

A STUDY ON THE EYESIGHT OF STUDENTS WITH DIFFERENT BMI

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Abstract

Keywords:

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Purpose: The purpose of this article is to gain some insights into the relationship between college students' eyesight and their body mass indexes (BMI for short) through an investigation on the BMI and eyesight of all the students in Zhejiang Normal University. Methodology: In order to find out the status quo of students' eyesight and BMI and the relation between the two, the researcher did a close reading on the health reports of 1573 students from Zhejiang Normal University. Results: The study shows that the students whose BMI differ from each other also show a difference in their eyesight: 1 The average eyesight of the boy students who are underweight is notably worse than that of those who are overweight and who have a normal weight; Conclusion: Among the 1573 students whose health reports are studied in this research.

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1. Introduction

In recent years, the eyesight of Chinese students have become worse and worse. A survey on Chinese students' health shows that up to 40.9% of pupils, 67.3% of junior middle school students, 79.2% of senior middle school students and 84.7% of college students are nearsighted. The proportion of nearsighted students is so high and it rises continually as they age. The aggravation of students' average eyesight does not only do harm to their health but also influence their study and decrease their chances of getting employed. For this reason, effective prevention and treatment of students' nearsightedness have become one of the main tasks of the health care professionals in a school.

BMI, a calculated number based on one's height and weight, is an international standard used to judge whether one is too thin or too fat and whether one is well nourished.[1] It is equal to the weight, divided by the square of the height. The value of BMI not only affects other physical functions but also goes hand in hand with one's health. Poor eyesight is of course not without reasons. [2]Will or will not the BMI (a standard of nutrition) influence one's eyesight? [3]Studies on this issue are quite small in number, hence this research.

2. Research Method

2.1 Subjects

All the 1573 subjects are sophomores (enrolled in the year of 2011) from Zhejiang Normal University, aged from 19 to 22, among which 50.04%, i.e. 793 are boys and 49.96%, i.e. 780 are girls.

2.2 Methodology

2.2.1 Data collection

The researcher analyzed the eyesight, BMI and the mutual relation between the two according to the reports on those students' physical examination which is taken in 2015.

2.2.2 Data analysis

In the data analysis process, the software SPSS16.0 is used.

3. Results and Analysis

3.1 Status quo of Students' BMI

From table 1, we can find that the value of the participants' BMI falls between 15.14 and 31.49, and the mean value is 20.16 and the median is 19.83. Up to 69.74% of the participants have got a normal BMI and the peak value is 19 or so, which shows that the distribution is a normal one and the students' BMI in general are in good condition.

In the year of 1997, the WHO came up with a BMI standard for adults, according to which, the normal range for an adult's BMI should be 18.5~25, and if someone has an index lower than 18.5, he or she is underweight; if the value falls between 25 and 30, he or she is overweight and if the value is over 30, he or she has got obesity. If we compare the results here with this standard, we may find that the frequency distribution of these students' BMI is notably different from that of people of the same age and the mean BMI is much lower than the standard prescribed by WHO.[4]

While in June,2002, the Chinese health organization, the International Society of Life Science China agency, held a seminar on the topic of "On Obesity and Disease in China WGOC", on which another standard that varies from the standard by the WHO was formulated. According to the new standard, the normal range for an adult's BMI should be 18.5~24, and anyone who has an index lower than 18.5 is underweight and those whose BMI value falls between 24 and 30 are overweight and those who value is over 30 have got obesity. [8]The frequency distribution of these students' BMI is identical with this new standard.[5]

But it is particularly noticeable that the number of underweight students is much greater than overweight and obese students. (Table 1)

Table1 Frequency distribution of BMI

	underweight%	normal %	overweight %	obesity %
BMI standard (by WHO)	<18.5	$18.5 \leq \text{BMI} < 25$	$25 \leq \text{BMI} < 30$	≥ 30
1573 college students	410(26.06%)	1097(69.74%)	48 (3.05%)	18 (1.15%)

3.2 Frequency Distribution of Eyesight

Only when one's eyesight of both naked eyes is no less than 5.0, he or she got a normal eyesight; otherwise he or she is nearsighted: if the value is 4.9, we consider it as light nearsightedness; if it is between 4.6 and 4.8, we call it as moderate nearsightedness and if the value is lower than 4.5, it is severe nearsightedness.[6] The researcher found that up to 90.33% of all the investigators are nearsighted and the nearsightedness rate of students

from rural areas is slightly higher than that of students from cities, but the difference shows no statistic significance ($X^2 = 1.558798$, $P > 0.05$).

Table 2 also tells us that the nearsightedness rate of girl students is slightly higher than that of boy students, but the difference shows no statistic significance ($X^2 = 1.558798$, $P > 0.05$). Chinese experts in relevant fields find that the nearsightedness rate of girl students is notably higher than that of boy students in primary and middle schools, while the research finds out that as the students grow up, the difference tends to be less and less significant.

Table 2 Status quo of students' eyesight

		No.of students	No. Of nearsighted students	Rate of nearsightedness(%)	Chi-square value
hometown	cities	779	700	89.86	F=1.56 (P>0.05)
	rural areas	794	721	90.08	
sex	male	793	707	89.15	F=0.40 (P>0.05)
	femal e	780	714	91.54	
total		1573	1421	90.33	

3.3 Corelation between BMI and Eyesight

With the mean value as the middle point, we divided all the participants into four groups on the basis of the criteria we use in normal distribution: the 40% on the left of the mean value is group B2 (those who are slightly underweight); the 40% on the right of the mean value is group B3 (those who are slightly overweight); the left 10% on the left side is group B1 (those who are undernourished) and the left 10% on the right side is group B4 (those who are obese). Table 3 and 4 show that the eyesight of undernourished boys is remarkably lower than the other three groups and the eyesight of slightly underweight boys is remarkably higher than the other three groups.

3.3.1 Corelation between boy students' BMI and Eyesight

From table 3, you may notice that the eyesight of boy students with a BMI value lower than 17.20 is much lower that that of boy students with a BMI value higher than 24.00. The

P and F value shows great statistic significance of the eyesight difference of boys in the four groups: the eyesight of boys in Group B4 is better than that of boys in group B1, B2 and B3, and their eyesight in general becomes better as the BMI value goes higher.

Table 3 Eyesight difference of boys in different groups

Group	BMI	No. of students	of mean value	standard deviation	minimum	maximum	F value & P value
B1	<17.20	79	4.303	0.358	3.70	5.00	F=2.791
B2	17.20 ~ 20.49	317	4.435	0.350	3.70	5.20	P<0.05
B3	20.50 ~ 23.99	318	4.423	0.362	3.30	5.20	B4>B1 B4>B2
B4	>24.00	79	4.482	0.366	3.80	5.30	B4>B3
	Total	793	4.431	0.359	3.30	5.30	

3.3.2 Correlation between girl students' BMI and Eyesight

The correlation between girl students' BMI and eyesight is in some ways different from that between the boy students' BMI and eyesight. The P and F values show great statistic significance of the eyesight difference of girls in the four groups: the average eyesight value of Group B2 is higher than that of group Group B1 and B3 and Group B1 have got far better eyesight than Group B3 and their average eyesight value in general grows in a curve as the BMI value goes higher.

Table 4 Eyesight difference of girls in different groups

Group	BMI	No. of students	of Mean value	Standard deviation	minimum	maximum	F value & P value
B1	<15.99	78	4.385	0.352	3.70	5.15	F=3.351
B2	16.00 ~ 18.99	312	4.499	0.343	3.40	5.25	P<0.05
B3	19.00 ~ 21.99	312	4.428	0.322	3.50	5.30	B2>B1 B2>B3
B4	> 22.00	78	4.452	0.319	3.55	5.10	
	Total	780	4.452	0.334	3.40	5.30	

4Discussion

In this research, the frequency distribution of Chinese college students' BMI is consistent with the BMI standard for adults made by the Chinese Health Organization: the value of the participants' BMI falls between 15.14 and 31.49, and the mean value is 20.16 and the median is 19.83. Up to 69.74% of the participants have got a normal BMI and the peak value is 19 or so, which shows that the distribution is a normal one and the students' BMI in general are in good condition.[5]

According to the BMI standard for adults proposed by the WHO,[4] the normal range for an adult's BMI should be 18.5~25, and if someone has an index lower than 18.5, he or she is underweight; if the value falls between 25 and 30, he or she is overweight and if the value is over 30, he or she has got obesity.

But it is particularly noticeable that the rate of underweight students is much higher than that of overweight and obese students. College students have relatively regular living habits, which include having meals at the right time and doing exercise regularly, which, to some extent, help them stay in shape.

Current Condition of College Students' Eyesight

The nearsightedness rate this year is up to 90.33%, which is higher than the figure in the year before. As the living condition in rural areas improves, which owes to the development of economy in the countryside, the nearsightedness rate of students from cities and that of students from rural areas show no significant difference; [3]The nearsightedness rate of girl students is slightly higher than that of the opposite gender, which contrasts with the report that the rate of nearsightedness among girl is much lower than that of the opposite gender. [5]

The boy students in Group B3 (undernourished) have far worse eyesight than those in the other three groups and the girl students in B1 (slightly underweight) have much better eyesight than those in the other groups.

The reason why the eyesight of Group B3 is remarkably worse than the other three groups is that most boys like to be masculine, while the state of being underweight is caused by lack of nutrition and exercise and obesity is also caused by lack of sports. The students

with higher BMI values are confident with their health condition and take more chances to do sports and outdoor activities, thus they have relatively better eyesight.

The correlation between girl students' BMI and eyesight is in some ways different from that between the boy students' BMI and eyesight. The P and F values show great statistical significance of the eyesight difference of girls in the four groups: the average eyesight value of Group B2 is higher than that of group Group B1 and B3 and Group B1 have got far better eyesight than Group B3 and their average eyesight value in general grows in a curve as the BMI value goes higher.

Some scholars pointed out the cause of the curved growth in girl students' BMI value is that living in a society which considers slenderness as the soul of beauty, girl students feel the pressure to stay in shape, which in turn leads to the situation that most girls are not happy with their bodies. Thinking that they are "too fat", they tend to be too harsh on themselves: They go on a diet to keep slim, though it may not be necessary for them. [7] Thus, excessive pursuit of slenderness has become a factor that influences their eating habit and at the worst, it leads to a disease called Anorexia Nervosa. It works like a chain: a misunderstanding of beauty leads to girls' overpursuit of slenderness by eating less and too many snacks, which result in malnutrition. Now it is not surprising why girls in Group B2 have worse eyesight than girls in Group B1.

4. Conclusion

After the study, the research comes to the conclusion that one's BMI does have an effect on one's eyesight, while the ways it influences boys' eyesight and girls' eyesight are different. Malnutrition increases the probability of nearsightedness, especially when the influence of heredity factors on one's BMI is not so obvious, and BMI is an important indicator of one's status of nutrition. However, usually a high BMI comes from inheritance. Girls with relatively higher BMI are easy to be undernourished because they usually keep a diet for long to keep fit, which leads to the state of undernourishment.

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