enrolled in college or vocational programs. Wolfram *et al.* (2013) recognized the trends in self-control behavior across the domains of dietary, financial and academic behavior. Tench *et al.* (2014) pointed out that in the general population,

anthropometrics and dietary practices appear to differ by race and gender in college students and should be considered when planning obesity programs. Nelson *et al.* (2009) examined whether young adult meal patterning, dietary intake and home food availability differed among nonstudents, 2-year college students and 4-year college students. Anding *et al.* (2001) surveyed the diet, exercise and health habits of 60 female students enrolled in three university aerobics courses and estimated food and nutrient intake using 3-day food records. Anderson (2010) examined the impact of nutritional feedback on dietary intake and body composition of college women volleyball players.

In this study, the characteristics of dietary intake of male PE major college students was explored, its target was to analyze the trait of dietary intake structure and give some suggestion on the nutrient intake of college student.

MATERIALS AND METHODS

Subjects: Thirty two college student voluntarily participated in this study, 16 of them were physical education major students and 16 were non-physical education major students. The basic information is listed in Table 1.

Methods:

3-day food record: According to the following step to record the dietary intake:

- At the beginning of the investigation, tell each subject to record 3-day dietary intake.

Table 1: The basic information of the subjects in the study

| Group | Age (yrs) | Body weight (kg) | Body height (cm) |
|-----------------------|-----------|------------------|------------------|
| PE major (n = 16) | 20.3±3.3 | 61.4±7.8 | 178.5±4.5 |
| Non-PE major (n = 16) | 20.1±2.4 | 60.7±8.1 | 171.4±3.4 |

- Tell the subject that not fill out the food log if he feel sick or unlike his usual self. If this applies to him, wait for a day that correctly mirrors his usual routine.
- Write down all drinks, candies and snacks he consume. Write any supplements on the log as if he was were food. It would be best to fill the log out right after he eat. Suggest bring a bit of notepaper or his food record sheets to write down what he ate, so he do not forget.
- Be sure to include all “hidden foods” and toppings. For example, milk to cereal or coffee; sugar added to cereal, coffee, etc. spreads on toast; oils added when frying or baking foods. Salt or other spices.
- Requires that he write the exact time he had his food.
- Record everything he eat and drink (i.e.: meals, snacks, toppings, drinks). Include brand names of foods, flavors, low-fat and no-fat specifics. If you are eating a new product, bring the label in, so the researchers able to match his foods up precisely.

Data analysis: All data collected from this study were analyzed with SPSS 16.0 for Windows. Independent sample t test was used in this study. All significant level was set at p<0.05 level and extremely significant level at p<0.01.

RESULTS AND DISCUSSION

Dietary intake difference between non- and PE major students: As indicated in Table 2, the sugary drinks, vegetables and fruits, aquatic products, animal fat and other foods intake of PE majors were significantly higher than that of the non-physical education majors. By comparison with the reference value of dietary intake, vegetables and fruits, milk and dairy products, fats and oils intake of PE majors were lower than the recommended amount. In addition, aquatic, slightly lower than the recommended standard, poultry, meat, peas and beans products intake was above the recommended amount.

Carbohydrates, proteins and fats intake difference between non-and PE major students: Carbohydrate intake of PE major students were lower than the recommended amount. Protein and fat intake of PE major students has basically reached the recommended amount. Since the carbohydrate intake of PE major students was significantly lower, due to the lower carbohydrate intake, it resulted in its higher proportion of fat intake for energy supply (Table 3). Thus Carbohydrates, proteins and fats intake of PE major students was disproportionate.

Table 2: Category of dietary intake between Non- and PE major college students

| Category | Non-PE | PE | Ref. value |
|------------------|-------------|-------------|------------|
| Grains/potatoes | 620.3±241.7 | 710.4±247.5 | 550~600 |
| Vegetables | 251.5±114.8 | 298.5± 94.3 | 550 |
| Fruits | 223.9±185.2 | 335.4±183.7 | 500 |
| Meat | 132.4±69.5 | 153.8±83.1 | 90 |
| Poultry | 47.5±55.9 | 62.4±68.7 | 65 |
| Peas and beans | 140.7±98.4 | 169.4±112.4 | 50 |
| Fat | 20.1±9.8 | 31.4±15.7 | 45 |
| Sugary beverage | 311.4±193.6 | 435.7±231.2 | 1000 |
| Milk | 264.7±175.5 | 201.7±142.3 | 300 |
| Eggs | 57.8±27.1 | 75.7±31.5 | 50~100 |
| Aquatic products | 61.5±42.7 | 101.5±45.7 | 70 |

Table 3: Carbohydrates, proteins and fats intake between Non-physical education and physical education

| Elements | Non-PE | PE | Ref. value |
|--------------|-------------|---------------|------------|
| Carbohydrate | 301.7±131.1 | 431.2±120.4** | 480~570 |
| Protein | 87.5±30.2 | 123.7±43.7** | 105~131 |
| Fats | 87.9±28.2 | 97.1±33.1 | 97~117 |

** : Indicates extremely significant difference at p<0.01

Table 4: Vitamins and minerals intake between Non- and PE major college students

| Type | Non-PE | PE | Ref. Value |
|----------------|-------------|---------------|------------|
| Vitamins | | | |
| Vitamin A (RE) | 543.3±255.9 | 792.±341.3** | 774 |
| Vitamin B1 | 0.51±0.32 | 1.76±0.71** | 3~5 |
| Vitamin B2 | 1.78±0.74 | 2.76±0.89** | 2~2.5 |
| Vitamin C | 69.3±41.2 | 88.4±50.1* | 140 |
| Niacin | 21.2±8.6 | 30.3±10.3** | 20~30 |
| Vitamin E | 20.3±7.7 | 28.7±9.3** | 15~20 |
| Minerals | | | |
| Ca | 599.7±136.8 | 741.6±223.9 | 1000~1500 |
| Fe | 23.3±4.8 | 32.8±5.5* | 20~25 |
| Zn | 16.7±6.6 | 21.6±5.3** | 20~25 |
| Se | 91.3±34.8 | 131.4±51.3** | 50~150 |
| K | 2336±8119 | 3312±1201** | 3000~4000 |
| Na | 4775±2113 | 6478±2412** | <5000 |
| Mg | 336.2±122.4 | 441.3±109.7** | 400~500 |
| Cu | 1.97±0.85 | 2.91±1.14* | 3.5 |

*: Indicates significant difference at p<0.01, **: indicates extremely significant difference at p<0.01

Nutrient intake difference between non-and PE major students: As indicated in Table 4, it listed the nutrient intake (vitamins and minerals) difference between non-and PE major students. As can be seen, most of the physical education majors micro-nutrients were significantly lower than non-physical education majors. By comparison with the recommended amount, the vitamin A, vitamin B1, vitamin B2 and vitamin C intake of PE major students were insufficient and the calcium, zinc, potassium, magnesium and copper intake of PE major students were the similar situation.

Discussion: From the perspective of the total daily intake of energy and the proportion of carbohydrates, proteins and fats intake, the total daily intake of energy of PE major students was significantly higher than non-PE major students and higher than the recommended amount, however, the proportion of carbohydrates, proteins and fats was unreasonable. The results in this study showed that PE major students total daily intake of energy was sufficient, but, the intake of carbohydrate intake was inadequate and a higher proportion of fat

intake for energy. The previous study have shown that the disproportionate of carbohydrates, proteins and fats intake will damage the athletic performance. Carbohydrate is the primary energy source of mankind, its insufficient intake or the disproportionate proportion will affect the athletic performance and reduce the proportion of energy supply. Since fats and oils provide essential fatty acids and fat-soluble vitamins, it is required to get enough fat per day; however, if the proportion of dietary fat intake is higher, it may affect the absorption of protein and iron and thus impact on athletic performance. Further analysis found out that the livestock food intake of PE major students was higher, as known; livestock foods contain more saturated fatty acids which are likely to cause adverse effects on health and weight control. Currently, the dietary guidelines not only provide the suggestion on the amount of dietary fat requested but also on the category of fats and oils intake, such as higher intake of saturated fatty acids may have a negative impact. In short, PE major students should increase the proportion of carbohydrate intake and lower intake of lipids and adjust its kind, especially to reduce the higher fat content such as meat intake.

From the perspective of the food structure, the vegetables, fruits and aquatic foods intake of the PE major students are much higher than the non-sports major students, but the vegetables, fruits intake were below the recommended amount, while meat, peas and beans and their products is higher than the recommended amount. It is visible that the dietary food composition of PE major students was not rational. The vitamins intake of PE major students was insufficient due to the insufficient intake of fruits and vegetables. As we known, vitamins play an important role in the body, although the vitamin itself does not produce any energy, but they are used as a catalyst metabolic reactions involved in energy metabolism and therefore need to focus on the vitamins supply of PE major students.

In addition, this study found out the shortage of total protein intake of PE major students, further analysis found out that the milk intake was insufficient while the higher meat, beans and their products intake. Protein intake to those people who undertaking physical activity are very important, the recommended value of protein intake in adult on dietary guidelines is 0.8 g/kg per day and the study of PE major students showed there was some shortage of protein intake. Which Some researches (Phillips, 2006; Rodriguez *et al.*, 2009) pointed out that higher protein intake can improve the athletic ability. Therefore, it is necessary to focus on protein intake and variety of aquatic products of PE major students and consider the reasonable proportion of animal and vegetable protein.

From the perspective of nutrient intake, the majority of micro-nutrient intake of PE major students was significantly higher than non-PE major students, but vitamin B1, vitamin B2 and vitamin C intake were lower than the recommended amount, minerals (Ca and

Cu, etc.) was also inadequate intake. Trace elements including vitamins and minerals, it can not only promote energy production, but also has multiple functions, such as participation in hemoglobin synthesis, maintain bone health, to keep the immune system to protect human tissue from oxidative damage and repair after exercise muscle and so on. For sports professional students, dietary intake of trace elements are in greater demand, the demand for Ca, Mg, vitamin A, vitamin C, vitamin E, etc. are high. Movement consumes a large amount of trace elements, thus to cause the reduction of the trace elements. As we known, the greater the exercise intensity, the more trace elements are used to repair lean tissue. In addition, it is also possible that a substantial change in the control of energy intake and body weight during exercise in PE major students, the risk of micro-nutrient deficiencies greatly improved. In terms of vitamin and mineral supplements, compared with supplements, from vitamins and minerals in food has better bio-availability and, tonic improper intake may cause toxic reactions, Therefore, PE major students should be appropriate to intake food sources of vitamins and minerals, such as by increasing the fish and seafood like oysters, mussels, kelp, seaweed, etc. to supplement zinc, can increase the plants foods containing iron-rich element such as black fungus, kelp, celery, leek, black sesame, red bean, mung beans and other food to supplement iron and so on.

At present, there are dietary guidelines on general population at home and abroad, however there is no dietary guidance system for athletes or the like population. Some researchers pointed out that the dietary guidance should be set up for different populations, such as athletics and the like. Therefore, we should develop the specific dietary for PE major students.

CONCLUSION

- Total energy intake of PE major students was insufficient and carbohydrate, protein and fat disproportionate and it appeared the excessive fat intake and the carbohydrate intake inadequate.
- Vegetables and fruits, milk and dairy intake of PE major students were insufficient.
- Most micro-nutrients of PE majors students were significantly lower than the recommended amount, vitamin including vitamin B1, vitamin B2 and vitamin C and minerals including Ca and Cu.

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