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Research Article

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The comparative analysis different body fat percent (fat%) and physical characteristics of male students in college

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ABSTRACT

The object is to make a study about body functions, quality and physical health evaluation level of male students in college with various level of Fat%. Methods: Compare and analyze the body functions and physical health evaluation level of 271 male students from Zhejiang University with various level of Fat%, chosen by random sampling. Results: There are obvious differences in body functions and quality among male students in college with various level of Fat%. The higher Fat% group has the best index of vital capacity and grip strength, but students with lower Fat% are obviously better in the other body functions and quality than students with normal, higher and obese Fat%. Meanwhile, the group with normal Fat% is obviously better than the higher and obese Fat% group. Lower Fat% group has the highest percentage (61.6%) of physical health evaluation level which is above good, and the lowest one is the obese Fat% group (6.3%). However, the obese Fat% group has the highest failure rates (50%) of physical health evaluation level, and the lower Fat% group is the lowest (2.9%).Conclusion: excessive Fat% will affect physical health of male students in college.

Key words: Male Students in College, Fat%, Constitution, Physical Characteristics, Comparative Analysis.

INTRODUCTION

Body fat percent is defined as the percentage of total body fat in the total weight, which can objectively and accurately reflect the body fat content and distribution, and it is one of the most important indicators to evaluate the degree of human obesity. Human health needs reasonable body fat percentage, as too much or too little body fat will induce various diseases. In 1998 China Obesity Research recommended that male Fat%<15% is underweight, 15%≤Fat%＜25% is normal, 25%≤Fat%＜30% is overweight, and Fat%≥30% is obesity[1]. Through the retrieval of related literature of Chinese National Knowledge Infrastructure (CNKI), the scholars from various countries made a lot of research on Fat% and obesity, and the related diseases caused by them, but there are not many research on the physical health. Therefore, this study attempts to compare and analyze the physical characteristics of male students in college from various groups with different Fat%, realize their body functions, quality and physical health evaluation level, and study the impact on physical health, in order to provide a theoretical basis for the physical health evaluation and design interventions.

1. THE RESEARCH OBJECT AND METHODS

The research object is 271 healthy male students from Zhejiang University were chosen by random sampling. The research methods are Literature Research: According to the research purposes, search the domestic research materials through the Internet and the library of Zhejiang University. Determine the index system: The main research indicators include body fat percentage, vital capacity, vital capacity in body mass index, 1000m(s), grip strength (kg), grip strength values of body mass index, standing long jump (cm) and physical health evaluation level. Test Method: Based on the testing methods, testing rules and requirements of body shape, function and quality according to the sports metrology, the instruments meet the National Student Physical Health Standards which are produced by Tiankang instrument Factory specified by the State Sports General Administration, the tests of body

shape, function and quality index system of 271 male students are then completed. The test of body fat percent index: Use the Inbody 3.2 human body composition analyzer (Biospace, Korea) for testing, and correct the instrument before the test. Participants should avoid strenuous exercise and drink lots of water within 24 hour before the test. Participants should be dressed in light clothing when testing, and use saline water paper towel to wipe hands and feet in advance in order to increase in skin conductivity. The testing index includes body moisture content, protein content, fat content and inorganic salt content. The establishment of database: Entering the test data of students' evaluation index system, and establish a database. Mathematical Statistic Method: In 1998 China Obesity Research recommended the male Fat% grouping standard (Fat%<10% is underweight, 10%≤Fat%＜20% is normal, 20%≤Fat%＜25% is overweight, and Fat%≥25% is obesity). The Fat% testing data of 271 male students could be divided into four groups: lower group, normal group, higher group, obese group. Count the average of each group, then compare the body function, quality and physical fitness test scores of each group by pairwise; make a comparative study about physical health evaluation level of female students between different groups of Fat%. All data are using Microsoft Excel 2007software function and sports scientific research data statistics processing system software package for processing. Comprehensive analysis Method: A comprehensive analysis of the statistical results reveals the characteristic of male students in different groups of Fat% with body function, physical fitness and physical health evaluation level.

RESULTS AND ANALYSIS

The relationship between male students' Fat% and body function, quality and physical fitness test scores. According to the male Fat% grouping standard which China Obesity Research recommended in 1998, 271 male students could be divided into four groups: lower group, normal group, higher group, obese group. Based on the body function, quality and physical fitness test total scores in 4 Fat% groups, and by using Microsoft Excel 2007 to rank the Fat% from small to large and do statistics calculation of each group, the result is shown in Table 1.

Tab. 1: The elated statistics parameters of male students' Fat% and the corresponding body function, quality and physical fitness test total scores

Index	Lower group (104 people)	Normal group (143 people)	Higher group (16 people)	Obese group (8 people)
Fat%	11.90±2.69	18.84±2.72	26.87±1.25	38.11±7.57
Vital capacity	4181.98±731.16	4327.55±644.38	4453.31±573.92	4365.63±451.93
vital capacity in body mass index	70.84±11.33	67.47±11.67	59.69±8.16	61.38±14.88
1000m (s)	237.57±19.09	243.38±16.37	254.38±18.15	268.88±38.94
grip strength (kg)	43.45±6.61	44.90±6.53	46.09±7.72	42.36±9.69
grip strength values of body mass index	74.06±12.09	69.30±10.52	60.15±7.68	59.68±19.08
standing long jump (cm)	241.33±17.41	236.90±15.76	233.13±14.43	230.25±34.42
physical fitness test total scores	76.20±7.19	72.38±7.79	63.56±6.99	55.13±22.17

According to the average of body function of 4 Fat% groups as shown in Table 1:

Vital capacity ranked from large to small is obese group, higher group, normal group and lower group; the vital capacity in body mass index ranked from large to small is lower group, normal group, higher group and obese group.

Seen from the average of the physical quality and physical fitness test total scores of 4 Fat% groups: lower group performs best in 1000m(s), grip strength values of body mass index, standing long jump (cm) and physical fitness test total scores ,next is normal group and higher group, obese group is the worst; obese group performs best in grip strength(kg), next is normal group and lower group, higher group is the wors. Thus it can be seen that obese Fat% group perform best in vital capacity and grip strength(kg), lower Fat% group are the best in all the other physical quality and functions while obese group is the worst.

On the basis of the statistics parameter of body function, quality and physical fitness test total scores of male students of various Fat% groups as shown in Table 1, a comparison test(t-test) of them by pairwise is made, the result is shown in Table 2.

According to the body function, quality and physical fitness test total scores of male students of various Fat% groups, a t-test of them by pairwise is made.

Vital capacity: Students' vital capacity with various Fat% groups does not mean range, but there is no significant difference in statistics ($P > 0.05$).

Vital capacity in body mass index: Lower group has significant differences with normal group and higher group, normal group and obese group (P<0.05); students between lower group and obese group have a very significant difference (P<0.001); there are no significant differences between normal group and higher group, obese group and higher group (P>0.05). It indicates that the vital capacity in body mass index of normal group, higher group and obese group is obviously worse than students from lower group; and higher group is obviously worse than normal group as well.

Tab. 2: The testing value list of male students' Fat% and the corresponding body function, quality and physical fitness test total scores

t-test by pairwise	Vital capacity	vital capacity in body mass index	1000m (s)	grip strength (kg)	grip strength values of body mass index	standing long jump (cm)	physical fitness test total scores
Lower-normal	1.66	2.27*	2.57*	1.71	3.30**	2.08*	3.93***
lower-higher	1.42	3.78***	3.30**	1.45	4.46***	1.79	6.57 ***
lower-obese	0.70	2.23*	4.08****	0.43	3.10**	1.59	6.43***
normal-higher	0.75	2.59*	2.52*	0.68	3.38***	0.92	4.33***
normal-obese	0.16	1.42	3.88***	1.04	2.39*	1.07	5.28***
higher-obese	0.38	0.36	1.26	1.03	0.09	0.29	1.41

*Noted: *;** and *** means P <0.05; P <0.01and P <0.001 respectively.*

1000m (s): There are significant differences between lower group and normal group, normal group and higher group (P<0.05); students between lower group and obese group have a quite significant difference (P<0.01); the results reveal exist very significant differences between lower group and obese group, normal group and obese group (P<0.001); there are no significant differences between higher group and obese group (P>0.05). It indicates the 1000m scores of students from lower group are much better than students from normal group, higher group and obese group; normal group is obviously better than higher group and obese group as well.

Grip strength (kg): Students' grip strength with various Fat% groups do not mean range, but there is no significant difference in statistics (P > 0.05).

Grip strength values of body mass index: Students between normal group and higher group have significant differences (P<0.05); students among lower group and normal group, higher group have quite significant difference (P<0.01); students among lower group, normal group and obese group have a very significant differences (P<0.001); there are no significant differences between obese group and higher group, (P>0.05). It indicates that the grip strength values of body mass index of students from lower group are much better than those from normal group, higher group and obese group; normal group is obviously better than higher group and obese group as well.

Standing long jump (cm): There are significant differences between lower group and normal group (P<0.05); there are no significant difference between lower group and higher group and obese group (P>0.05).The reason may be the number of higher group and obese group than less.

Physical fitness test total scores: There are exist very significant differences between lower group and normal group, higher group, obese group (P<0.001); there is no significant difference between higher group and obese group (P>0.05). It indicates that the physical fitness test total scores of lower group are obviously better than students from normal group, higher group and obese group; and normal group is obviously better than higher group and obese group as well.

The feature analysis of physical health evaluation level of male students from different Fat% groups. According to the 271 male students in college with various Fat% groups and their corresponding physical health evaluation level, and by using Microsoft Excel 2007, the number of people and percentage of different level are counted. On the basis of calculation results, a chi-square test analysis with the sports scientific research and data statistics processing system software package is made. The result is shown in Table 3.

Tab. 3: Chi-square test list of the number and percentage of male students of four Fat% groups and their corresponding physical health evaluation level

Fat% group	number	Excellent	%	Good	%	Pass	%	Fail	%
Lower	104	3	2.9	61	58.7	37	35.6	3	2.9
Normal	143	0	0.0	63	44.1	68	47.6	12	8.4
Higher	16	0	0.0	1	6.3	10	62.5	5	31.3
obese	8	0	0.0	1	12.5	3	37.5	4	50.0

χ^2 (chi-square) = 47.875 (P<0.01)

It can be seen in accordance with Table 3: Students of lower Fat% group achieve excellent or good fitness evaluation level for 61.6%, pass for 35.6%, and fail for 2.9%; students of normal Fat% group achieve excellent or good fitness evaluation level for 44.1%, pass for 47.6%, and fail for 8.4%; students of higher Fat% group achieve excellent or good fitness evaluation level for 6.3%, pass for 62.5%, and fail for 31.3%; students of obese Fat% group achieve excellent or good fitness evaluation level for 12.5%, pass for 37.5%, and fail for 50.0%.

Based on the number percentage of male students from four Fat% groups and their corresponding physical health evaluation level, a chi-square test analysis with the sports scientific research and data statistics processing system software package is made: through calculation χ^2=47.875(P<0.01, the results reveal that the number percentage of male students of various groups and their corresponding physical health evaluation level have very significant differences.

CONCLUSION

There are obvious differences of body functions and quality between male students in college with various level of Fat%, higher Fat% group has the best index of vital capacity and grip strength, students of lower Fat% group are obviously better than students of normal, higher and obese Fat% group in the other body functions and quality, while normal Fat% group is obviously better than higher and obese Fat% group.

There are obvious differences of physical health evaluation level between male students in college with various level of Fat%. Lower Fat% group has the highest percentage above good, followed by the normal Fat% group; obese Fat% group has the highest failure rates, and higher Fat% group is the second. Therefore, excessive Fat % will affect physical health of male students in college.

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REFERENCES

[1] China Obesity Research. *Chinese Journal of Integrative Medicine*. 18 (**1998**) 317-319.
[2] L. Wei, Y. Yu, X. Y. *Journal of Guangzhou Sport University*. 5 (**2009**) 108-111.
[3] S. Wang, Y. Wen. *China Sport Science and Technology*. 43 (**2007**) 72-74.
[4] S. Li. *Journal of Beijing University of Physical Education*. 25 (**2002**) 351-354.
[5] W. Liu, F. Li. *Journal of Physical Education*. 11 (**2004**) 52-55.
[6] Y. Zhao. *Journal of Shenyang Institute of Physical Education*. 123 (**2004**) 437-439.
[7] B. Sun, W. Jiang, Q. Tang. *Journal of Sports and Science*. 23 (**2002**) 56-63.